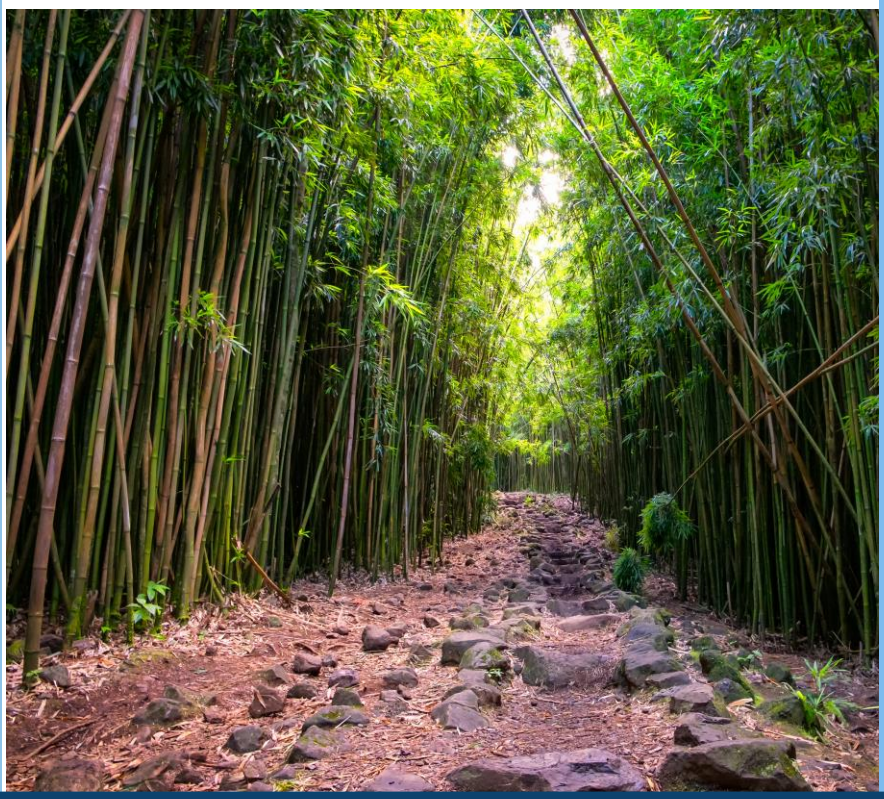

# KĀʻEO 2021 Operational Technical Report:
## Grade 3-8 HLA & Math
## Grades 5 & 8 Science

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# Chapter 1: Introduction

The state of Hawai‘i represents a linguistically and culturally diverse population. The state constitution identifies Hawaiian and English as the official languages of Hawai‘i in Article XV, Section 4, while Article XII, Section 7 ensures traditional and customary rights. These rights include, but are not limited to, the ability to use the Hawaiian language in home, school and business settings, and to access places and gather plants for use in traditional Hawaiian cultural practices. In addition, the state constitution (Article X, Section 4) mandates that the Hawaiian education system shall support and promote the study of Hawaiian language, culture, and history. Working with parents and Hawaiian leaders, the state established the Hawaiian Language Immersion Program, Ka Papahana Kaiapuni Hawai‘i (Kaiapuni). Kaiapuni students are instructed through the medium of the Hawaiian language using a language immersion framework. Currently, 27 Kaiapuni schools instruct over 3,000 students in dedicated classrooms or schools. Students receive instruction exclusively in Hawaiian through 5th grade after which English is introduced for one hour a day. From kindergarten to 12th grade, the medium of instruction is Hawaiian. Any parent can enroll their child as a student in the Kaiapuni schools.

As part of the state education system, Kaiapuni schools are required to comply with student testing requirements stipulated under the Every Student Succeeds Act (ESSA). For elementary and middle school students, the ESSA requires testing of students in reading/Hawaiian Language Arts each year; math in grades 3–8 and high school, and science in grades 5 and 8 and high school. Kaiapuni schools face a unique challenge when administering summative statewide assessments because Kaiapuni students are taught exclusively in Hawaiian through grade 4. In the past, the Hawai‘i Department of Education (HIDOE) implemented different assessment strategies for Kaiapuni students, including a portfolio assessment (the Hawaiian Aligned Portfolio Assessment) and a translation of the Hawaiian State Assessment. In the 2014–15 school year, the state of Hawai’i tested most students using the Smarter Balanced Assessment Consortium (SBAC) summative assessments, which do not offer a Hawaiian language translation (Figure 1.1).

Beginning with the 2014–15 school year, the HIDOE entered into a memorandum of agreement with the University of Hawai’i (UH) to develop the Kaiapuni Assessment of Educational Outcomes (KĀ‘EO). Starting in 2015, Kaiapuni students in grades 3 and 4 engage in technically rigorous, native-language assessments that are culturally appropriate, meet current psychometric standards, and are aligned with the requirements of the ESSA. Beginning in 2017, the HIDOE stipulated the addition of grades 5–8 to the KĀ‘EO assessment program. The results from these operational tests are covered in this technical report.

## Figure 1.1: Timeline

# KĀʻEO

Kaiapuni Assessment of Educational Outcomes

# Timeline

*Establishing cultural validity and fairness to ensure the use of results*

*Establishing technical qualities (e.g., reliability and validity) to meet U.S. Department of Education peer review requirements*

**2014-present**

Development of a Hawaiian language assessment (KĀʻEO) for students in grades 3-8.

Validity studies support technical and cultural validity (e.g., cognitive labs, theory of change, differential item functioning).

*Lacking evidence of cultural validity (e.g., concerns with translation)*

*Lacking fairness for grades 5-8*

*Sufficient technical qualities (e.g., reliability and validity) to meet USDOE peer review requirements*

**2010-2014**

Grade 3-4 Kaiapuni students return to a translated version of the Hawaiʻi State Assessment (HSA).

Grade 5-8 Kaiapuni students take English HSA.

Community concerns grow; participation decreases.

**2014**

The Board of Education redrafts Policies 2104 and 2105, which reconfirm the state's commitment to Hawaiian language and culture in every aspect of the education system, including assessment.

**2005-2011**

Development of the Hawaiʻi Aligned Portfolio Assessment (HAPA) in Hawaiian.

Grade 3-4 Kaiapuni students take culturally based test.

Grade 5-8 Kaiapuni students take English HSA.

Culturally and linguistically appropriate, HAPA is built in Hawaiian and grounded in Hawaiian priorities.

Technical qualities present challenges for USDOE peer review.

**2003-2005**

Grade 3-4 Kaiapuni students take translated test: the Hawaiʻi State Assessment (HSA).

Grade 5-8 Kaiapuni students take English HSA.

**2002**

Hawaiʻi adopts No Child Left Behind requirements for assessment.

**1987**

The State of Hawaiʻi Board of Education approves the Hawaiian Language Immersion Program.

Kaiapuni schools are founded.

**1978**

An amendment to the Hawaiʻi Constitution provides that "English and Hawaiian shall be the official languages of Hawaiʻi."

**1896**

The newly created Republic of Hawaiʻi enacts a law requiring English to be the sole medium of instruction in all public and private schools.

**1853**

Nearly three-fourths of the Native Hawaiian population over age 16 is literate in the Hawaiian language.

**1820**

Missionaries arrive in Hawaiʻi and form a written Hawaiian language.

*Sources for timeline events:*

*Hawaii State Department of Education. (n.d.) The foundational and administrative framework for kaiapuni education. https://www.hawaiipublicschools.org/TeachingAndLearning/StudentLearning/HawaiianEducation/Pages/FAFKE.aspx*

*Kaipoleimanu Kaʻawaloa, L. (2014). Translation v. tradition: Fighting for equal standardized testing ma ka ʻōlelo Hawaiʻi. University of Hawaiʻi Law Review, 36(2), 487-528. https://hawaiilawreview.com/*

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## 1.1. Theoretical Foundation for the Hawaiian Language Immersion Program and Assessment System

### 1.1.1. *Overview*

Language is the marker of identity, and has a vision of the past, present, and future; "Language not only transmits visions of the past but also expressions of social relationships, individual friendships as well as community knowledge, a wealth of organizing experiences, rules about social relationships plus ideas about art, craft, science, poetry, song, life, death and language itself" (Baker, 2011, p. 45). Learning what Skutnabb-Kangas (2009) terms a mother-tongue language, such as the Hawaiian language, is an act of reconnecting with ancestors, understanding one's current place in the world as indigenous peoples, and imagining the future of language, culture, and community through a Hawaiian-language lens. These benefits and rights have been confirmed by the United Nations Declaration on the Rights of Indigenous Peoples (2008).

Additionally, the benefits of bilingual education have been well-documented in the world of qualitative research (Baker, 1988, 2011; Cummins, 1981, 1986, 1999, 2000, 2003; Fishman, 1976; Hakuta & Gould, 1987; Hakuta, 1986; Skutnabb-Kangas, 2009). According to Garcia (2008), bilingual education (which includes the immersion model currently being followed by the Hawaiian Language Immersion Program) has the potential to be transformative, and can expand and stimulate the intellects of children and allow them to draw from a greater pool of knowledge and experiences than if they were monolingual. In addition, children who speak more than one language bring with them a wealth of experience and knowledge that enhances their learning: "Crossing cultural, social class, and language boundaries, students in a bilingual class develop multiple ways of solving human problems and approach ecological and social science issues from a cross-national perspective. These learners acquire deep academic proficiency in two languages, which becomes a valuable resource in adult professional life" (Thomas and Collier, December 1997/January 1998, p. 26).

The KĀ'EO was developed as a part of an international and national movement to support the education of native children. At the international level, in Aotearoa New Zealand, Ngā Whanaketanga Rumaki Māori were developed and implemented for Māori-medium schools in literacy and numeracy (see the New Zealand Ministry of Education website at minedu.govt.nz/theMinistry/EducationInitiatives/ NgaWhanaketangaRumakiMaori.aspx). Additionally, in Norway, an Action Plan for Sami Languages was developed by the Norwegian government to demonstrate its broad and long-term commitment to preserving the Sami language in all facets of life, including instruction in Sami in K–12 schools and teacher preparation programs (see the Norwegian Ministry of Labour and Social Inclusion Report at regjeringen.no/globalassets/upload/fad/vedlegg/ sami/hp_2009_samisk_sprak_engelsk.pdf).

Some examples of the national movement include the development of cultural standards for native children in Alaska via the Alaska Cultural Standards for Educators that were adopted by the Alaska State Board of Education and Early Development in 2010 (https://www.eed.state.ak.us/standards/pdf/cultural_standards.pdf) and the existence of the Office of Dine´ Standards, Curriculum & Assessment in the Navajo Nation (http://www.odclc.navajo-nsn.gov), which oversees the development and continuous improvement of the implementation of Dine´ language and culture in their schools. In addition, the Native Youth Report, released by the Executive Office of the President in 2014, recognizes that native students have languished under educational systems that have denied native communities educational self-determination, and giving native peoples more control over the education of their children is a key component of improving the life trajectories of native youth. This

report also articulates a commitment to better support native language revitalization through education, and recognizes the positive impacts that integrating native language and culture can have on a child's sense of identity, self-esteem, and educational achievement (www.whitehouse.gov/sites/default/files/docs/20141129nativeyouthreport_final.pdf).

In Hawai'i, the movement to revitalize the Hawaiian language in the education system is marked by a number of key events and policy changes, the most relevant of which was the movement to ensure the right to use Hawaiian as a medium of instruction: "By 1986, parents of children who spoke the Hawaiian language and advocates of the cause began entreating the State legislature to rescind the ninety-year-old Act 57, removing the last legal barrier to the creation of Hawaiian language immersion programs" (Kahumoku, 2000, p. 203). This was only possible because of a change in the state's constitution in 1978, whereby Hawaiian became one of the two official languages of the State of Hawai'i. More recently, the redraft of Board of Education Policy 105-8 reconfirmed the state's commitment to Hawaiian language and culture being present in every aspect of the education system, as well as highlighting the significance of Hawaiian immersion education in the state of Hawai'i. The alignment of this work with the larger movement towards improved academic outcomes for native students is clear; the value of this work lies in the direct impact it will have on not only Hawaiian immersion students, but also the state as a whole.

### 1.1.2. *Summative Assessment in the Kaiapuni Program*

A key consideration in assessment is the validity with which a key construct or domain is measured. Testing programs must ensure that students are able to access the material in the test. In order to best accommodate access, testing programs must consider and include appropriate methods to ensure that students can demonstrate their knowledge. These practices must reflect the most salient characteristics of the student population. The state of Hawai'i recognizes the intricate and integral roles language and culture play in the assessment process. Assessment practices and priorities are derived from the culture in which they are developed and are based on cultural and contextual assumptions (Solano-Flores, Trumbell, & Nelson-Barber, 2002; Solano-Flores, 2006). In addition, assessment by its very nature requires academic knowledge of the written or spoken language (Solano-Flores, 2012). These implications must be acknowledged when developing a test to ensure the valid measurement of the construct. If language and culture are not considered, the test could ultimately be measuring other domains, resulting in a biased assessment. Indeed, "the notions of constructive alignment between assessment, curriculum, and student and/or cultural responsiveness are key to the success of teaching and thus learning" (Keegan, Brown, & Hattie, 2013).

For the KĀ'EO, the development process first considered the assessment language. The language diversity of the Kaiapuni students varies based on their home language and time of entry into the Kaiapuni system. However, all students in 3rd and 4th grades are educated exclusively in Hawaiian. The language acquisition of emerging bilingual students presents a challenge to test development, but also an opportunity to explore ways to more appropriately engage and assess students. Research has shown that emerging bilinguals possess "cognitive and linguistic practices that differ from monolinguals" (Menken, Hudson, & Leung, 2014, p. 602), and that these traits and differences should be examined and evaluated independently in order to best understand their unique characteristics (Menken et al., 2014; Mislevy & Duran, 2014). Further, Solano-Flores & Trumbull (2003) state that these specific and unique mental processes of bilingual students should be a foremost concern in test development to ensure that students are interpreting the items as intended. In addition, research suggests that myriad problems can arise when students are

taught in one language and tested in another. Thus, a nexus should exist between the language of assessment and the language of instruction (Abedi et al., 2004; Keiffer et al., 2009).

Second, good assessment practices dictate the explicit consideration of culture. While assessments often reflect the values, beliefs, and priorities of the dominant culture (Padilla & Borsato, 2008), this can create potential bias for other students. The KĀʻEO allows for the overt inclusion of Hawaiian culture, experiences, and priorities in order to encompass a sociocultural view. "A sociocultural view of knowing accepts that there are cultural differences in the nature of learning, differences in what is viewed as valued knowledge and the way individuals connect with previous generations and draw on cultural legacies, often mediated by the cultural tools that they inherit" (Klenowski, 2009, p. 90). This allows for improved relevancy of the assessment material as well as student access to and engagement with this material.

Culture and language need to be understood and examined on an ongoing basis and in multiple ways throughout the assessment development and administration process (He & van de Vijver, 2012). For example, Padilla and Borsato (2008) recommend that community members should be involved in assessment development and that test developers should build their knowledge of customs and communication styles. Research supports the adoption of a "pluralist" approach to item writing, whereby items are created specifically for a cultural group to ensure greater sensitivity (Keegan, Brown, & Hattie, 2013). By doing this, test developers can build assessments that strive toward reducing bias because they have increased their sensitivity, knowledge, and understanding. Thus, considerations of culture and language were embedded throughout the development process. One critical method that was used entailed the engagement and involvement of stakeholders. The project included the widespread involvement of the Hawaiian community in the writing and review of items, Student Learning Outcomes (SLOs), scoring, and advisory groups.

### 1.1.3. *Inclusion*

Hawaiian immersion students had previously been included in the statewide assessment program that was built on a worldview and language derived from a majority perspective. A central tenet of the KĀʻEO is to develop a more valid measure for assessing immersion students by placing culture and language at the center of the assessment program. Thus, throughout the assessment development process, the program focused on building an assessment that would be more relevant and accessible to immersion students. This was accomplished because all the assessment development tasks – standards development, item writing, item review, scoring, and standard setting – encompassed a purposeful collaboration among teachers from across the islands. These educators contributed a vast amount of knowledge about their communities, variations in academic language, and educational philosophy, resulting in a sense of ownership of the process and the product, thereby garnering community support. The community ownership of the process supports the notion that the assessment has the potential to provide important academic achievement information to schools, teachers, parents, and the community that is grounded in the priorities of the Hawaiian people.

## 1.2. Initial Meetings and Project Plan

The development of the KĀʻEO started in the fall of 2014 (Table 1.1). In December 2014, the project team began initial meetings with staff members and assessment specialists to discuss elements of test design. A plan was developed that followed a foundation of assessment industry best practices (e.g., *Standards for Educational and*

*Psychological Testing, Revised 2014 edition* developed by American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME]). This plan included developing assessment purpose statements and blueprints, building high quality items, reporting results, and technical work (e.g., item analyses, standard setting) As the project has progressed, additional grades and content areas have been added (for additional details on the development process, see 2017 Technical Report).

**Table 1.1: Assessment Development Timeline**

| | |
|---|---|
| **2014** | • Assessment MOA between HIDOE and UH Manoa<br>• Content standards development for grade 3 and 4 math and HLA<br>• Identify and convene Kaiapuni advisory boards<br>• Initiate development of assessment technology framework<br>• Waiver from US DOE for math/LA double testing in English and Hawaiian<br>• Develop test blueprints for HLA/math<br>• Item writing and review |
| **2015** | • Continue item writing<br>• Develop administration, accommodation, and security procedures<br>• Spring and Fall field tests<br>• Administer surveys to participating educators on assessment and use feedback to improve the test<br>• Cognitive interviews<br>• Psychometric Analyses<br>• Alignment of Math and LA standards to the CCSS |
| **2016** | • Grade 4 science standards development<br>• Develop science assessment blueprints<br>• Science item writing and review<br>• Grade 4 science field test<br>• Grade 3 and 4 math/HLA operational assessments<br>• Cognitive interviews<br>• Psychometric analyses<br>• Alignment of items to standards (math/HLA)<br>• Standard setting workshop (math/HLA)<br>• Results<br>• Develop parent, school, teacher reports |
| **2017** | • US DOE Peer review for grades 3-4 assessments<br>• Additional item writing and review grades 3 and 4<br>• Grade 3 and 4 operational assessments in math/HLA; and grade 4 science<br>• External validity study<br>• Science standard setting<br>• Science items to standards alignment<br>• Score reporting for all content areas<br>• Item writing for grades 5-8 math/HLA and grade 8 science |
| **2018** | • Grade 3 and 4 operational assessments in math/HLA; and grade 4 science<br>• Grades 5-8 field test in math/HLA and grade 8 science<br>• Additional item writing and review for all content areas<br>• Cognitive interviews<br>• External validity study<br>• Score reporting for grades 3-4 in all content areas<br>• Grades 3-4 equating study. |

| | |
|---|---|
| | • Grades 5-8 standard setting.<br>• Grades 3-4 External validity study finalized.<br>• Continued item development<br>• Development and field testing of Grade 5 science assessment<br>• Score reporting for grades 3-4 in all content areas.<br>• US DOE Peer review for grades 5-8 assessments |
| **2019** | • Grade 3 - 8 math/HLA & Grade 8 Science operational assessments<br>• Grades 3-4 equating Study<br>• Grades 5-8 standard setting<br>• External validity study finalized<br>• Continued item development<br>• Development and field testing of Grade 5 science assessment<br>• Score reporting for grades 3-4 in all content areas<br>• US DOE Peer review for grades 5-8 assessments |
| **2020** | • ESSA waiver cancelled test administration<br>• Item bias and sensitivity review<br>• Continued Item writing |
| **2021** | • Grade 5 science operational field test assessment first administration<br>• Grade 3 - 8 math/HLA & Grade 8 Science operational assessments<br>• Grade 5 Science Alignment study<br>• Grade 5 Science Preliminary Standard Setting<br>• Score reporting for all grades and content areas<br>• Continued item development<br>• Refresh grades 3-4 and release items.<br>• US DOE Peer review for grades 5 science assessment<br>• Retirement of Grade 4 Science assessment |
| **2022** | • Grade 3 - 8 math/HLA & Grades 5 & 8 Science operational assessments<br>• Grades 5-8 equating study<br>• Score reporting for all grades and content areas<br>• Continued item development |
| **2023** | • Grade 3 - 8 math/HLA & Grades 5 & 8 Science operational assessments<br>• Grade 5 Science Standard Setting<br>• Score reporting for all grades and content areas<br>• Continued item development |

## 1.3. Framing Documents

The project team was committed to generating an assessment that was both technically rigorous and supported by the community. To facilitate the process, the team purposefully considered materials generated by the Next Generation Science Standards (NGSS) and general assessment materials from the SBAC. These resources included:

- Item writing guidance
- Item review guidance
- Rubric development
- SBAC assessment blueprints
- Reading and listening passage review guidance
- Assessment Claims and Targets in mathematics

- Achievement level descriptors (ALDs) and threshold descriptors for 3rd and 4th grades
- Guidance on universal design (UD) and technology-based assessment.

By considering these materials as a starting point, the team was able to collaborate with community members to adapt the materials, which streamlined the development effort in contrast to developing all new materials. In addition, these documents provided information that gave the work a firm foundation and prioritized content in a manner that was both thoughtful and thorough. This process ensured that the assessments were based on a unified set of standards, resources, and materials, as adopted by Hawai'i's Board of Education. Throughout this report, these documents are referenced and describe how they were used to inform the work.

## 1.4. Purpose of this Report

The purpose of this report is to provide documentation of the development processes, methodologies, and progress up to the 2021 test cycle. The report includes information on the assessments' validity and reliability including developing assessment blueprints, item writing and review, computer-based administration, educator and student surveys, scoring procedures, and analysis of the test items.

### 1.4.1. *UH KĀ'EO Assessment Staff*

The UH staff is responsible for the oversight of the project, coordination of teams, and implementation of assessment tasks.

- Dr. Pohai Kukea Shultz: Principal Investigator
- 'Ulu Victor: Hawaiian language, math, and science specialist
- Keli'i Ruth: Hawaiian language, math, and language arts specialist
- Nicholas Lum: Hawaiian language and Hawaiian language arts specialist
- Lindsey Ching: Hawaiian language specialist, project manager
- Patrick Karjala: programmer

### 1.4.2. *KĀ'EO Technical Team*

The technical team supports the ongoing work of the project including psychometrics and technical considerations (e.g., item writing). The team also supports special studies including standard setting and alignment.

- Ms. Jessica Allen; psychometrician
- Mr. Frank Brockmann: Content development, reporting, information manager
- Dr. Karla Egan: Standard setting and overall technical consultant
- Dr. Kerry Englert: Lead psychometrician
- Ms. Monique Fountain: Analyst
- Dr. Bruce Randel: Psychometrician, alignment, technical consultant
- Dr. Linda Oshita: Special education, universal design
- Dr. Phoebe Winter: Peer review and technical consultant

The UH KĀ'EO Assessment Staff and the KĀ'EO Technical Team make up the KĀ'EO Assessment Team and execute the design of every aspect of the KĀ'EO development.

### 1.4.3. *Hawai‘i Department of Education Technical Advisory Committee (HIDOE TAC)*

The HIDOE TAC is the primary technical advisory committee for all State of Hawai‘i assessments. The KĀ‘EO assessment is just one of many assessments in the Hawai‘i assessment portfolio.

- Dr. Lauress Wise (chair)
- Dr. Martha Thurlow
- Dr. Gage Kingsbury
- Dr. Tony Alpert
- Dr. Guillermo Solano-Flores

# Chapter 2: Theory of Action

The KĀʻEO is founded on the idea that the assessment will facilitate meaningful changes in instruction by providing teachers, parents, and community members with information about student achievement. The development process has sought to bring together members of the community at every milestone including developing crosswalks, item writing, item review, alignment, standard setting, and cognitive interviews. It is through these events that educators provide meaningful input into the assessment development process as well as engaging with each other in discourse about student learning and instruction. This process allows for ongoing reflection and collaboration, which facilitates opportunities for changes throughout the development process.

A "theory of action" was first developed to talk about the major goals and specific outcomes that might emerge from the process. A theory of action offers a straightforward process for generating broad goals based on expectations. The project team considered several models that informed the development of the KĀʻEO theory of action, including the SBAC theory of action (files.eric.ed.gov/fulltext/ED536956.pdf). These documents informed the types of goals and processes that might be included in the development of the KĀʻEO theory of action.

Throughout the early meetings, participants including teachers, administrators, and advisory board members were asked about their greatest hopes and fears. This open exchange allowed for shared expectations of the assessment development process. UH KĀʻEO Assessment staff used the ideas expressed during these meetings to begin generating a theory of action (see Appendix A). The theory of action was developed by identifying salient themes and synthesizing the most important ideas that were gathered from all stakeholders. UH KĀʻEO assessment staff looked at a number of theory of action models to determine which model would be most appropriate from a Hawaiian cultural perspective, as well as to gain an understanding of the unique aspects of this theory. Then, a document was created defining the specific purposes and goals of the process (see Appendix B). The most important aspect of the process of creating a theory of action and purpose statements was that it was conducted in Hawaiian from start to finish to ensure that the foundation of these assessments was situated firmly in a Hawaiian worldview, thereby strengthening the validity of the assessments for Hawaiian community stakeholders.

# Chapter 3: Grounding the Assessment in a Validity Argument

The AERA, APA, and NCME state that "validity refers to the degree to which evidence and theory support the interpretations of test scores for the proposed uses of tests" (AERA/APA/NCME, 2014, p. 11). Education researchers and psychometricians view validity as a central concern when constructing and evaluating assessments. At its essence, validity evidence conveys the degree to which an assessment provides information on a given topic for a given purpose. However, validity is not a property of the test itself. Rather, it is an evaluation of how test scores are interpreted compared with the intended uses of those scores. This type of evaluation implies that a definitive "yes" or "no" answer is never the outcome (nor the intended goal) of validity research. Rather, validity presents evidence supporting or refuting a test's usefulness for the proposed purposes. This means that test validation is never complete, and validity should be revisited and amended over time as more data are collected in relation to test scores and the proposed uses change.

Constructing a validity argument is a complex process, and this was especially so in relation to this project. There is very little research describing how to build validity studies for an assessment based in a native language, particularly one that supports a program of cultural immersion (Solano-Flores, 2011). In this report, we present validity as an argument-based approach because this provides a framework for the ongoing evaluation of threats to, and assumptions about, validity. "The argument-based approach to validation adopts the interpretive argument as the framework for collecting and presenting validity evidence and seeks to provide convincing evidence for its inferences and assumptions, especially its most questionable assumptions" (Kane, 1992, p. 527). Throughout the report, we propose studies to build evidence in support of our validity arguments. In addition, we seek to develop questions that might help to identify misinterpretations and counterfactuals that potentially threaten validity.

## 3.1. Validity Concepts

The following validity concepts form the foundation of the **current and proposed** validity work:

***Use and Interpretation.*** Perhaps the main validity issue for this study, is to develop evidence in support of the intended uses and interpretations of the assessment results. Messick asserts that validity is "an integrated evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores or other modes of assessment" (Messick, 1989, p. 13). This complex schema provides a deeper understanding of the measures and the underlying constructs, which are crucial to the building of theories and the progression of knowledge. Included in this type of validity evidence is a detailed development of the purposes of the assessment system, theory of action, and examination of the alignment of these concepts across the system.

***Content validity.*** Evidence based on content is central to supporting the validity claims of the assessments. In other words, does the instrument sufficiently represent the key content associated with student achievement in the Kaiapuni academic content standards? It is not sufficient to merely examine correlational evidence to determine whether a test validly predicts a behavior or whether the content of a particular curriculum is represented by a test. Rather, we need to understand *what* dimensions are measured by the test and why. While this process can entail collecting content and predictive evidence, validity studies must move beyond this to focus on critically assessing the test and challenging ourselves and our conceptions to arrive at different hypotheses. These hypotheses must be scrutinized and challenged in search of other plausible interpretations of test scores.

***Reliability.*** Reliability plays an important role in providing evidence in support of validity. Reliability evidence provides information regarding the consistency of information obtained from a measure over repeated observations (Kane, 2006). Thus, the degree to which an instrument can produce consistent results speaks to its importance within the domain of validity – an instrument's validity evidence is compromised if its results vary in ways that are not consistent with the participants' true scores. This becomes critical when looking at the implementation of the KĀ'EO because the consistency of the information impacts the utility of the measure used for making decisions based on accurate results.

***Construct Validity (Internal and External Validity).*** Construct validity also plays a central role in better understanding the technical qualities of the instrument. Construct validity is a broad category that focuses on the importance of the inferences from and interpretations of scores, and involves going beyond simple predictions or assessment of the content domain. Other aspects of validity such as concurrent, predictive, discriminant, and convergent validity are subsumed under construct validation as "data collection and data analysis strategies" (Angoff, 1988, p. 28) and include an examination of construct-irrelevant variance or construct underrepresentation (Brualdi, 1999). The applications of these processes provide evidence of how well the test conforms to or measures the underlying construct. While this term can be quite broad in its application, we focus our discussion of construct validity on an examination of issues such as internal consistency and relationships with external factors. Therefore, we propose to examine the dimensionality of the assessment, the correlational patterns of items, and the relationships between scores and other factors.

***Cultural Validity (including Fairness and Bias).*** While the abovementioned concepts are typical considerations in assessment development, a central tenet of the system is that the KĀ'EO provides a more accurate and fairer measure for students who are educated in Hawaiian immersion schools. As such, the system must deeply consider cultural validity.

The KĀ'EO program is uniquely grounded in the language, culture, and worldview of the Hawaiian immersion community. These factors play intricate and integral roles in the assessment process, thus necessitating a broader approach to the examination of validity. Because assessment practices and priorities are derived from the culture in which they are developed and are based on cultural and contextual assumptions, all aspects of testing should reflect an underlying consideration of the learner, the learning process and context, and the content being measured. These considerations place the onus on development staff to account for culture and language because they directly impact the construct on which the test is based and that it will measure. If these factors are not considered, the test could ultimately be measuring other constructs such as knowledge of the dominant culture. This could result in the introduction of construct-irrelevant variance and a biased assessment, which can have in negative consequences for students.

While culture is certainly considered in the assessment literature (AERA/APA/NCME, 2014), it is often viewed as a threat to validity as opposed to something worthy of intrinsic consideration as an aspect of validity (Solano-Flores, 2011). Kirkhart (2016) argues that validity in itself is culturally situated and, as such, should be central to any validity study to ensure sensitive and accurate measurement. The KĀ'EO Assessment Team recognizes that culture is a complex factor, and there are no easy or established methods that enable direct consideration of cultural validity (Solano-Flores, 2011). However, this does not diminish the need for its consideration. Researchers need to build comprehensive validity arguments that reflect their priorities in relation to the use of the data. For example, one purpose of the KĀ'EO assessment system is to honor and preserve the values of the community (e.g., aloha) and

the Hawaiian language as they are taught in schools. If researchers fail to think broadly about validity and the degree to which an assessment embodies cultural priorities, it can result in the marginalization of some participants.

Solano-Flores discusses the distinct contribution of, and provides a definition for, cultural validity in stating that it represents "the effectiveness with which […] assessment addresses the sociocultural influences that shape student thinking and the ways in which students make sense of […] items and respond to them" (Solano-Flores, 2011, p. 3, citing Solano-Flores and Nelson-Barber, 2001). This includes an array of considerations including language, worldview, teaching and learning, and values. Grounding research on a foundation of cultural validity can expand our perception of the traditional concept of validity by providing perspective and focus for our validity argument.

We propose that cultural validity is not a distinct type of validity, but rather is something that underpins the entire concept of validity. Thus, each time a validity study is developed as a part of the KĀʻEO system, we consider the ways in which language and culture form a part of the validity argument. The validity study advances the ways in which we think about the complexities involved in cultural validity, which are informed by worldview, learning styles, and community (Solano-Flores & Nelson-Barber, 2001). "Ideally, if cultural validity issues were addressed properly at the inception of an assessment … there would be no cultural bias and providing accommodations for cultural minorities would not be necessary" (Solano-Flores & Nelson-Barber, 2001, p. 557). Thus, true cultural validity goes beyond fairness and equal educational opportunity to consider culture and language via the purposeful involvement of the community. This ensures transparency, buy-in, and ownership by the community, and promotes a level of validity that cannot be achieved using traditional methods.

When this approach is adopted, validity studies become more actionable and focused. As part of our validity studies, we include specific discussions about language and culture, and always include as many educators and community members as possible based on the study context. For example, our alignment studies included teachers who were knowledgeable about Hawaiian immersion instruction, as well as culture, and thus were uniquely qualified to make informed judgements in these areas.

## 3.2. Validity Argument

The concept of validity is often promoted as an ongoing argument that continually seeks to gather evidence as a means of improving instruments and their associated interpretations. However, this is often infeasible, and validity studies must consider the limits and priorities inherent in the situation. Therefore, the UH KĀʻEO assessment team and KĀʻEO Technical Team attempt to strike a balance that relies on stakeholder priorities and the community's perspective and worldview, coupled with rigorous technical processes. The goal is to provide the UH KĀʻEO assessment team with pertinent information that they can use to determine the strengths of the assessment, as well as providing ideas for future improvement. Some of the potential priorities included in the purpose statements and theory of action not only include summative and formative uses of the system, but also aim to ensure fairness, consistency, accurate feedback, and education improvement. This work considers the priorities of stakeholders, as well as a variety of technical guidance (AERA/APA/NCME, 2014; Gullickson, 2008; Kane, 2006; Messick, 1989).

With regard to technical quality, the team has and will continue to examine the validity evidence pertaining to the assessment within several technical areas of validity that we believe to be particularly relevant to supporting this assessment. Based on the purposes and uses of the system, we to collect evidence in the following main areas: content-based validity, validity based on cognitive processes, internal validity, external validity, reliability, and fairness and bias (including cultural validity). While we present these aspects of validity as distinct categories, we

recognize their interconnectedness. For example, it is difficult, if not impossible, to correctly interpret a score if the score does not adequately represent the intended content.

The validity framework is guided by both professional standards (AERA/APA/NCME, 2014) and US Department of Education (DOE) peer review guidance (US DOE, 2018). These guidelines suggest potential topics of consideration for a validity agenda including examining the content of the assessments and alignment to standards/student learning objectives, construct validity (e.g., patterns in correlations between and across different factors, unidimensionality of the assessment), bias review, standard setting, classification accuracy and consistency, and fairness (e.g., differential item functioning).

As with any assessment, validity plays an important role in laying out the development and research tasks. The US DOE peer review guidance specifies a range of documentation that is needed to support the validity of inferences from and uses of an assessment. The research team used the US DOE peer review guidance as a framework to ensure that we addressed a range of priorities. The tasks listed in Tables 1–6 provide guidance to the development team regarding priorities and the data that must be collected. It is also important to note that cultural validity is embedded throughout the development and research efforts as an ongoing validity consideration.

Table 3.1 presents an overall framework for the validity argument, specifying the different types of validity evidence that are aligned with the intended purposes of the assessment system. Tables 2–6 list the sources of supporting evidence for each type of validity.

**Table 3.1: Assessment Purpose Aligned with each Type of Validity Evidence**

| Purpose Statement | Content Validity | Validity Based on Cognitive Processes | Internal Validity | External Validity | Additional Technical Evidence (reliability, fairness) |
|---|---|---|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.** | X | X | X | X | X |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in the classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | X | X | X | X | X |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | X | X | X | X | X |

The assessment purposes specifically reflect the importance of informing stakeholders about student achievement in important content areas in math, language arts, and science. In order to ensure that these purposes are supported, a key focus of the development is ensuring the appropriate representation of content (Table 3.2). As defined by the standards, content validity information is "evidence based on test content that supports the intended interpretations of the test" (AERA/APA/NCME, 2014, p. 218).

### Table 3.2: Summary of Content Validity Evidence

| Purpose Statement | Summary | Chapter(s) | Evidence |
|---|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.** | • Systematic construction of assessments including blueprints, item development and representing cognitive complexity.<br>• All development tasks were completed with broad community support and involvement. | • Test development<br>• Item and test analyses | • Item development<br>• Blueprints<br>• Meeting notes<br>• Meeting attendance records<br>• Meeting agendas<br>• Blueprint review<br>• Model fit statistics<br>• Alignment studies<br>• Standard setting<br>• Achievement level descriptors |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | • Systematic construction of assessments including blueprints and item development reflects the breadth and depth of the intended content standards.<br>• All development tasks were completed with broad community support and involvement. | • Test development<br>• Item and test analyses | • Item development<br>• Blueprints<br>• Meeting notes<br>• Meeting attendance records<br>• Meeting agendas<br>• Blueprint review<br>• Model fit statistics<br>• Alignment studies<br>• Standard setting<br>• Achievement level descriptors |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | • All development tasks were completed with broad community support and involvement. | • Test development<br>• Kaiapuni SLO development<br>• Theory of action | • Meeting notes<br>• Meeting attendance records<br>• Meeting agendas<br>• Blueprint review<br>• Alignment studies<br>• Standard setting |

One purpose of the KĀ'EO testing program is to specifically measure Hawaiian immersion students' performance in HLA, math, and science. The testing program provides a unique opportunity to develop assessments that reflect the priorities and needs of the Hawaiian immersion community. In doing so, the assessment program faces a unique context for the development and implementation of test items. A central issue is making sure that the assessment taps student achievement in these domains while minimizing the effects of irrelevant constructs. As such, the test development process considers multiple methods for evaluating the assessment items and the degree to which students can access each item based on cognitive processes (Table 3.3).

### Table 3.3: Summary of Validity Evidence Based on Cognitive Processes

| Purpose Statement | Summary | Chapter(s) | Notes |
|---|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community** | • Cognitive testing showed that students were interpreting the items as anticipated across different student groups (e.g., special education, language background).<br>• Teacher review of items (e.g., bias, content, depth of knowledge) indicated that the items measure | • Special studies<br>• Test development | Additional validity studies will be conducted in 2022 to examine data related to cognitive processes. These studies will include collecting and comparing information from teachers about the degree to which they believe their students can think deeply and critically on complex assessment tasks |

| | | | |
|---|---|---|---|
| **accountability as well as for state and federal accountability.** | content in a way that all students will interpret consistently. | | relative to students' performance on those tasks. |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | • Cognitive testing showed that students were interpreting the items as anticipated across different student groups (e.g., special education, language background).<br>• Teacher review of items (e.g., bias, content, depth of knowledge) indicated that the items measure content in a way that all students will interpret consistently. | • Special studies<br>• Test development | Additional validity studies will be conducted in 2022 to examine data cognitive processes. This study will include collecting and comparing information from teachers about the degree to which their students can think deeply and critically on complex assessment tasks relative to students' performance on those tasks. |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | • Teacher review of items (e.g., bias, content, depth of knowledge) indicated that the items measure content in a way that all students will interpret consistently. | • Test development | |

Construct validity addresses the degree to which the test conforms to or measures the underlying construct or trait that is the target of the measure. This is often a statistical argument that focuses on such evidence as internal consistency in scores, relationships between scores and external factors, and score patterns. Evidence of internal validity can support the claim that the test conforms to or measures the underlying construct or trait that is the target of the measure (see Table 3.4).

### Table 3.4: Summary of Internal Validity Evidence

| Purpose Statement | Summary | Chapter |
|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.** | • Analyses that show the internal content is consistent with the content standards.<br>• Differential item functioning that shows the items perform the same way for different groups. | • Item and test analyses<br>• Special studies |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | • Analyses that show the internal content is consistent with the content standards.<br>• Differential item functioning that shows the items perform the same way for different groups. | • Item and test analyses<br>• Special studies |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | | • Item and test analyses<br>• Special studies |

Similar to internal validity, external validity supports the assessment by providing information on the degree to which the assessment reflects key content by relating scores to other similar variables. This type of evidence is typically generated by examining the relationships between assessment scores and scores from other similar assessments (e.g., the state assessment system and the NAEP, TIMMS, college readiness assessments, and the NWEA). However, there are no similar Hawaiian language assessments with which to make these comparisons, and so additional data is collected to enable comparisons to be made (see Table 3.5). One important point to note is that

the KĀʻEO program considered Smarter Balanced and NGSS materials throughout the development process (e.g., blueprints, ALDs, and reports) to provide a grounding framework for the KĀʻEO.

**Table 3.5: Summary of External Validity Evidence**

| Purpose Statement | Summary | Chapter | Notes |
|---|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.** | • The assessment structures were informed by Smarter Balanced materials including blueprints and performance standards.<br>• Additional validity study | • Introduction<br>• Special studies | This type of evidence is typically generated by examining the relationships between assessment scores and scores from other similar assessments. However, there are no similar Hawaiian language assessments by which to make these comparisons. The research team is developing a plan to examine relationships between KĀʻEO scores and teacher ratings of student proficiency. |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | • The assessment structures were informed by Smarter Balanced materials including blueprints and performance standards.<br>• Additional validity study | • Introduction<br>• Special studies | |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | • Additional validity study | • Special studies | |

Generating additional technical information is necessary to ensure the adequacy of the assessments in supporting the purpose statements, as well as evaluating the assessments for continued improvement. Table 3.6 outlines the evidence that was generated to support other technical qualities of the assessment including reliability, fairness, and rigorous scoring methods in support of the test purposes. Standard 4.0 of the AERA/APA/NCME standards states that "Test developers and publishers should document steps taken during the design and development process to provide evidence of fairness, reliability, and validity for intended uses for individuals in the intended examinee population" (AERA/APA/NCME, 2014, p. 85).

### Table 3.6: Summary of Additional Evidence

| Purpose Statement | Summary | Chapter | Notes |
|---|---|---|---|
| **To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.** | • Classical test theory (CTT) reliability statistics, Rasch reliability statistics (reliability, item and person separation statistics)<br>• Conditional standard error of measurement (CSEM)<br>• Test information function (TIF)<br>• Decision consistency<br>• Differential item functioning (DIF)<br>• Item writing and review<br>• Cognitive interviews<br>• Item specifications<br>• Usability and comparability studies<br>• Item by person distributions<br>• Scoring information | • Item and test analyses<br>• Special studies<br>• Test development | The analysis plan includes an in-depth examination of the items and test which includes Rasch, classical test theory (CTT) analyses, and descriptive statistics. |
| **To provide an appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.** | • CTT reliability statistics, Rasch reliability statistics (reliability, item and person separation statistics)<br>• Conditional standard error of measurement (CSEM)<br>• Test information function (TIF)<br>• Decision consistency<br>• Differential item functioning (DIF)<br>• Item writing and review<br>• Cognitive interviews<br>• Item specifications<br>• Usability and comparability studies<br>• Item by person distributions<br>• Scoring information | • Item and test analyses<br>• Special studies<br>• Test development | |
| **The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.** | • Item writing and review<br>• Cognitive interviews<br>• Item specifications<br>• Usability and comparability studies | • Item and test analyses<br>• Special studies<br>• Test development | |

# Chapter 4: Content Standards

As mentioned in Chapter 1, the state constitution names Hawaiian and English as official languages of Hawai‘i (Article XV, Section 4). This provides students in the State of Hawai‘i with a unique opportunity to follow one of two language pathways in their educational journey – either in an English medium setting or a Hawaiian medium setting. Furthermore, because the State of Hawai'i Board of Education has adopted a unified set of standards, the Hawai'i Department of Education (HIDOE) has ensured that students are fairly and appropriately assessed in their medium of instruction (either Hawaiian or English). As such, the use of the Kaiapuni SLOs was done to ensure that while the standards and assessments were built in two distinct languages, that these assessments were founded on the unified set of state standards. Starting in 2015, the assessment program focused on developing assessments for Hawaiian language arts (HLA) and mathematics (HIDOE, August 7, 2020).

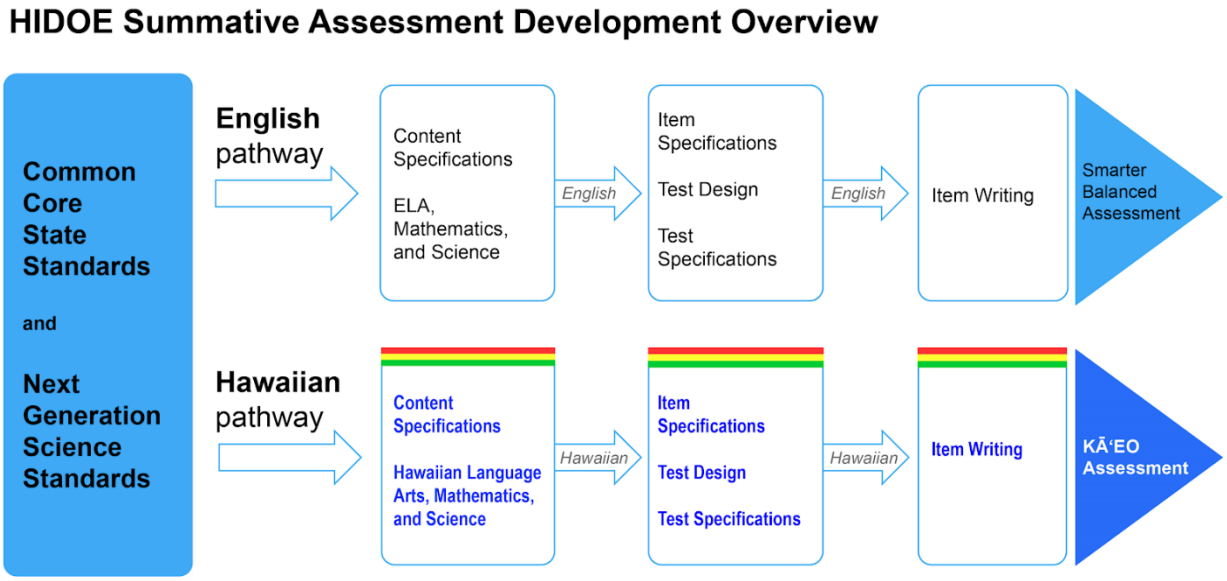
This policy further states that HIDOE develop curriculum and standards to prepare students for college, career, and community contribution. To do this, HIDOE adopted a single set of standards (the CCSS) with two language paths: English and Hawaiian. The adoption of a single set of standards ensures that schools are teaching to the same expectations regardless of the language of instruction. This same set of expectations ensures that students are able to transition between language pathways.

The Common Core State Standards (CCSS) and the Next Generation Science Standards (NGSS) have always been central to the development of KĀ‘EO. Students in the Hawaiian Language Immersion program, like students in all Hawaii public schools, are held to the expectations (the content and cognitive processes) of the CCSS and NGSS. As such, the standards have been foundational to the development of the KĀ‘EO, and HIDOE developed the Kaiapuni SLOs to specify how the standards would be represented on KĀ‘EO. By providing a way to guide item writers in developing items aligned to the standards in the Hawaiian language, the Kaiapuni SLOs have served as tool to ensure content developers are consistent in their use of Hawaiian in terms of accuracy, phrasing, terminology, and fidelity to cultural norms and values as expressed through the use of the language.

The KĀ‘EO Content Specifications (2019-2020) document(s) describe the interrelationships between the standards, the Kaiapuni SLOs, and KĀ‘EO item development. UH developed these specifications, in part, to help clarify existing relationships between test development documentation and the CCSS. Per AERA standards, content specification documents are important because they allow for a specification of the "content, skills, processes, and diagnostic features" (p. 76) of the assessment. Similarly, SBAC has a content specification document (SBAC Content Specifications for the Summative Assessment, 2015) aimed at describing the relationship between CCSS, the skills and content targeted for assessment, and the broader goals and objectives of SBAC test content development.

Student Learning Outcomes (SLOs) are a critical component of the KĀ‘EO Content Specifications. The use of the term "SLO" within these specifications is a direct reference to the original contract between HIDOE and UH to develop KĀ‘EO, which called for the development and adoption of Student Learning Outcomes. As such, "SLO" is now the preferred term, as it provides a more clear and accurate description of the place of these KĀ‘EO-specific learning outcomes within the larger context of KĀ‘EO's content specifications. (NOTE: During the transition from the previous documentation to the Content Specifications documentation, however, the terms "KĀ‘EO SLOs" and "Kaiapuni Standards" may be treated synonymously) (Figure 4.1).

## Figure 4.1: HIDOE Summative Assessment Development Overview




reference: adapted from the *Content Specifications for the Summative Assessment of the Common Core State Standards*, accessible at: *http://www.smarterbalanced.org/wp-content/uploads/2015/08/ELA_Content_Specs.pdf*

# Chapter 5: Test Content Development

The careful development of test content is one of the most critical steps in creating a high-quality assessment. A high-quality test development process assures that test blueprints adhere to test specifications, items are written to align to test blueprints and content standards, and forms are selected to align to test blueprints.

Content-related validity, a primary concern of high-quality testing programs, depends on a strong and demonstrable relationship between the test content standards and the specifications of the content domain. The following excerpts from *Standards for Educational and Psychological Testing* (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014) describe the relationship:

> **Standard 4.0** Tests and testing programs should be designed and developed in a way that supports the validity of interpretations of the test scores for their intended uses. (APA, AREA, NCME, 2014, p. 85)
>
> **Standard 4.12** Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications. (APA, AREA, NCME, 2014, p. 89)

AERA/APA/NCME (2014) also describes the responsibilities of test developers, including the careful and ongoing consideration of the examinee population and its characteristics:

> **Standard 3.2.1** Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (APA, AREA, NCME, 2014, p. 64)
>
> **Standard 4.0** Test developers and publishers should document steps taken during the design and development process to provide evidence of fairness, reliability, and validity for intended uses for individuals in the intended examinee population. (APA, AREA, NCME, 2014, p. 85)

To this end, the Kaiapuni Assessment of Educational Outcomes (KĀʻEO) offered a unique opportunity to develop a psychometrically rigorous assessment in the context of the Hawaiian language and culture.

## 5.1. Collaborative, Community-Based Approach to Test Development

Community and collaboration are important components of Hawaiian culture. The KĀʻEO test development process reflected these aspects of Hawaiian culture, in that it was created with the explicit inclusion and involvement of community members, educators, technical experts, and UH KĀʻEO Assessment staff. These experts were included at every step in the project to ensure the quality and relevancy of the assessment. Such steps included item writing, item review, standards and alignment review, and scoring, all of which were led and facilitated by the UH KĀʻEO assessment team staff and external experts. The development of the assessment was only possible through this collaborative structure and dedicated community involvement.

Figure 5.1 provides an overview of the test development cycle for the KĀʻEO. In this chapter, the steps specific to test content development are described in detail, from the creation of Kaiapuni test specifications to the selection of operational test forms. At every development juncture, the KĀʻEO utilized many of the resources and research

generated by the Smarter Balanced Assessment Consortium (SBAC) and NGSS guidance for science. These resources included:

- SBAC assessment blueprints;
- Item writing guidance;
- Item review guidance;
- Reading and listening passage review guidance;
- Assessment Claims and Targets in mathematics;
- Achievement level descriptors (ALD) and threshold descriptors for 3rd and 4th grade; and
- Guidance on Universal Design (UD) and technology-based assessment.

**Figure 5.1: Test Development Cycle for KĀʻEO**

## 5.2. KĀʻEO Test Specifications

AERA/APA/NCME (2014) Standard 4.1 states the following:

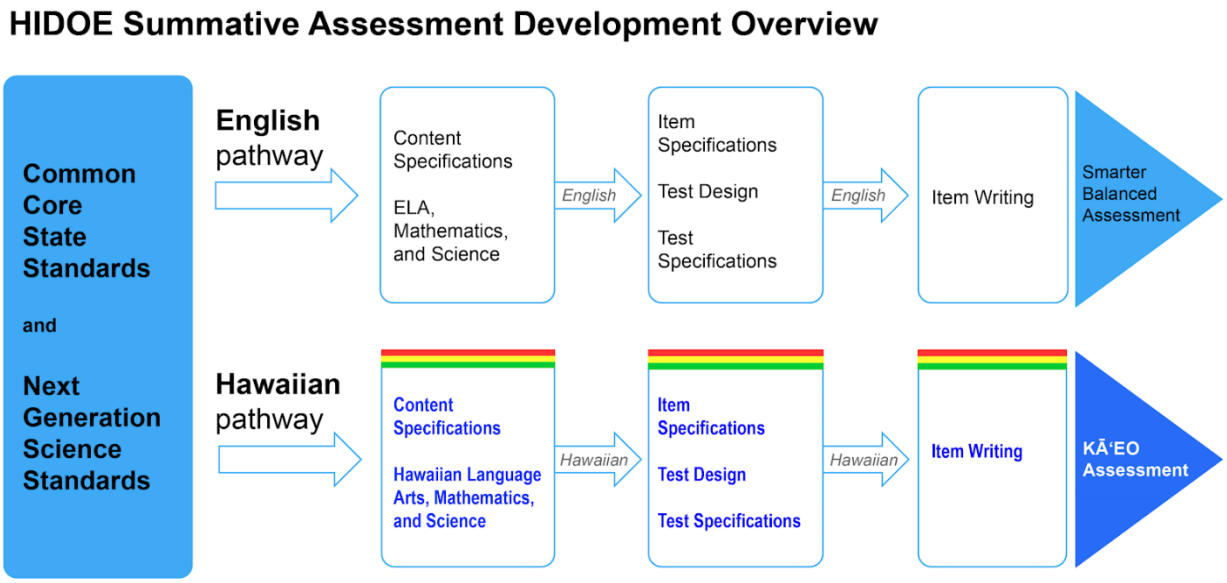
> Test specifications should describe the purpose(s) of the test, the definition of the construct or domain measured, the intended examinee population, and interpretations for intended uses. The specifications should include a rationale supporting the interpretations and uses of test results for the intended purpose(s). (APA, AREA, NCME, 2014, p. 85)

In 2019, a separate test specifications document was developed to clarify and consolidate the existing documentation and practices aimed at meeting this standard for KĀʻEO. As part of the KĀʻEO Content Specifications, the KĀʻEO Test Specifications describe KĀʻEO's purpose statement and provide descriptions of both the examinee population for which KĀʻEO is intended and the domains it aims to measure. The KĀʻEO Test Specifications describe the ways in which test blueprints are designed to support score reports, and they describe the capacity for subscore reporting across for each of the content domains and grade levels assessed. Examples of score reports are provided in the Test Specifications, along with a discussion of how results are interpreted through both public and confidential score reporting.

Each KĀʻEO test form was selected according to established criteria documented in the test blueprints, which specify both the content and cognitive complexity requirements at each content area and grade level. A well-constructed test blueprint is a foundational element of an assessment program because it provides documentation regarding the content to be covered in the assessment and emphasis for each standard or learning objective. Test blueprints also describe the weighting of each standard or learning objective on the test as well as the weighting across different levels of cognitive complexity (e.g., how many items will ask students to recall information versus how many items will ask students to develop a strategy or employ a multi-step solution to a problem). A high-quality blueprint then facilitates the construction of a test that is conceptually grounded in the content by providing guidance to item writers, test review panels, test developers, and test users about the test objectives and the content assessed.

Through the entire development process (Figure 5.2), the assessment team reviewed and incorporated the methodology, research, and products generated by the Smarter Balanced Assessment Consortium. For blueprint development, the team specifically considered the SBAC assessment blueprints for English language arts and mathematics (for additional information about the development of the original blueprints, see the 2017 KĀʻEO technical manual). In this way, KĀʻEO blueprints were designed to maintain these foundational links to the Common Core State Standards and the Next Generation Science Standards. The Student Learning Objectives (SLOs) were the cornerstone of the KĀʻEO blueprints, as they identified the skills and knowledge eligible to be assessed in the Hawaiian pathway of the HIDOE summative assessment program.

**Figure 5.2: KĀ'EO Development Process**




reference: adapted from the *Content Specifications for the Summative Assessment of the Common Core State Standards*, accessible at: *http://www.smarterbalanced.org/wp-content/uploads/2015/08/ELA_Content_Specs.pdf*

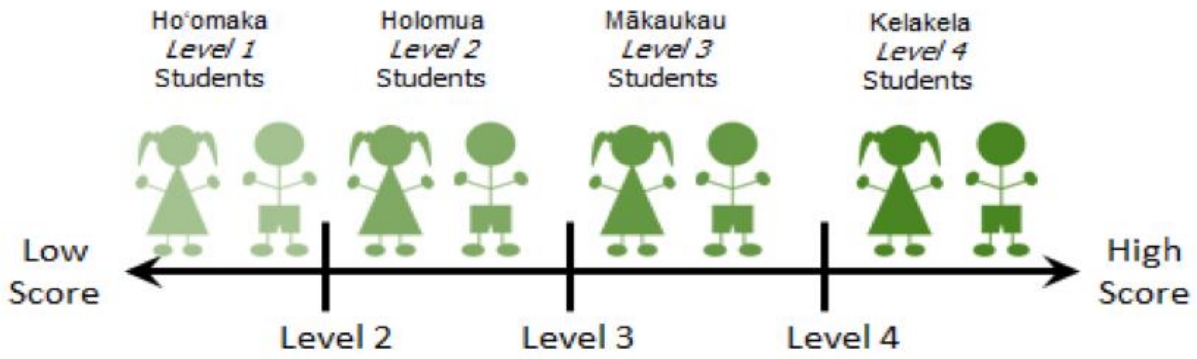
## 5.3. Science Evidence Statements

Evidence statements provide educators with additional information about what students should be able to know and do and performance expectations for each content standard. These evidence statements should be observable and measurable, and should identify how a proficient student can demonstrate their understanding. In order to ensure that the 3-dimensional nature of the Next Generation Science Standards (NGSS) standards was considered, teachers and content experts generated evidence statements guided by NGSS documentation and based on the content of the Hawaiian medium Kaiapuni content specifications. The evidence statements were utilized during item development.

## 5.4. Achievement Level Descriptors

Achievement level descriptors (ALDs) provide information on student expectations of knowledge, skills, and competencies across the standards for an assessment. ALDs provide such context by describing the students' capabilities in terms of performance categories. These performance categories divide students into levels based on what they know (Figure 5.3). Level 1 students are students who can do basic skills. These skills progress across levels until students reach Level 4 where they demonstrate that they can accomplish more complex tasks.

**Figure 5.3: Performance Categories**




## 5.5. Types of ALDs

There are a variety of ALDs to meet different needs and purposes of the assessment system, and each type supports various development needs (Figure 5.3) (Egan, Schneider, & Ferrara, 2012). Each type of ALD is written based on the task for which it is used and on the relevant stakeholder. Policy ALDs are the most general and are used by policymakers to understand high level descriptions of the levels across the system. Range ALDs are written early in the development process and describe the range of knowledge and skills within each performance level. Threshold ALDs describe the minimum knowledge students would need to get into the next performance level, which is critical to tasks such as standard setting. Finally, reporting ALDs are used to help stakeholders understand the performance levels on student reports.

**Table 5.1: Types of ALDs**

| ALD Type | Purpose | Typical Stakeholder Audience | Notes |
|---|---|---|---|
| **Policy ALDs** | Written at a higher level that generally states goals and rigor for performance | Policy makers | Typically written as one set for use across the assessment program (not for each grade level) |
| **Range ALDs** | Describe the range of knowledge, skills, and cognitive processes required within each of the performance levels | Item writers | Usually written at the beginning of the test cycle. These are cumulative (e.g., if a student is in level 3, they have met the requirements of levels 1 and 2) |
| **Threshold ALDs** | State the minimum level of knowledge and skills required to advance to the next performance level | Standard setting participants | As with range ALDs, these represent cumulative skills. |
| **Reporting ALDs** | Written based on the results of standard setting and help stakeholders interpret assessment scores | Stakeholders | Used for reporting students' scores for the assessment |
| **General** | These are the ALDs that appear on the student reports | Parents, policy makers | |

Importantly, ALDs support content validity by establishing a foundation of skills and knowledge across the performance levels and ensuring that the range of skills is considered as assessment system documents (e.g., standards, items, blueprint) are developed. This information is important to assessment tasks, such as standard

setting and reporting; however, even before standard setting the KĀʻEO team began using ALDs to help inform the development process. For example, during item writing, it is important that item writers generate items across the continuum of skills to accurately measure the range of knowledge and skills. Figure 5.4 shows the development cycle of the assessment and the key junctures where ALDs were developed and used.

**Figure 5.4: ALDs in the Development Cycle**

## 5.6. Overview of ALD Development Process for Math and HLA

The development of the KĀʻEO ALDs began with consideration of the Smarter Balanced Assessment Consortium (SBAC) ALDs, which provided detailed descriptions of students' skills and knowledge across performance levels. (www.smarterbalanced.org/wp-content/uploads/2015/08/Smarter-Balanced-Math-ALDs.pdf). Starting with the SBAC ALDs supported the rigor of the assessment by ensuring KĀʻEO was grounded in a consistent set of skills and knowledge required by SBAC, again ensuring that these Hawaiian medium assessments were in line with the unified set of state standards.

Using the SBAC ALDs as a foundation, the team generated a suite of KĀʻEO ALDs for policy, threshold, range, and reporting. These were written in Hawaiian and included language from the Hawaiian medium Kaiapuni SLOs. It was important to have these documents in Hawaiian to support tasks such as item writing and standard setting, which were conducted exclusively in Hawaiian.

## 5.7. Overview of ALD Development Process for Science

Initial drafts of the science threshold and range ALDs were drafted by the UH team using the Kaiapuni science standards. The team also considered the previously developed math and HLA ALDs, as well as guidance from SBAC to ensure consistency in language and rigor across the content areas. During standard setting, panelists began by reviewing the draft ALDs, revising and finalizing these ALDs, and subsequently using them to inform standard setting (see Standard Setting Technical Report for additional information).

## 5.8. Kaiapuni Item Development: Phase I

Item development is a critical step in assessment. Item development for the Kaiapuni Assessment of Educational Outcomes (KĀʻEO) complies with AERA/APA/NCME (2014) standard 4.7:

> The procedures used to develop, review, and try out items to select items from the item pool should be documented (APA, AREA, NCME, 2014, p.87).

The KĀʻEO specifically focused on developing items using native language teachers, coaches, and higher education staff. Supporting documentation included training materials, forms, and blueprints. Item writing was especially critical because at the onset of the development process there were limited numbers of available items. Therefore, UH staff focused on leveraging resources to write new items that aligned to the content standards and fit the test blueprints. Consultants supported this effort by focusing on developing the training for teacher item writers and on developing procedures for collecting written items.

The development of the initial KĀʻEO items for mathematics and HLA started in January of 2015 and followed an abbreviated timeline to generate sufficient items for field testing. The team identified current teachers outside of the 3rd and 4th grade testing levels in Kaiapuni schools as the main source for generating test items. The team believed that these particular teachers were not only well versed in the content, but they might already have existing items from which to draw. However, it is important to note that while teachers might have expertise in developing classroom formative assessments, writing items for large-scale summative assessment presents unique challenges.

The item development for science followed many of the same steps as math and HLA item writing but with additional information from science specific sources. The KĀʻEO team specifically focused on developing items relying upon native language teachers, coaches, higher education staff, and content experts. This process for writing items also included training materials, forms, and blueprints. UH staff focused on leveraging resources to write new items that aligned to the content standards and fit the test blueprints.

## 5.9. Item Development Phase II (2016-Current)

The UH team is prioritizing additional item writing for KĀʻEO and is continuing to build the item pool. At the end of 2016, an external consultant was hired (Center Point Assessment Solutions) to work with teachers and expand the overall capacity for item development. The focus of this effort was to expand the existing knowledge of the Kaiapuni teachers with regard to item writing (based on what the program had learned from the past two years) and to use an increasingly sophisticated set of inputs to write targeted content and address areas in the item pool with potentially insufficient coverage.

The KĀʻEO Assessment Team compares KĀʻEO item pools against the assessment blueprints, using a host of analytical tools, including spreadsheet-based gap analyses, alignment studies, test form selection tools, ad hoc reviews, and other inputs. The comparison helps to determine which areas need to be addressed and where to place their collective item development efforts. Once these determinations are made, item writing templates are generated for specific standards, DOKs, claims, and other criteria; then teachers developing items are directed to focus on specific areas of content to ensure additional coverage where needed. In this manner, the KĀʻEO item development model has evolved from *bulk item writing and item pool generation* to *item pool maintenance and targeted supplementation*. Compliance with the established blueprint(s) is always a primary point of concern; current KĀʻEO

development processes are designed to detect, analyze, and narrow (or eliminate) gaps in coverage in order to mitigate future test selection constraints within the item pool itself and to help ensure compliance with the blueprint requirements. This effort also includes the development of a separate KĀ'EO item development manual. The refined processes were part of a recent item writing workshop, which built upon teachers' existing item writing knowledge and included processes to better target items needed for the item bank (for details see KĀ'EO Item Development Manual (2019)).

During 2020, the assessment was not administered due to COVID-19. The UH team used the opportunity to write items for future field testing across all grades and content areas. This item writing focused on several priorities 1) addressing weaknesses identified in the independent alignment study (Davidson, & Egan, 2020) 2) identifying areas of the item pool that needed additional items identified through a gap analysis and 3) revising items that were flagged during field or operational testing.

## 5.10. Item Review

The next step was to conduct a thorough review of all the items in the pool, an important phase in any assessment development process, with the goal of ensuring the inclusion of the highest quality of items possible prior to field testing. Item reviewers accomplished this by confirming that items matched the assessed content and that the items were appropriate for different subgroups of students.

University of Hawai'i staff recruited item reviewers with a range of schools and grade level expertise, including university faculty with Hawaiian language proficiency and experience in Hawaiian language immersion schools. This diversity of thought and experience was extremely important for the review process, because – as mentioned previously – academic language use can vary between schools. In order to address this issue, reviewers were invited from different islands, different schools, and different universities to ensure that the language used in items was appropriate for students at that grade level, that vocabulary and grammatical patterns used were familiar enough for all schools to access, and that items did not reflect a bias toward a particular language community. The Item Review Committees were composed of representatives from various backgrounds whose purpose was to screen the items for content match to the appropriate academic standard, as well as racial, socioeconomic, gender, and other sensitivity issues, particularly within the context of the Hawaiian immersion program. All item reviewers were proficient in both English and Hawaiian. This follows AERA/APA/NCME (2014) standards 3.1 and 3.2, which state:

> **Standard 3.1** Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population. (APA, AREA, NCME, 2014, p. 63)
>
> **Standard 3.2** Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (APA, AREA, NCME, 2014, p. 64)

These standards are particularly critical for this assessment program. The intended uses of test scores described in Chapter 2 include the use of test scores for purposes of accountability, as well as appropriately measuring students in their language of instruction. The review process was implemented in order to solicit information from reviewers about typical review criteria (e.g., alignment of the item to the appropriate standard, gender sensitivity). However,

because the test needed to consider important information regarding Hawaiian language and culture, reviewers were also asked to review items in terms of linguistic appropriateness and educational value. For additional information on item review, see the KĀʻEO 2017 Technical Report and the KĀʻEO Item Development Manual.

### 5.10.1. *June 2020 Item Review*

In June 2020, KĀʻEO program staff facilitated an item panel review. The review included Kaiapuni school educators, assessment consultants, and University of Hawaiʻi (UH) staff. Kaiapuni educators provided expert judgments in the form of ratings on bias/fairness/sensitivity and accessibility. Twenty-seven Kaiapuni educators participated in the review. The educators teach in schools from all five islands where Kaiapuni schools are located and have experience teaching in Kaiapuni schools and teaching KĀ'EO assessment subjects. These 27 teachers were divided into 4 review panels by grade level bands and content areas.

The online item review workshop began with assessment experts providing a half day training. The training was divided into two sections: bias/fairness/sensitivity and accessibility. Both sections were organized so that participants received the content information as a whole group, reviewed sample items in their assigned panels and then returned to the larger group to debrief on their small panel discussion and questions. After training, participants broke up into assigned small groups and reviewed all of the items on their assigned content area assessments. An online review tool gave panelists access to the items and provided space for panelists to record individual ratings for bias, fairness, sensitivity and accessibility and a single place for comments. During the item review, if a participant flagged an item as 2 (potential issues) or 3 (significant issues), facilitators prompted panelists to discuss their ratings and were encouraged to provide a comment to support their rating(s). Given the context of the project to focus on bias/fairness/sensitivity and accessibility in the context of the Hawaiian language and culture, the ratings allowed individual panel members to highlight items for discussion. The comments indicated that the panelists discussed issues related to understanding how the items reflected cultural and linguistic considerations. These ratings did not necessarily indicate an issue with the item but instead presented an opportunity to jointly interpret the item for any concerns related to bias or accessibility. This provided a rich source of data for item developers to consider for future item development and when revising current items.

After the review meeting, analysts examined the information provided by panelists in their review sheets. Analysts used the individual ratings to calculate median item fairness and accessibility ratings. The analysts then qualitatively categorized and coded panelists comments. Both the item and the comment analysis are presented by individual assessment and overall for each subject area.

#### Math Results

Two panels reviewed the mathematics assessments. Both the grade 3-5 math and the grade 6-8 math panels were comprised of seven teachers each. For all the math assessments, over 87% of items had a median rating of 1 (no issues) for both bias/fairness/sensitivity and accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the math assessment were most frequently categorized as issues with clarity/directions, language/linguistics, visual/clutter, and answer choices.

#### Hawaiian Language Arts (HLA) Results

Two panels reviewed the HLA assessments. The grade 3-5 HLA panel consisted of seven teachers and the grade 6-8 math panel consisted of six teachers. For all the HLA assessments, over 87% of items had a median rating of 1 (no

issues) for bias/fairness/sensitivity and over 76% had a median rating of 1 (no issues) for accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the HLA assessment were most frequently categorized as issues with language/linguistics, answer choices, clarity/directions, geographic issues, sensitive issue, and task knowledge.

### Science Results

Two panels reviewed the science assessments. Both the grade 5 and grade 8 panels consisted of seven teachers each. For both the science assessments, over 89% of items had a median rating of 1 (no issues) for both bias/fairness/sensitivity and accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the science assessment were most frequently categorized as issues with visual/clutter, answer choices, clarity/directions, geographic, language/linguistics, sensitive issue, standard, and task knowledge.

### Recommendations

The goal of the workshop was to provide additional information to the UH team about the KĀ'EO items. In order to align with both the goal of the workshop and the analyses of the workshop data, the following recommendations are suggested for future item writing:

- Review all comments provided by panelists and use the UH team's expertise to determine what (if any) action needs to be taken. During the review, prioritize the following codes:
    - Answer choice (e.g. '*not a definite correct answer", "maybe second answer is correct?"*)
    - Clarity/directions (e.g. *"not sure students understand that they need to round", clarify question*").
    - Sensitive issue (e.g. *"bullying issues in schools", "sensitive: religious, death, illness"*).
    - Geographic (e.g. *"not all students are familiar with some of these places"*).
- Revise the KĀ'EO Content Specifications (including item and test specifications, and accessibility guidelines) based on feedback from panelists about visuals, color choices, font sizes, consistency with regard to the visual elements in math and science (charts, graphs, labels for visual elements), and language consistency between stimulus and answer choice in all content areas.

### Follow-up

The UH team reviewed all the comments provided by panelists and made determinations on how to proceed with each item. The determinations ranged from no changes were needed to flagging the item to be spiraled out of the operational item pool. The UH team also revised the Content Specifications guidelines to include more information on standards around item writing and presentation.

## 5.11. Test Form Selection

For the 2021 operational assessments, the psychometric team used item metadata from the field test and test blueprints to specify operational forms. Items were stored in a spreadsheet that contained an item number and information generated from the item reviews and the field test (i.e., content standard, the depth of knowledge or DOK, item type, and difficulty). Consultants created a series of tables to facilitate item selection in order to ensure that the content of the assessment matched the grade level blueprint. Items were selected to represent the percent ranges specified in the blueprint for each SLO/Claim and DOK level. Item difficulty also was considered. If items exceeded the specified blueprint range, adjustments were made. This iterative process continued until all blueprint criteria were satisfied. Once the psychometric team selected items that met the range of item numbers presented in

the blueprint, the list of items was sent to the UH team for review to ensure a diversity of items within standards. The psychometric team then made adjustments and reran the frequency analyses to ensure blueprint coverage.

Item selection in 2021 focused on building the item pool specifically around standards that might have fewer associated items or where the alignment studies noted some weaknesses (e.g., DOK 4 items in grade 4 math). Numbers of items that were included in each assessment and numbers of items in the item pool are listed in Table 5.2. Item selection also addressed continual improvement in the assessments as identified in findings from the alignment study, item review, and psychometric analyses. Processes to ensure the results of such findings are addressed in future item selection efforts are documented thought the use of KĀ‘EO Action logs.

### Table 5.2: Number of Items by Grade and Content Area

| Grade | Subject | Number of Operational Items | Number of Operational Points | Number of Embedded Field Test Items |
|---|---|---|---|---|
| 3 | HLA | 58 | 66 | 1 |
| 4 | HLA | 59 | 66 | 0 |
| 5 | HLA | 59 | 68 | 0 |
| 6 | HLA | 59 | 75 | 0 |
| 7 | HLA | 59 | 77 | 0 |
| 8 | HLA | 58 | 73 | 0 |
| 3 | MA | 55 | 58 | 0 |
| 4 | MA | 56 | 60 | 0 |
| 5 | MA | 58 | 66 | 0 |
| 6 | MA | 57 | 71 | 0 |
| 7 | MA | 56 | 63 | 0 |
| 8 | MA | 56 | 63 | 0 |
| 5 | SC | 53 | 69 | 0 |
| 8 | SC | 58 | 66 | 0 |

The KĀʻEO program uses an item selection tool, developed specifically for KĀʻEO by Center Point Assessment Solutions, to allow for greater efficiency and accuracy of item selection as the item pool expanded. To ensure that KĀʻEO meets all testing specifications, this tool is integrated and aligned with each testing blueprint. By automating item selection, use of the tool reduces the likelihood of human error during item selection. The tool also provides visual indicators when the item numbers in each cell approach the minimum or maximum number, which prompts the item selection team to focus item development in these categories (See Figure 5.5 and Figure 5.6).

### Figure 5.5: Item Selector Tool Output I

**Pilihelu (Mathematics)**
**Grade 4 OP Selection Output Report**

Current Selection from OP Selector Tab

| Reporting Category | Total Items Current Selection | Claim 1 | vs. blueprint | Claims 2/4 | | Claim 3 | | Computer scored | SC MC DD STV | Hand scored | ER SA FTG | Total items within range? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard 1 OA | 13 | 6 | ok | 3 | ok | 4 | ok | 12 | ok | 1 | ok | ok |
| 1.1 | 9 | 4 | | 2 | | 3 | | 8 | | 1 | | |
| 1.2 | 2 | 1 | | 0 | | 1 | | 2 | | 0 | | |
| 1.3 | 2 | 1 | | 1 | | 0 | | 2 | | 0 | | |
| Standard 2 NBT | 10 | 5 | ok | 3 | ok | 2 | ok | 8 | ok | 2 | ok | ok |
| 2.1 | 4 | 3 | | 0 | | 1 | | 4 | | 0 | | |
| 2.2 | 6 | 2 | | 3 | | 1 | | 4 | | 2 | | |
| Standard 3 NF | 19 | 10 | ok | 4 | ok | 5 | ok | 17 | ok | 2 | ok | ok |
| 3.1 | 6 | 4 | | 0 | | 2 | | 5 | | 1 | | |
| 3.2 | 8 | 4 | | 3 | | 1 | | 8 | | 0 | | |
| 3.3 | 5 | 2 | | 1 | | 2 | | 4 | | 1 | | |
| Standard 4 MD/G | 14 | 6 | ok | 6 | ok | 2 | ok | 13 | ok | 1 | ok | ok |
| 4.1 | 8 | 2 | | 4 | | 2 | | 7 | | 1 | | |
| 4.2 | 1 | 1 | | 0 | | 0 | | 1 | | 0 | | |
| 4.3 | 1 | 1 | | 0 | | 0 | | 1 | | 0 | | |
| 4.4 | 4 | 2 | | 2 | | 0 | | 4 | | 0 | | |
| Total Test | 56 | 27 | ok | 16 | ok | 13 | ok | 50 | ok | 6 | ok | ok |

**Figure 5.6: Item Selector Output II**

Current OP Selection

| | Claim 1 | | Claims 2/4 | | Claim 3 | | Totals | | |
|---|---|---|---|---|---|---|---|---|---|
| DOK 1 | 11 | ok | 3 | ok | 0 | ok | 14 | ok | |
| DOK 2 | 15 | ok | 4 | ok | 4 | ok | 23 | ok | |
| DOK 3 | 1 | ok | 6 | ok | 7 | ok | 14 | ok | |
| DOK 4 | 0 | ok | 3 | ok | 2 | ok | 5 | ok | |
| Totals | 27 | ok | 16 | ok | 13 | ok | 56 | ok | Item Count Total |
| Range Checks | ok | | ok | | ok | | ok | | |

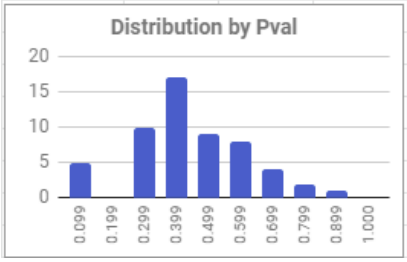
| P-vals | | count | % |
|---|---|---|---|
| 0 to | 0.099 | 5 | 9% |
| 0.1 to | 0.199 | 0 | 0% |
| 0.2 to | 0.299 | 10 | 18% |
| 0.3 to | 0.399 | 17 | 30% |
| 0.4 to | 0.499 | 9 | 16% |
| 0.5 to | 0.599 | 8 | 14% |
| 0.6 to | 0.699 | 4 | 7% |
| 0.7 to | 0.799 | 2 | 4% |
| 0.8 to | 0.899 | 1 | 2% |
| 0.9 to | 1.000 | 0 | 0% |
| | | 56 | items |

| Difficulty | Totals | | |
|---|---|---|---|
| Easy/Ma'alahi | 18 | | |
| Moderate/Ma'amau | 27 | | |
| Difficult/Pa'akikī | 11 | | |
| | 56 | | Item Count Total |

| Total OP selections | Totals | | |
|---|---|---|---|
| Computer Scored | 50 | 89% | |
| Hand Scored | 6 | 11% | |
| | 56 | | Item Count Total |

| Avg P-val |
|---|
| 0.40 |

| Hand scored only | Totals | | |
|---|---|---|---|
| Short Answer/FTG | 4 | 67% | ok |
| Extended Response | 2 | 33% | |
| | 6 | | Handscored Items |




## 5.12. Technology, Graphic Design, and Layout

In the initial development process, the KĀ'EO assessment team worked with the university's College of Education's Distance Course Design and Consulting Group (DCDC). The DCDC team was initially tasked with placing the assessment online in a format similar to the SBAC assessment and in a manner that ensured consistency with the operational tests, thus ensuring students would be able to engage with the assessment using a computer-based format. Data could then be downloaded from the system, cleaned and formatted, and used to conduct subsequent item analyses and scaling. This work has continued with the KĀ'EO Asssement team's own programmer who was a part of DCDC from the beginning to ensure continuity.

Universal design (UD) guidelines are followed in response to Section 508 of the Rehabilitation Act of 1973 in the development of all educational technologies. UD is implemented via recommended web development practices outlined within the W3C Web Content Accessibility Guidelines (WCAG) 2.0 last updated in December 2008. To ensure implementation of all recommended guidelines during development, the KĀ'EO Assessment team employs a pair-programming process so that multiple employees see and test code throughout creation. Accessibility issues

are further exposed via usability testing with users and through external accessibility testing tools such as AChecker and WAVE.

Importantly, the computer format would allow for a range of assessment item types. This included single choice, multiple choice, fill-in-the blank, sorting values, and written responses, both short and long. The online format also facilitated access to accommodations and ensured aspects of universal design. All students were able to enlarge the text, pause the assessment, and listen at their own pace to audio passages (additional information on accommodations is provided in the administration section below). This also follows AERA/APA/NCME (2014) standards:

> **Standard 3.1** Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population. (APA, AREA, NCME, 2014, p. 63)
>
> **Standard 3.2** Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (APA, AREA, NCME, 2014, p. 64)

## 5.13. Usability

During 2018 - 2019 cognitive interviews were conducted with students at three different schools on two different islands across the state to understand the usability of the assessment technology and platform. The design included standard characteristics of usability testing; defined objectives, real users, real tasks, analysis, and recommendations for improvements (Miami University of Ohio, 2004; Krug, 2010). This design was chosen in order to align this usability study with the main purpose to evaluate the ease-of-use and learner experience with the assessment software. The usability study design incorporated into the cognitive study was sufficient for the purpose and doable for the researchers. It included core usability design elements and was intended to capture insights that enabled the researchers to recommend improvements to what DCDC is building (Krug, 2010).

Observations made and questions asked of students during the cognitive interviews showed that students were not inhibited by the technology; they felt comfortable using all of the functions that were present on the online assessment system. This aligned with the results of the 2016 cognitive interviews with students in grades 3 and 4, which showed that the online assessment tool was accessible and that there were no visual or functional issues with the assessment from their perspective. The students did have minor feedback about the layout of fill-in-the-blank questions, which was used to make slight adjustments to the visual aspects of these types of questions on future administrations (for more information see the 2018 Technical Report).

## 5.14. Accessibility Tools

Accessibility supports for exam testing are delineated in the Designated Supports and Accommodations section of the Test Administration Manual. KĀ'EO relies on inherent system functionality for the following accessibility functionality:

- **Zoom:** Available on all browsers supported by the testing software (Chrome, Firefox and Internet Explorer) by default

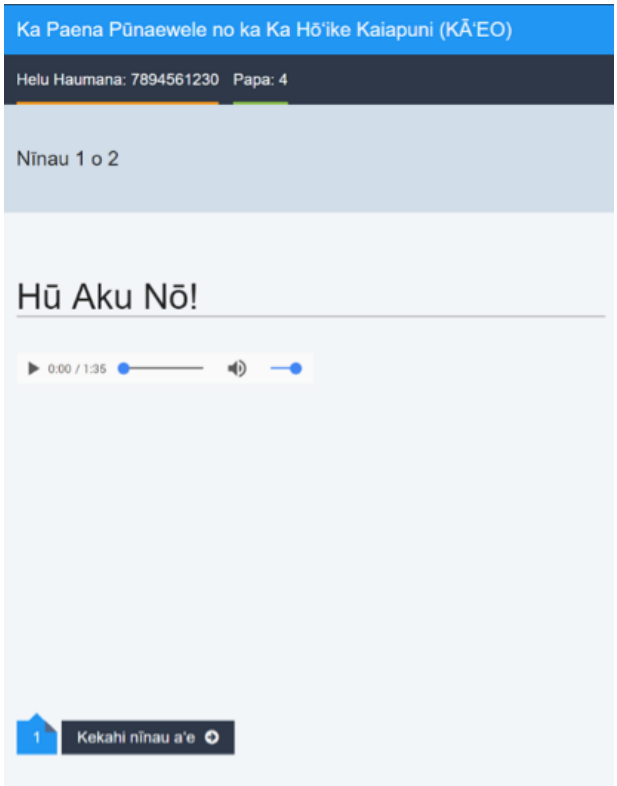
- **Magnification:** Available on all operating systems supported by the testing software (Windows and Mac) by default
- **Color Contrast:** Enables a student to adjust screen background or font color, based on his or her needs or preferences. This may include reversing the colors for the entire interface or choosing the color of font and background. (*Replaces the previous background colors on computer screen accommodation.*)
- **Masking:** Enables a student to block off content that is not of immediate need or that may be distracting. A student is able to focus his or her attention on a specific part of the test item by masking. (*Replaces the previous accommodation that involved having a student hold a template provided by the school against the computer screen to reduce his or her visual field.*)

### 5.14.1. *Features*

The assessment software provides a series of features to assist the learner during the test taking process, which include:

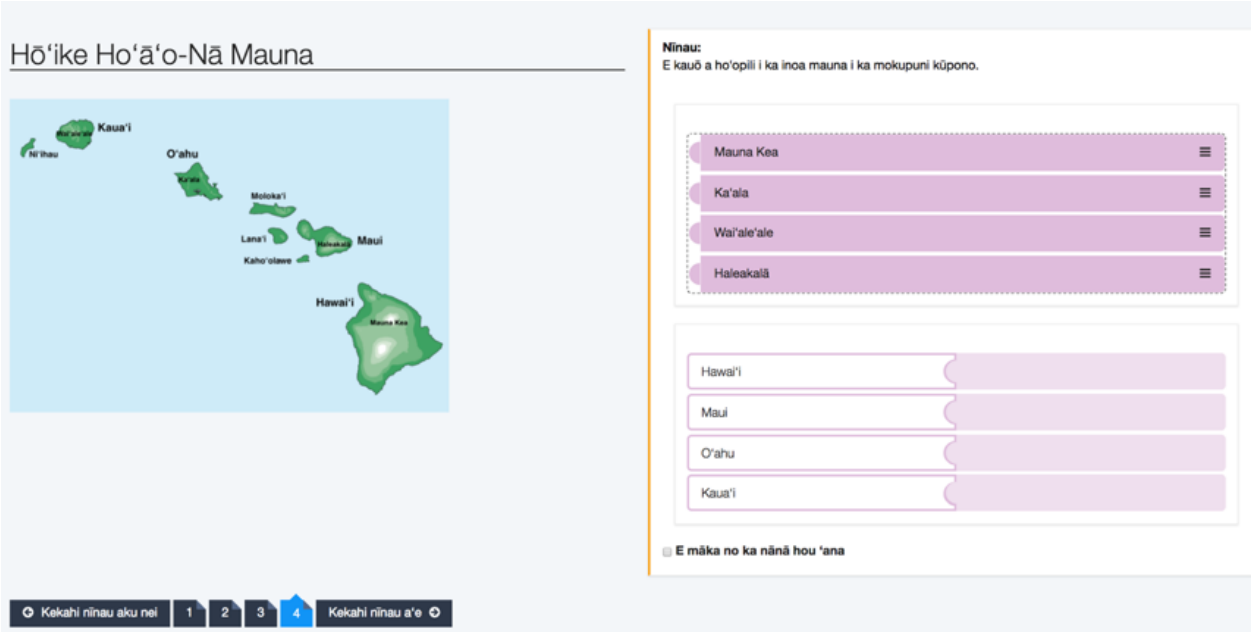
1) **Adjust the volume for listening passages:** All students can adjust the volume on their headphones for the listening passages (Figure 5.7).

**Figure 5.7: Volume Control**



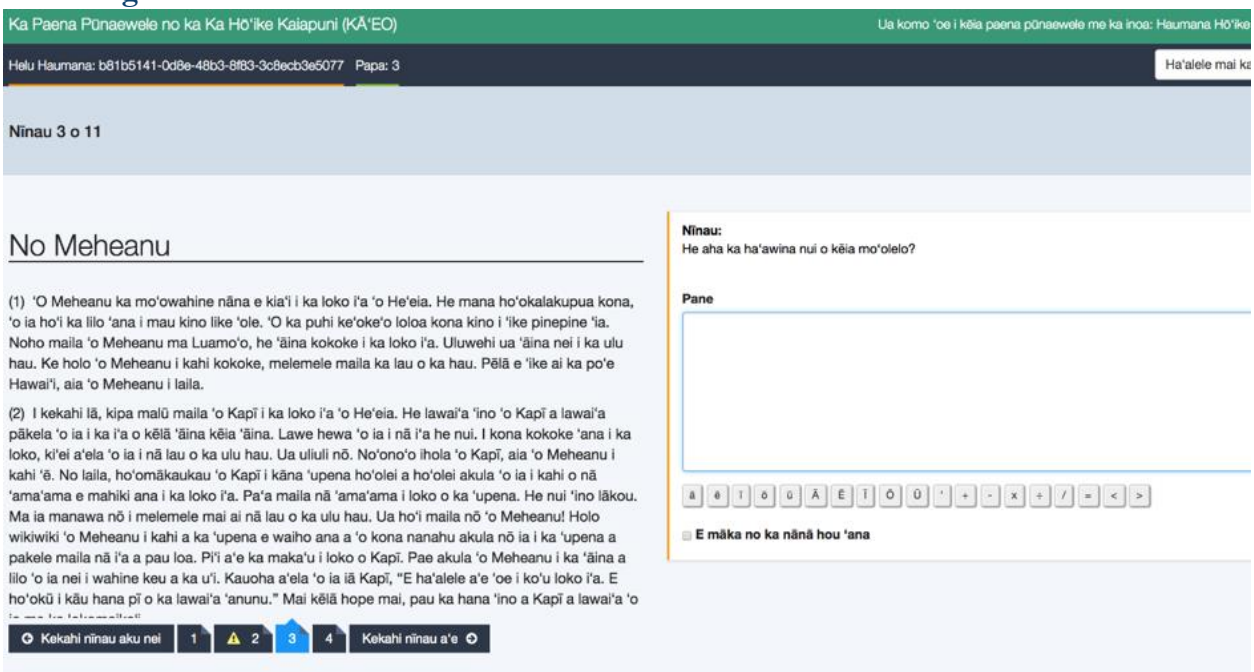

2) **Visual progress:** A list of the question numbers at the bottom of each test lets students monitor their progress visually onscreen (Figure 5.8).

**Figure 5.8: Visual Progress**




3) **Designate a question for later review:** Students can select any question to return to for later review. This can be marked using a checkbox available on each item and is identified on the question numbers as a warning symbol (Figure 5.9).

**Figure 5.9: Designate for Later Review**



# Chapter 6: Test Administration

Administration of the assessment needed to be conducted in a consistent manner across sites to ensure that students could demonstrate their knowledge in a reliable manner. In addition, it was important that the administration conditions simulated the operational assessment. This resulted in the development of formal guidelines and procedures. The UH staff and consultants framed the administration guidelines using current and past HIDOE procedures (e.g., the SBAC guidelines, the HSA for science and end-of-course assessments, and the Hawaiian Aligned Portfolio Assessment procedures). By considering these procedures, the assessment team was able to ensure that the test administration was aligned to state testing protocols. These procedures were used for all field testing and operational testing in 2021.

## 6.1. Training

Separate sets of documents were developed by UH staff and implemented across the administration process including training, administration, and scoring. The assessment team developed administration training materials and Administration guides (https://kaiapuni-wp.coe.hawaii.edu/wp-content/uploads/2021/04/English-2021-KAEO-TAM.pdf) These materials included a training video that demonstrated the basic features and functions of the test and familiarized teachers with what their students could expect to see when taking the assessment. The UH KĀʻEO assessment team also provided written test administration instructions in English and Hawaiian via the Test Administration Manual for both English and Hawaiian speaking Test Administrators and Coordinators. Specific details were provided regarding the roles and responsibilities of staff members including the school administrator, test coordinator, and test administrators, ensuring and maintaining test security, providing accommodations, and reporting incidents. School staff were then trained in relation to administration and procedures by the test coordinators in each school. Finally, a live webinar was conducted prior to the testing window to enable test coordinators and test administrators to ask any questions and obtain clarification and view demonstrations of the test procedures. The webinar was recorded and posted to the KĀʻEO website so that it could be accessed later.

Additionally, a help desk was opened prior to the testing window that testing coordinators and administrators could either phone or email to obtain answers to their questions. The help desk was open Monday to Friday from 7:30 am to 2:30 pm throughout the testing window and was staffed by Hawaiian and English speakers. School staff members taking part in the administration were required to complete the training and sign Appendix A of the Test Administration Manual, stating that they understood all testing procedures as they were presented. In addition, every test coordinator and test administrator was required to pass a certification test that ensured that all school personnel were well versed with the contents of the TAM and could securely administer the assessment; these tasks were required before each school was allowed to administer the assessment. UH staff collected documents, recorded receipt of materials, and followed up with schools to ensure that all documentation was complete.

## 6.2. Testing Environment and Security

The KĀʻEO prioritizes test security in order to protect student and school information, as well as to protect the integrity of the test. The data security plan is divided into three segments: prevention, detection, and follow-up. Prevention includes a rigorous security process throughout test development (e.g., item writing, review, standard setting, and alignment) and test administration (e.g., test administrator training on security procedures). Detection

includes reporting any irregularities during the test administration (e.g., the findings of HIDOE monitoring) as well as subsequent data forensics (e.g., examination of the time it takes students to answer items, and person fit statistics). Finally, HIDOE, in collaboration with the UH KĀʻEO assessment team, undertakes follow-up and identifies appropriate corrective action in response to any irregularities or violations of security procedures, as well as a system for detection collusion. For additional information, see the Test Security Section of the Test Administration Manual.

### 6.2.1. *Test Security*

Test security is critical for ensuring fair and equitable administration of the assessment. It is imperative that security procedures are maintained to ensure the integrity of the tests and the data, and thus the reliability of the results. It is also critical that student information is secured to protect the rights and privacy of all students.

This assessment is the property of the HIDOE. Thus, these testing procedures mirror the processes used for all tests within the Hawaiʻi Statewide Assessment System (See https://alohahsap.org/). It is critical that test security be maintained before, during, and after the administration of the HLA and mathematics tests. All testing incidents require documentation based on the degree of severity, as described below.

### 6.2.2. *Testing Incidents*

A testing incident is any disruption to the stated testing procedures that might have an impact on the integrity of the test scores. Three general types of testing incidents can occur, and school personnel are required to report these incidents to HIDOE. The three categories are outlined below.

> **Test Impropriety**: These incidents may involve one or more students but have only a small chance of impacting test results and interpretability. They include students talking, making gestures that disturb other students, and accessing the internet or electronic devices for purposes other than cheating, and teachers leaving instructional materials on the wall of the test venue.
>
> **Irregularities**: These are incidents may involve one or more students and can impact test scores or results. They include such things as students cheating, disruptions to the test environment (e.g., a fire drill or electrical failure), and test administrators providing incorrect instructions, providing a test participant's login information to another user, coaching students, or providing test materials that are not on the approved list of materials.
>
> **Breaches**: Breaches are serious incidents that could threaten the validity of the test scores. Schools are required to immediately report breaches to UH staff. Examples of breaches include a school staff member altering the responses of one or more students, students using cellphones to take pictures of assessment items, unapproved printing of test items or reading passages, and any retention or distribution of test

responses/answers (including improper shredding of scratch paper, any reproduction of test materials, and removing any test materials from the test environment[1]).

### 6.2.3. *Reporting Testing Incidents*

It is extremely important that all testing incidents are reported. It is important in relation to the interpretability of the analyses that HIDOE and UH KĀʻEO assessment staff understand the type, breadth, and severity of the incident. Schools were trained to report testing incidents and submit appropriate documentation to HIDOE, who in turn follow a thorough process of internal evaluation and resolution (see https://kaiapuni-wp.coe.hawaii.edu/wp-content/uploads/2021/04/English-2021-KAEO-TAM.pdf)

### 6.2.4. *Ancillary Materials*

The following materials were provided to schools to facilitate training and administration:

- Help desk contact information: phone 808-260-2356; email kaiapuni@hawaii.edu
- Website: https://kaiapuni-wp.coe.hawaii.edu/kumu (which includes a list of frequently asked questions)
- Administration training video
- Student rosters (provided by HI DOE)
- Test log-in materials
- Test security and administration procedures (including a list of accommodations and a Hawaiian language script)
- Practice tests: https://kaiapuni.coe.hawaii.edu
- Testing forms in the Test Administration Manual
- Test Security and Administration Procedures Acknowledgment Form
- Accommodation Verification Form
- Designated Supports Verification Form
- Additional Accommodation/Designated Supports Request Form
- Testing Incident Report

## 6.3. Accommodations Information

The AERA/APA/NCME standards state that:

> **Standard 3.9** Test developers and/or test users are responsible for developing and providing test accommodations, when appropriate and feasible, to remove construct-irrelevant barriers that otherwise would interfere with examinees' ability to demonstrate their standing on the target constructs. (APA, AREA, NCME, 2014, p. 67)

[1] For additional examples of testing incidents, please see the HSA Science Assessment and End-of-Course Exams Test Administration Manual (pp. 11–13) under the "Test Administration Documents" heading on the HSA Science Resources page at alohahsap.org.

**Standard 6.2** When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing. (APA, AREA, NCME, 2014, p. 115)

The accommodations and designated supports policies below are based on the Hawai'i State Assessments and End-of-Course Exams Test Administration Manual. Assessment accommodations may be provided by school staff for students who are IDEA eligible or 504, and have an IEP or 504 plan. Accommodations are changes in procedures or materials that increase equitable access for IDEA-eligible and 504 students during the administration of KĀ'EO. A student's need for an embedded or non-embedded accommodation must be documented in his or her IEP or 504 Plan. School staff must use the guidelines for determining an accommodation as follows:

- The accommodation is based on the student's learning needs
- The accommodation is one that is currently used by the student in the classroom
- School staff that work with the student agree on the accommodation
- The accommodation is stipulated in the student's IEP or 504 plan

Designated supports are access features that are available for use by a student for whom a need has been indicated by an educator or team of educators, as well as a parent/guardian and the student. A consistent process must be used to determine which embedded and non-embedded designated supports (Table 6.1: Table A.1) are needed by a student for an assessment or exam. Educators who make these decisions for an identified student must have a clear understanding of the process of ensuring that this student is currently using the feature during classroom instruction and is given an opportunity to practice using any variation in the feature that will be provided during the administration of an assessment or exam.

The test administrator must complete an Accommodation Verification Form or Designated Support Verification Form, provided in Appendix B and Appendix C, respectively, of the Test Administration Manual for each student who receives an accommodation or designated support. These requests are then submitted to the HIDOE assessment section for verification based on HIDOE processes and procedures.

### Table 6.1: Table A.1: KĀ'EO Accommodations

| Embedded Accommodation |
|---|
| • **American Sign Language (ASL), Braille (BR), or Closed Captioning (CC):** Please contact the Help Desk if you need more information about this accommodation. |
| **Non-embedded Accommodation :** |
| • **100s Number Table:** A table listing numbers from 1-100 is a non-embedded accommodation only for students with visual processing or spatial perception needs as documented in their IEP or 504 plan. This table may be printed only for students approved for this accommodation. Guidelines for the 100s Number Table are provided in Test Administration Manual: Appendix H: Multiplication Table and 100s Number Table.<br>• **Alternate Response Options:** Students with some physical disabilities, including both fine motor and gross motor skills, may need to use adapted keyboards, large keyboards, StickyKeys, MouseKeys, FilterKeys, adapted mouse, touch screen, head wand, and switches.<br>• **Multiplication Table:** A single-digit (1–9) multiplication table is a non-embedded accommodation only for students with a documented and persistent calculation disability. This table may be printed only for students approved for this accommodation. Guidelines for the Multiplication Table are provided in Test Administration Manual: Appendix H: Multiplication Table and 100s Number Table.<br>• **Print on Request:** A student may request printed copies of individual test items and stimuli based on a documented need. A request must be made for this accommodation for a student using the Appendix B form in the Test Administration Manual. Please call the Help Desk for additional information. |

| Embedded Designated Supports |
| --- |
| • **Zoom functionality** to increase the font size for the entire assessment or exam is native to all web browsers supported by this testing application. Please contact the Help Desk if you need assistance. **Streamline, Color Overlay or Masking:** Please contact the Help Desk if you need more information about this accommodation. |
| **Non-embedded Designated Supports** |
| • **Color Overlays:** A student who meets the criteria for the Print on Demand accommodation may place color transparencies over the printed stimuli, items, and answer options in an Assessment if these color transparencies are used during classroom instruction.<br>• **Magnification:** A student may adjust the size of specific areas on the screen, e.g., text, formulas, tables, graphics, and navigation buttons using the native functionality available on all supported operating systems. Please contact us if you need assistance.<br>• **Noise Buffers:** A student wears equipment, e.g., ear mufflers, white noise, to block external sounds and will need to wear headphones unless tested individually in a separate setting.<br>• **Read Aloud:** Students who are struggling readers may have all or portions of an assessment or exam read aloud, e.g., stimuli, and/or items by a trained and qualified TA human reader. The reader should review and adhere to the Read Aloud Guidelines on alohasap.org and to ensure that the designated support is provided in Hawaiian. Please contact the Help Desk for further information. This designated support also requires a separate setting designated support.<br>• **Scribe:** A student who has documented significant motor or processing difficulties, or who has had a recent injury, such as a broken hand or arm, that makes it difficult to produce responses may dictate his or her responses to a trained and qualified TA human scribe who records the responses verbatim. The scribe must independently review the Scribing Guidelines on alohasap.org and adjust to ensure that the designated support is provided in Hawaiian. Please contact the Help Desk for further information.<br>• **Separate Setting:** Test location is altered so that the student is tested in a setting different from the setting made available for most students. Four previous settings that were accommodations are included.<br>  o Read Aloud to Self<br>  o Being Seated Near TA<br>  o Being Tested Individually<br>  o Being Tested in a Small Group<br>• **Simplified Test Directions:** Students who need additional support understanding the test directions may be provided with Simplified Test Directions as a designated support allowable across the assessments. This could include students with difficulties in auditory processing, short-term memory, attention, or decoding. This designated support may require testing in a separate setting to avoid distracting other test takers. |

If a student requires an accommodation or designated support that is not listed above, it can be requested using the Accommodation Verification Form. Additional designated supports for Hawaiian language learners are currently being discussed and developed for future administrations of the assessment.

# Chapter 7: Scoring

Scoring is a critical aspect of the assessment process. It is through accurate, reliable, and consistent scoring that assurances can be given that the resulting information is suitable for the purposes for which it was intended.

The AERA/APA/NCME standards specify that:

> **Standard 4.18** Procedures for scoring and, if relevant, scoring criteria, should be presented by the test developer with sufficient detail and clarity to maximize the accuracy of scoring. Instructions for using rating scales or for deriving scores obtained by coding, scaling, or classifying constructed responses should be clear. This is especially critical for extended-response items such as performance tasks, portfolios, and essays. (APA, AREA, NCME, 2014, p. 91)

The KĀʻEO includes both traditional selected-response items and open-ended items that contribute to the overall student score on the assessment. Selected-response items are machine-scored within the assessment delivery system, which is designed and hosted by UH. As a quality assurance measure, the UH KĀʻEO Assessment team checked 10% of the machine-scored items to ensure that they were scored correctly by the system. The KĀʻEO open-ended item scoring involved a three-step process. Each step is described briefly here, and in more detail below.

The first step was the development of the scoring materials. The thoroughness of the scoring materials was critical because these documents served as the foundation by which the items were scored. The details provided in these materials ensured that scorers understood the item and the range of student responses associated with each score point. The scoring materials also ensured that scorers made accurate determinations in relation to student responses.

The second step involved developing training materials and identifying and training scorers. Based on the AERA/APA/NCME standards:

> **Standard 4.20** The process for selecting, training, qualifying, and monitoring scorers should be specified by the test developer. The training materials, such as the scoring rubrics and examples of test takers' responses that illustrate the levels on the rubric score scale, and the procedures for training scorers should result in a degree of accuracy and agreement among scorers that allows the scores to be interpreted as originally intended by the test developer. Specifications should also describe processes for assessing scorer consistency and potential drift over time in raters' scoring. (APA, AREA, NCME, 2014, p. 92)

All open-ended (i.e., constructed response) items were scored by hand using trained scorers during a scoring meeting. UH KĀʻEO assessment staff recruited current or former Kaiapuni classroom teachers to participate as scorers. To be considered as scorers, participants were required to be fluent in Hawaiian and to possess a college degree in teaching or in the content area to which they were assigned. All participants were required to participate in scorer training. Prospective scorers were specifically trained on the scoring process and the items that they scored. Scorers were monitored throughout the scoring process by a scoring manager. The scoring manager was a current grade 5–8 teacher in the Kaiapuni system who had been trained by UH KĀʻEO assessment staff or a UH staff member.

Regarding the monitoring of the scoring process, the AERA/APA/NCME standards state that:

> **Standard 6.9** Those responsible for test scoring should establish and document quality control processes and criteria. Adequate training should be provided. The quality of scoring should be monitored and documented. Any systematic source of scoring errors should be documented and corrected. (APA, AREA, NCME, 2014, p. 118)

This standard was addressed in the final step, the actual scoring and analysis of the open-ended items. UH staff spent considerable time ensuring that the scoring was accurate and consistent, while also aiming to structure the meeting and discussion in a manner that would be respectful of and appropriate to the unique circumstances of educators in a Hawaiian language immersion setting. All scorers simultaneously worked through each question. UH staff led a discussion involving all scorers that included having all scorers read the question an answer it as they would expect a student at the grade level to answer it, discussing some of the grammatical and/or language issues contained in the question that were unique to a Hawaiian language immersion context, examining a number of anchor papers in order to "calibrate" and ensure consensus among all scorers regarding how each item was scored, and answering any questions or concerns related to the questions prior to scoring. This process was followed for every extended-response question that needed to be hand-scored, and proved to be a valuable process, albeit one that took a considerable amount of time.

The scoring meeting was held virtually over a five-day period with approximately 30–35 scorers participating every day. The UH staff ensured that the scorers were properly trained in scoring items in this unique context and had the opportunity to discuss any issues that arose, and that the responses were scored in a rigorous, meaningful, and accurate manner. The scorers read and scored items using a computer-based system. Ongoing monitoring ensured that they remained precise in their scoring and consistent with other scorers who were working on the same item. The scoring manager was also available to answer any questions from the scorers. Because the meeting was held virtually, additional security measures were put into place to ensure the security of test items that align with the procedures in the HIDOE test security manual. First, scorers signed a confidentiality and non-disclosure agreement to ensure that there was a common understanding of the security requirements of the virtual meeting. These requirements included maintaining the confidentiality of the assessment items, participation in the scoring meeting in a separate location that was secure and where their computer screen could not be seen by others, and the removal of all other electronic devices from the area where the participants worked. Second, the UH Assessment team utilized Digify to keep all items secure. Digify ensured that screenshots or the printing of items could not be done. It also required participant login at every question, and the program kept a log of participant activity that was monitored throughout the meeting. Once the question scored, participants no longer had access to that question. Finally, participants were required to keep their cameras on at all times so that UH Assessment staff could monitor the security of the scorer's environment during the course of the meeting.

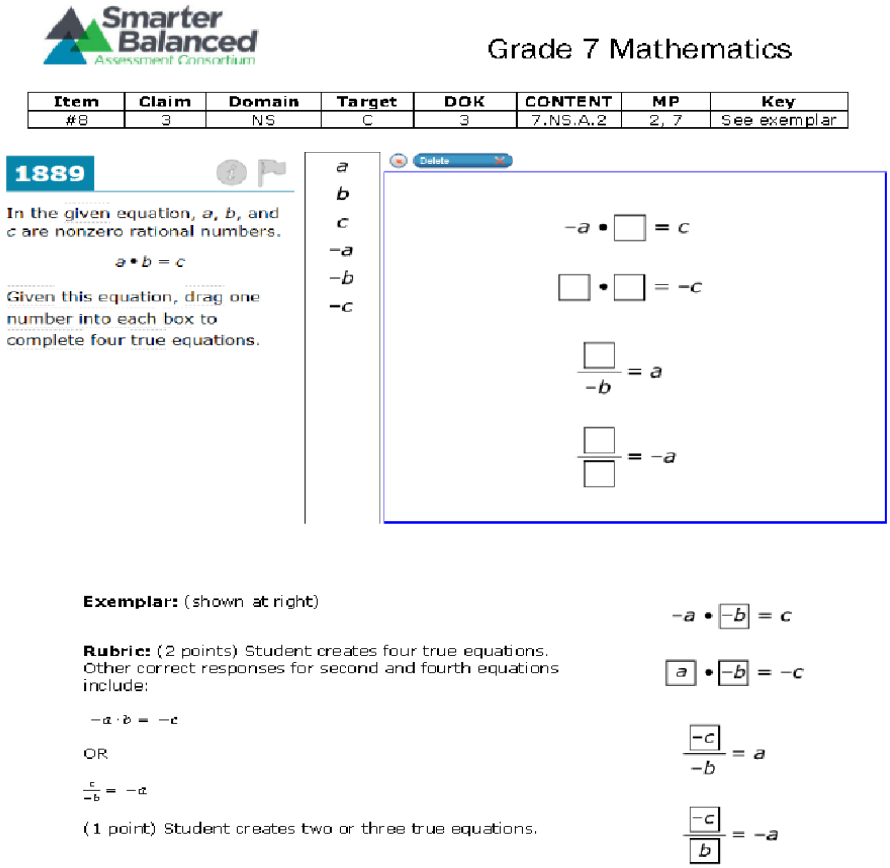
## 7.1. Developing Scoring Materials

It is important for each open-ended item to be accompanied by a guide that contains all of the critical information about the item. Thus, the UH staff developed a guide for each open-ended item. Staff members reviewed the scoring materials published by the SBAC and the materials developed for NGSS-aligned assessments to ensure that the KĀʻEO scoring guides included all relevant information for each item that needed to be hand-scored (downloaded from http://www.smarterbalanced.org, see Figure 7.1). The development of the generic and item-specific rubrics followed the guidelines published by the NGSS, which used the mathematics rubrics of the CCSS as a guide, while integrating the three dimensions of the NGSS into the rubric (see

https://www.nextgenscience.org/news/equip-ngss-rubric-development). Thus, following the SBAC- and CCSS-based mathematics rubrics allowed the development to be more closely aligned with the NGSS. The guides included the following information:

- Item images and question
- Item metadata (including standard, claim, target, DOK, and degree of difficulty)
- Generic item rubric for reference
- Item-specific rubric
- Anchor paper examples for each score point.

**Figure 7.1: Scoring Guide for a Mathematics Item**




### 7.1.1. *Generic Rubrics*

The first step in developing scoring materials was for the UH team to construct three generic content-based rubrics. These rubrics provided basic information on the meaning of each score point and were foundational in developing the item-specific rubrics.

**HLA rubrics**. The team used the generic rubrics presented by the SBAC to ensure the rigor and completeness of the rubrics. From these examples, generic rubrics were developed in Hawaiian, scorers were trained on how to use

them during the scoring process, and they were made available throughout the scoring meetings (Table 7.1: through Table 7.4).

### Table 7.1: KĀʻEO HLA General Rubric for 4-Point Item

| Helu ʻAi | Nā Ana Loiloi no nā Nīnau Mākau ʻŌlelo |
|---|---|
| 4 | Ua hoʻonohonoho ʻia ke kākau i mōakāka loa ka manaʻo o ka haumāna. Hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e lawa ai ka maopopo loa o kona manaʻo a me ke kumu i manaʻo ʻia ai. Kākau ka haumāna me ka holo pono o kona mau manaʻo, mai kekahi manaʻo a i kekahi. Ma kēia kākau ʻana, he pololei loa ke ʻano o ke kaʻina kumuhana i pili kūpono i ka pōʻaiapili o ka paukū kākau. Ma ka wā e pono ai, e hoʻohana kūpono ʻia nā loina Hawai'i a me ʻike Hawai'i ʻiʻo kūpono e wehewehe piha ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua kū like ke ʻano o ia mahele i ke ʻano mōakāka loa no ia mau mahele a pau. |
| 3 | Ua hoʻonohonoho ʻia ke kākau a ʻano mōakāka ka manaʻo o ka haumāna akā he mau ʻike iki i pono ʻole a i ʻole i komo ʻole. Hoʻolauna ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e ʻano maopopo ai kona manaʻo nui. Kākau ka haumāna me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, akā ʻaʻole nō i piha loa. Ma kēia kākau ʻana, he pololei ke kaʻina kumuhana i pili kūpono. Ma ka wā e pono ai, e hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua ʻano mōakāka ia mau mahele a pau. |
| 2 | Ua hoʻonohonoho ʻia ke kākau a mōakāka iki ka manaʻo. Hoʻolauna ʻia ka manaʻo (nui) akā ʻaʻole paha hoʻohana ʻia nā laʻana e kākoʻo ai i kona manaʻo nui. ʻAʻole kākau ka haumāna me ka holo o kona manaʻo, mai kekahi manaʻo a i kekahi, akā hiki ke kuhi, maopopo ka manaʻo nui o ka nīnau i ka haumāna. ʻAʻole paha hoʻokomo ʻia nā loina Hawai'i a me ka ʻike Hawai'i, akā hoʻokomo ʻia kekahi ʻike o ka ʻohana/kupuna. Ma loko o nā mahele a pau o ke kākau ʻana, mōakāka iki ia nā mahele a pau. |
| 1 | Ua hoʻonohonoho ʻia ke kākau a ʻaʻole nō i mōakāka loa ka manaʻo o ka haumāna. E ʻike ʻia ana ke ʻano pili ʻole o kekahi mau mahele o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻole nō i lawa nā laʻana e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili loa a maopopo loa kona manaʻo. Ma kēia kākau ʻana, ʻaʻole i pololei loa ke kaʻina kumuhana a me ka pōʻaiapili akā ua kokoke ka haʻina i ka manaʻo i pili a pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ʻaʻole mōakāka nā mahele a pau. |
| 0 | ʻAʻole i hoʻonohonoho ʻia ke kākau a ʻaʻole nō i mōakāka ka manaʻo o ka haumāna. Pili ʻole loa nō nā mahele a pau o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻohe laʻana kūpono e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili iki a maopopo iki kona manaʻo i ke kumuhana kūpono. Ma kēia kākau ʻana, ʻaʻole i pololei ke kaʻina kumuhana a me ka pōʻaiapili a ʻaʻole i kokoke iki ka haʻina i kekahi mea pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. He ʻano hopena kēia o ka hoʻāʻo ʻole e pane iki ma ke ʻano pololei a piha nō hoʻi. |

### Table 7.2: KĀʻEO HLA General Rubric for 3-Point Item

| Helu ʻAi | Nā Ana Loiloi no nā Nīnau Mākau ʻŌlelo |
|---|---|
| 3 | Ua hoʻonohonoho ʻia ke kākau i mōakāka loa ka manaʻo o ka haumāna. Hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e lawa ai ka maopopo loa o kona manaʻo a me ke kumu i manaʻo ʻia ai. Kākau ka haumāna me ka holo pono o kona mau manaʻo, mai kekahi manaʻo a i kekahi. Ma kēia kākau ʻana, he pololei loa ke ʻano o ke kaʻina kumuhana i pili kūpono i ka pōʻaiapili o ka paukū kākau. Ma ka wā e pono ai, e hoʻohana kūpono ʻia nā loina Hawai'i a me ʻike Hawai'i ʻiʻo kūpono e wehewehe piha ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua kū like ke ʻano o ia mahele i ke ʻano mōakāka loa no ia mau mahele a pau. |
| 2 | Ua hoʻonohonoho ʻia ke kākau a ʻano mōakāka ka manaʻo o ka haumāna akā he mau ʻike iki i pono ʻole a i ʻole i komo ʻole. Hoʻolauna ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e ʻano maopopo ai kona manaʻo nui. Kākau ka haumāna me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, akā ʻaʻole nō i piha loa. Ma kēia kākau ʻana, he pololei ke kaʻina kumuhana i pili kūpono. Ma ka wā e pono ai, e hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua ʻano mōakāka ia mau mahele a pau. |
| 1 | Ua hoʻonohonoho ʻia ke kakau a ʻaʻole nō i mōakāka loa ka manaʻo o ka haumāna. E ʻike ʻia ana ke ʻano pili ʻole o kekahi mau mahele o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻole nō i lawa nā laʻana e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili loa a maopopo loa kona manaʻo. Ma kēia kākau ʻana, ʻaʻole i |

| Helu ʻAi | Nā Ana Loiloi no nā Nīnau Mākau ʻŌlelo |
|---|---|
| | pololei loa ke kaʻina kumuhana a me ka pōʻaiapili akā ua kokoke ka haʻina i ka manaʻo i pili a pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ʻaʻole mōakāka nā mahele a pau. |
| 0 | ʻAʻole i hoʻonohonoho ʻia ke kākau a ʻaʻole nō i mōakāka ka manaʻo o ka haumāna. Pili ʻole loa nō nā mahele a pau o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻohe laʻana kūpono e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili iki a maopopo iki kona manaʻo i ke kumuhana kūpono. Ma kēia kākau ʻana, ʻaʻole i pololei ke kaʻina kumuhana a me ka pōʻaiapili a ʻaʻole i kokoke iki ka haʻina i kekahi mea pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. He ʻano hopena kēia o ka hoʻāʻo ʻole e pane iki ma ke ʻano pololei a piha nō hoʻi. |

### Table 7.3: KĀʻEO HLA General Rubric for 2-Point Item

| Helu ʻAi | Nā Ana Loiloi no nā Nīnau Mākau ʻŌlelo |
|---|---|
| 2 | Ua hoʻonohonoho ʻia ke kākau i mōakāka loa ka manaʻo o ka haumāna. Hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e lawa ai ka maopopo loa o kona manaʻo a me ke kumu i manaʻo ʻia ai. Kākau ka haumāna me ka holo pono o kona mau manaʻo, mai kekahi manaʻo a i kekahi. Ma kēia kākau ʻana, he pololei loa ke ʻano o ke kaʻina kumuhana i pili kūpono i ka pōʻaiapili o ka paukū kākau. Ma ka wā e pono ai, e hoʻohana kūpono ʻia nā loina Hawai'i a me ʻike Hawai'i ʻiʻo kūpono e wehewehe piha ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua kū like ke ʻano o ia mahele i ke ʻano mōakāka loa no ia mau mahele a pau. |
| 1 | Ua hoʻonohonoho ʻia ke kakau a ʻaʻole nō i mōakāka loa ka manaʻo o ka haumāna. E ʻike ʻia ana ke ʻano pili ʻole o kekahi mau mahele o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻole nō i lawa nā laʻana e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili loa a maopopo loa kona manaʻo. Ma kēia kākau ʻana, ʻaʻole i pololei loa ke kaʻina kumuhana a me ka pōʻaiapili akā ua kokoke ka haʻina i ka manaʻo i pili a pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ʻaʻole mōakāka nā mahele a pau. |
| 0 | ʻAʻole i hoʻonohonoho ʻia ke kākau a ʻaʻole nō i mōakāka ka manaʻo o ka haumāna. Pili ʻole loa nō nā mahele a pau o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻohe laʻana kūpono e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili iki a maopopo iki kona manaʻo i ke kumuhana kūpono. Ma kēia kākau ʻana, ʻaʻole i pololei ke kaʻina kumuhana a me ka pōʻaiapili a ʻaʻole i kokoke iki ka haʻina i kekahi mea pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. He ʻano hopena kēia o ka hoʻāʻo ʻole e pane iki ma ke ʻano pololei a piha nō hoʻi. |

### Table 7.4: KĀʻEO HLA General Rubric for 1-Point Item

| Helu ʻAi | Nā Ana Loiloi no nā Nīnau Mākau ʻŌlelo |
|---|---|
| 1 | Ua hoʻonohonoho ʻia ke kākau a ʻano mōakāka ka manaʻo o ka haumāna akā he mau ʻike iki i pono ʻole a i ʻole i komo ʻole. Hoʻolauna ʻia ka manaʻo nui o ka haumāna a hoʻohana ʻia nā laʻana e ʻano maopopo ai kona manaʻo nui. Kākau ka haumāna me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, akā ʻaʻole nō i piha loa. Ma kēia kākau ʻana, he pololei ke kaʻina kumuhana i pili kūpono. Ma ka wā e pono ai, e hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. Ma loko o nā mahele a pau o ke kākau ʻana, ua ʻano mōakāka ia mau mahele a pau. |
| 0 | ʻAʻole i hoʻonohonoho ʻia ke kākau a ʻaʻole nō i mōakāka ka manaʻo o ka haumāna. Pili ʻole loa nō nā mahele a pau o kēia paukū i ke kumuhana nui o ka haʻina. ʻAʻole i hoʻolauna pono ʻia ka manaʻo nui o ka haumāna a ʻaʻohe laʻana kūpono e maopopo ai kona manaʻo nui. ʻAʻole ka haumāna i kākau me ka holo o kona mau manaʻo, mai kekahi manaʻo a i kekahi, a no laila ʻaʻole nō i pili iki a maopopo iki kona manaʻo i ke kumuhana kūpono. Ma kēia kākau ʻana, ʻaʻole i pololei ke kaʻina kumuhana a me ka pōʻaiapili a ʻaʻole i kokoke iki ka haʻina i kekahi mea pololei. ʻAʻole nō i hoʻokomo ʻia nā loina Hawai'i a me ʻike Hawai'i e wehewehe ʻia ai ka manaʻo. He ʻano hopena kēia o ka hoʻāʻo ʻole e pane iki ma ke ʻano pololei a piha nō hoʻi. |

**Mathematics rubrics**. Because the Kaiapuni math standards were a direct translation from the Common Core mathematics standards, scorers used the Smarter Balanced generic rubrics (

Table 7.5 through Table 7.7).

### Table 7.5: Smarter Balanced Math General Rubric for 3-Point Item

| Score | Description |
|---|---|
| 3 | The student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this task. The student has addressed the task in a mathematically sound manner. The response contains evidence of the student's competence in problem solving, reasoning, and/or modeling to the full extent that these processes relate to the specified task. The response may, however, contain minor flaws that do not detract from a demonstration of full understanding. |
| 2 | The student has demonstrated a **reasonable** understanding of the mathematical content and practices essential to this task. The student has addressed most of the task in a mathematically sound manner. The response contains sufficient evidence of the student's competence in problem solving, reasoning, and/or modeling, but not enough evidence to demonstrate a full understanding of the processes he or she applies to the specified task. The response may contain errors that can be attributed to misinterpretation of the prompt; errors attributed to insufficient, non-mathematical knowledge; and errors attributed to careless execution of mathematical processes or algorithms. |
| 1 | The student has demonstrated a **partial** understanding of the mathematical content and practices essential to this task. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task. Such deficits include evidence of insufficient mathematical knowledge; errors in fundamental mathematical procedures; and other omissions or irregularities that bring into question the student's competence in problem solving, reasoning, and/or modeling related to the specified task. |
| 0 | The student has demonstrated **merely an acquaintance** with the topic, or provided a completely incorrect or uninterpretable response. The student's response may be associated with the task, but contains few attributes of an appropriate response. There are significant omissions or irregularities that indicate a lack of comprehension in regard to the mathematical content and practices essential to this task. No evidence is present that demonstrates the student's competence in problem solving, reasoning, and/or modeling related to the specified task. |

### Table 7.6: Smarter Balanced Math General Rubric for 2-Point Item

| Score | Description |
|---|---|
| 2 | The student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this task. The student has addressed the task in a mathematically sound manner. The response contains evidence of the student's competence in problem solving, reasoning, and/or modeling to the full extent that these processes apply to the specified task. The response may, however, contain minor flaws that do not detract from a demonstration of full understanding. |
| 1 | The student has demonstrated a **partial** understanding of the mathematical content and practices essential to this task. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task. Such deficits include evidence of insufficient mathematical knowledge; errors in fundamental mathematical procedures; and other omissions or irregularities that bring into question the student's competence in problem solving, reasoning, and/or modeling related to the specified task. |
| 0 | The student has demonstrated **merely an acquaintance** with the topic, or provided a completely incorrect or uninterpretable response. The student's response may be associated with the task, but contains few attributes of an appropriate response. There are significant omissions or irregularities that indicate a lack of comprehension in regard to the mathematical content and practices essential to this task. No evidence is present that demonstrates the student's competence in problem solving, reasoning, and/or modeling related to the specified task. |

### Table 7.7: Smarter Balanced Math General Rubric for 1-Point Item

| Score | Description |
|---|---|
| 1 | The student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this task. The student has addressed the task in a mathematically sound manner. The response contains evidence of the student's competence in problem solving, reasoning, and/or modeling to the full extent that these processes apply to the specified task. The response may, however, contain minor flaws that do not detract from a demonstration of full understanding. |
| 0 | The student has demonstrated **merely an acquaintance** with the topic, or provided a completely incorrect or uninterpretable response. The student's response may be associated with the task, but contains few attributes of an appropriate response. There are significant omissions or irregularities that indicate a lack of comprehension in regard to the mathematical content and practices essential to this task. No evidence is present that demonstrates the student's competence in problem solving, reasoning, and/or modeling related to the specified task. |

**Science Rubrics**. The development of the generic science rubrics used guidance provided by the SBAC, but they were adjusted and revised to ensure their appropriateness for science (Table 7.8 through Table 7.10).

### Table 7.8: KĀʻEO Science General Rubric for 3-Point Item

| Helu ʻAi | Ke Ana Loiloi no nā Nīnau Akeakamai |
|---|---|
| 3 | • He ʻike Hawaiʼi ko ka haumāna (ke ake akamai, ke aloha ʻāina, ka ʻike kahua)<br>• Hōʻike ʻia ke kūanaʻike kūpuna (ʻo ka noiʻi ʻoe, ʻo ka noke ʻoe, apwa)<br>• Kūpono ka ʻikepili kākoʻo, a kākoʻo ʻia nō kona manaʻo<br>• Pili nā lāliʻi kākoʻo i ke kumuhana nui<br>• Wehewehe mōakāka ʻia kona manaʻo<br>• Pololei ka ʻike ʻepekema (inā nō ʻokoʻa ia mai ka ʻike Hawaiʼi)<br>• Holo pono kāna hana (ka wehewehena, ka noiʻi, ka hoʻokolohua, apwa) |
| 2 | • He ʻike Hawaiʼi mālani ko ka haumāna, akā he ʻike nō kona<br>• Hōʻike ʻia kekahi kūanaʻike, ʻaʻole naʻe ia he kūanaʻike kūpuna Hawaiʼi<br>• ʻAʻole paha kūpono ka ʻikepili no ke kākoʻo piha ʻana i ka manaʻo nui<br>• Pili kāpekepeke nā lāliʻi kākoʻo i ke kumuhana nui<br>• Wehewehe ʻia kona manaʻo, akā ʻaʻole paha akāka leʻa<br>• He ʻike ʻepekema kona<br>• Kūlanalana ka holo ʻana o kāna hana |
| 1 | • ʻAʻole paʻa ka ʻike Hawaiʼi iā ia<br>• ʻAʻole akāka kona kūanaʻike<br>• ʻAʻole launa maikaʻi ka lāliʻi i ke kumuhana<br>• Pohihihi kona manaʻo<br>• ʻAʻole i paʻa kekahi ʻike ʻepekema iā ia<br>• ʻAʻole i hoʻonoho ʻia kāna hana ma kahi kaʻina holo pono |
| 0 | • Ahuwale kona mākaukau ʻole<br>• ʻAʻohe noke, ʻaʻohe hoʻāʻo, auē ka minamina ē! |

### Table 7.9: KĀʻEO Science General Rubric for 2-Point Item

| Helu ʻAi | Ke Ana Loiloi no nā Nīnau Akeakamai |
|---|---|
| 2 | • He ʻike Hawaiʼi ko ka haumāna (ke ake akamai, ke aloha ʻāina, ka ʻike kahua)<br>• Hōʻike ʻia ke kūanaʻike kūpuna (ʻo ka noiʻi ʻoe, ʻo ka noke ʻoe, apwa)<br>• Kūpono ka ʻikepili kākoʻo, a kākoʻo ʻia nō kona manaʻo<br>• Pili nā lāliʻi kākoʻo i ke kumuhana nui<br>• Wehewehe mōakāk a ʻia kona manaʻo<br>• Pololei ka ʻike ʻepekema (inā nō ʻokoʻa ia mai ka ʻike Hawaiʼi)<br>• Holo pono kāna hana (ka wehewehena, ka noiʻi, ka hoʻokolohua, apwa) |
| 1 | • ʻAʻole paʻa ka ʻike Hawaiʼi iā ia<br>• ʻAʻole akāka kona kūanaʻike<br>• ʻAʻole launa maikaʻi ka lāliʻi i ke kumuhana<br>• Pohihihi kona manaʻo<br>• ʻAʻole i paʻa kekahi ʻike ʻepekema iā ia<br>• ʻAʻole i hoʻonoho ʻia kāna hana ma kahi kaʻina holo pono |
| 0 | • Ahuwale kona mākaukau ʻole<br>• ʻAʻohe noke, ʻaʻohe hoʻāʻo, auē ka minamina ē! |

**Table 7.10: KĀʻEO Science General Rubric for 1-Point Item**

| Helu ʻAi | Ke Ana Loiloi no nā Nīnau Akeakamai |
|---|---|
| 1 | • He ʻike Hawaiʼi ko ka haumāna (ke ake akamai, ke aloha ʻāina, ka ʻike kahua)<br>• Hōʻike ʻia ke kūanaʻike kūpuna (ʻo ka noiʻi ʻoe, ʻo ka noke ʻoe, apwa)<br>• Kūpono ka ʻikepili kākoʻo, a kākoʻo ʻia nō kona manaʻo<br>• Pili nā lāliʻi kākoʻo i ke kumuhana nui<br>• Wehewehe mōakāk a ʻia kona manaʻo<br>• Pololei ka ʻike ʻepekema (inā nō ʻokoʻa ia mai ka ʻike Hawaiʼi)<br>• Holo pono kāna hana (ka wehewehena, ka noiʻi, ka hoʻokolohua, apwa) |
| 0 | • ʻAʻole paʻa ka ʻike Hawaiʼi iā ia<br>• ʻAʻole akāka kona kūanaʻike<br>• ʻAʻole launa maikaʻi ka lāliʻi i ke kumuhana<br>• Pohihihi kona manaʻo<br>• ʻAʻole i paʻa kekahi ʻike ʻepekema iā ia<br>• ʻAʻole i hoʻonoho ʻia kāna hana ma kahi kaʻina holo pono |

### 7.1.2. *Item-specific Rubrics*

Using the item information and the generic rubric, UH KĀʻEO assessment staff members constructed item-specific rubrics for each open-ended item. The number of score points was based on the degree to which scorers were thought to be able to accurately differentiate between responses at each score point, as defined by the generic rubric. For example, an item that only has one possible answer might be one score point. This could be compared to a written essay that is being scored on organization. In this case, a scorer might be able to accurately differentiate between several score points. The item-specific rubric contains precise information regarding which student responses could be associated with each score point.

The item-specific rubrics were developed by UH staff prior to the scoring meeting using the following process:

- The target domain, standard, DOK, and dimension(s) were identified and a draft of the scoring rubric was written based on the question. This scoring rubric also included possible solutions or answers to the problem, while allowing for more than one possible answer if appropriate.
- A point value for the rubric (and question) was assigned based on guidance from SBAC generic rubrics, while also considering depth of knowledge and difficulty.
- The first draft of the scoring rubric was then reviewed by a Hawaiian language expert for appropriateness of vocabulary and grammatical structures.
- UH staff then randomly selected 10% of responses (which remained anonymous) per item and used these responses to verify that the rubric could be appropriately applied to score these sample responses.
- Any necessary revisions were made to the item-specific rubric based on this thorough review.

### 7.1.3. *Extended Writing Prompt Rubrics*

The writing portion of the assessment contains an extended writing prompt. The UH KĀʻEO assessment team was guided in terms of structure by the rubrics developed by the SBAC for extended response items, while also incorporating elements that were unique to HLA and the Hawaiian language. SBAC rubrics are divided into three separate categories (see https://www.smarterbalanced.org/wp-content/uploads/2015/09/Narrative_PT_Rubric.pdf for an example), which were also followed for the HLA

rubrics: Organization/Purpose, Development/Elaboration, and Conventions. KĀʻEO rubrics followed a similar structure and content, with some adaptations. For example, one portion of the rubric specified that students must be scored on their use of appropriate, grade-level conventions, but the definition of what is appropriate in the Hawaiian language is slightly different to that in relation to English. Diacritical marks are an important aspect of spelling in the Hawaiian language, as the presence or absence of a diacritical mark can completely change the meaning of a word. Thus, this is one issue that was not accounted for in the SBAC examples, but was addressed in the KĀʻEO rubrics. Another issue that complicated matters was the absence of standardized academic vocabulary or grammar in the Hawaiian immersion program, whereby the specific words used in relation to concepts varied on different islands or between different schools. Thus, the extended writing item-scoring guide provided some general guidance for scorers related to conventions, but it was critical for the scorers to be properly trained and calibrated as they worked through each question scoring responses to ensure that the same guidelines were applied across scorers. This was an issue that was discussed extensively, with common agreements reached before scoring began. Figure 7.2 shows an example of the grade 5 writing conventions. These conventions were adapted from the Smarter Balanced guides.

### Figure 7.2: Writing Conventions for Grade 5

**Smarter Balanced – Conventions Chart**
**Updated January 2016**

**Grade 5**

| Spelling | Capitalization | Punctuation | Grammar Usage | Sentence Completion |
|---|---|---|---|---|
| Correctly spell words at grade level and below. | Use **capitalization** rules from the previous grades. | Use **commas** to<br>• separate items in a series.<br>• separate an introductory element from the rest of the sentence.<br>• set off the words yes and no (e.g., Yes, thank you), to set off a tag question from the rest of the sentence (e.g., It's true, isn't it?), and to indicate direct address (e.g., Is that you, Steve?). | **Verbs:**<br>• Correctly use the **perfect** tense (e.g., I had walked, I have walked; I will have walked).<br>• Use **verb tense** to convey various times, sequences, states, and conditions.<br>• Avoid inappropriate shifts in **verb tense**.*<br><br>**Conjunctions:**<br>• Correctly use **correlative conjunctions** (e.g., either/or, neither/nor).<br><br>**Agreement:**<br>• **Pronouns and antecedents agree** (He brought his dog to school; He and Gary brought their lunch).<br>• **Subjects and verbs agree** (My friend and I go to recess together; Sally goes to recess with her friends).<br><br>**Frequently Confused Words:**<br>• Use **frequently confused words*** correctly. | Avoid **run-on sentences** (fused or run-together sentences, comma splices).<br><br>Avoid sentence **fragments*** (e.g., Going into town).<br><br>May correctly use **purposeful fragments** in dialogue (e.g., "Not us!"). |

*as appropriate for grade level

These conventions were written in Hawaiian, but a translated summary of how they were adapted is as follows:

- Spelling: correctly spell words that are appropriate for the grade level, using proper diacritical marks (kahakō and ʻokina).
- Capitalization: capitalize names, places, and titles of books or people.
- Punctuation: use commas appropriately to link ideas together or in dialogue. Apostrophes are not used in Hawaiian, but students should use the appropriate possessive marker (ko/ka/na/no/o/a) to show possession.

- Grammar usage: use markers correctly for singular or plural nouns (nā/ka); use markers correctly for verb tenses (Ua, E/ana, Ke/nei); use markers correctly for different kinds of verbs (static, transitive, intransitive, etc.); use correct grammatical placement of adjectives; use coordinating and subordinate conjunctions correctly, including with verbs.

## 7.2. Anchor Papers

After the rubrics were developed, UH KĀʻEO assessment staff scored a series of items. The number of items scored was four times the number of score points for each item (e.g., a two-point item would have eight student responses scored). From this sample of scored papers, one or two student responses were selected for each open-ended item score point. This set of papers provided examples of how student work was represented at each of the possible score points. Scorers and scoring managers used and referred to the anchor papers over the course of the scoring process for training, retraining, and to clarify any questions.

Once the anchor papers were selected by the staff, an anchor approval meeting was held. This meeting included UH KĀʻEO assessment staff and a team of educators and content experts consisting of at least four individuals who were highly knowledgeable about the content and the students at the specific grade level. The team also included a UH facilitator who guided the team in a reflective dialogue about the item, the content it measured, the depth of knowledge, and the selected anchor papers. The team reviewed the sample papers selected and scored by UH KĀʻEO assessment staff. Each team member read through the specific open-ended item, the associated item scoring guide, and the sample student responses. The team then discussed each score point and selected at least one paper that served as the 'exemplar' student response at that score point. This paper became the anchor paper for that item and score point. Additional anchor papers were selected if the committee believed that the additional work more accurately captured the breadth and depth of the student responses. If the committee determined that none of the selected student responses provided an accurate indicator of a given score point, UH staff pulled additional papers until one was agreed on.

The UH staff made detailed notes regarding the final selection of the anchor papers. These notes included any scoring information the committee felt was helpful, including information about any subtleties in potential student responses, which was an important part of the discussions during the scoring meeting. Anchor papers were a major focus of the scoring training, which is summarized in later sections. The anchor papers were used as a jumping-off point during the anchor paper meeting, but the anchor paper team ensured that the papers that were selected for the scoring meeting were appropriate within a Hawaiian context. Each anchor paper was signed off on by a UH staff member and one of the review committee members.

The end result of the anchor review meetings was a completed scoring guide for each open-ended item. This included a summary of the item that was used in discussion with scorers and a set of anchor papers for each score point.

## 7.3. Training

Training is critical for ensuring that items are accurately and consistently scored. It is only through this accuracy and consistency that we can begin to support score reliability. Furthermore, stakeholders cannot hope to make

appropriate decisions or interpretations based on scores that are unreliable. This speaks directly to the issue of validity. Thus, thoughtful and thorough training is critical in relation to the technical merits of the assessment.

Scorers were thoroughly trained to score each item in each assessment. Each scorer was instructed to read the scoring guide for the item they were scoring, the anchor papers, and the annotations for each anchor paper. The annotations that were generated during anchor paper selection were particularly important, as they provided the scorer with guidance on why the specific student response was an exemplar for that score point. The scorer was asked to reflect on the meaning of each score point. Scorers were encouraged to ask questions, and the trainer provided time for questions and answers. A more detailed description of this process is presented below.

Scorers then read through a series of training papers. There was a minimum of five papers at each grade and content level that had previously been scored by at least two UH staff members. Scorers practiced scoring these papers. Once the scorers completed their scoring, the scoring manager polled them about the scores they had assigned. Scorers were allowed to ask questions and discuss their scores.

An additional aspect of training for the scoring of the 2021 test administration was related to item and test security because the meeting was held virtually. These additional security steps were outlined in a previous section, but included training in the use of Digify, additional training related to the security of the scorer's work environment, and additional confidentiality training.

## 7.4. Certification

Before a scorer began scoring actual test items, they were certified to score papers in the relevant content area (McClellan, 2010). In order to make scorers comfortable with the process, the UH team used a collaborative process to ensure that the entire group of scorers was in agreement. This entailed looking at anchor papers that represented the range of possible score points for each item as a group. The group would then have an in-depth discussion about the score that each paper should be assigned and why. If there was disagreement on a paper, the group would continue to discuss the response, refer to the rubric, and talk through the disagreement until consensus was reached. This discussion occurred prior to the scoring of each item, and was used as a way to calibrate the group so that they would score each item in a consistent manner.

The UH team pulled a set of student responses that represented a range of scores in each content area (12 papers in total). Two team members scored each student paper and reached consensus on their scoring. These were the papers that each scorer needed to score correctly to become certified on that item. The papers were then divided into three sets: one for initial certification and two for recertification. The UH team included papers that might be difficult to score (e.g., the specific score point might not be clearly delineated).

Scorers were required to achieve a high level of agreement (80%) on all 12 papers relative to the scores generated by UH staff. If a scorer did not pass the first round, they were retrained and required to repeat the certification process. If they did not pass the second round, they were thanked for their time and excused from scoring. All scoring managers had passed two rounds.

## 7.5. Scoring

UH KĀʻEO assessment staff assigned an adequate number of scorers to each grade and content area. Because scorers needed to be proficient in the Hawaiian language, there was a limited pool of scorers. The size of the pool was considered when planning the timeline, and the time spent scoring items was carefully documented and monitored. Once a scorer was trained as described above, they were considered certified, and were assigned papers to score.

After training, scorers used a secure computer terminal where a student response was viewed on the screen. This was done anonymously so that the scorer could not identify the student or their school. The items were scored using the rubric and item-specific training materials. These materials were accessible on the computer screen and included the question, the standard and all metadata associated with the question, the scoring rubric, and the anchor papers. Scores were entered into the scoring database.

At this point, the sample anchor papers were thoroughly discussed and used to provide more in-depth training for the scorers. This was done for two reasons. First, as mentioned previously, academic vocabulary is not necessarily standardized across all schools on the different islands, although all islands were represented at the scoring meeting. This made it an opportune time to calibrate the group, not only in relation to the specific scoring rubrics, but also in relation to the language that it would be appropriate to see at this grade level in response to these specific questions. Achieving consensus on the score that would be assigned to an anchor paper and the discussion that took place to reach that consensus was an important part of ensuring that papers were scored consistently. Second, having these conversations in real time, rather than presenting the scorers with a summary of a conversation conducted in a previous meeting, provided the trainers with an opportunity to hear a range of thoughts, as well as the consensus that was reached, immediately prior to the scoring of an item. Once the scoring of an item began, however, conversation between scorers was stopped so that all student responses were scored independently and objectively.

All responses were then scored by another trained scorer, who was unaware of the score allocated by the first scorer. This helped to establish scoring reliability. The computer software that was used was created specifically for the KĀʻEO assessment program and was the same software that was used to administer the assessment. Thus, all student responses and scores were part of a fully integrated system, mitigating the possibility of human error. If the computer program recognized that scores from the double-scoring process were not in agreement, the relevant paper/item was sent to a scoring manager to be read and scored. The scoring manager was unaware of the first two scores. After the scoring manager had scored the paper/item, if the score allocated by the scoring manager was in agreement with one of the first two scores, the computer program recorded that as the final score and marked the response as complete. If no agreement was reached, another scoring manager was alerted and he/she scored the paper/item. This process was thoroughly documented, including the number of items the scoring manager rescored, the reasons for the discrepancy, and the final score. This process was fully automated and enabled UH staff to monitor the progress of scoring in real time, ensure that responses were scored properly, and respond to issues immediately. It also streamlined the scoring process, facilitated the efficient inputting of scores, and mitigated the possibility of human error.

If the scorer read anything in a response that was disturbing or inappropriate, he/she was instructed to immediately bring it to the attention of the scoring manager. Examples might include a student writing about self-harming, harming others, or being in a dangerous situation. If this occurred, the HIDOE Assessment Section Office was notified, a Test Incident form was completed detailing the response, and the Assessment Section followed up as

necessary, notifying the KĀ'EO assessment staff if any further follow-up was needed. Once all the scoring for a question was complete, the group moved on to the next question.

## 7.6. Documentation

The scoring manager thoroughly documented the training and scoring processes. All scorers signed a confidentiality and non-disclosure agreement stating that they were thoroughly trained and would maintain the security of the items and the student responses. The training documentation included the name of each scorer's trainer and the date on which certification occurred. The scoring manager also documented which scorers were assigned to each content area and grade level. Finally, they documented any questions that arose, as well as any issues that occurred during scoring. All records are maintained by the project team.

## 7.7. Analysis

Reliability and precision of assessment scores is a critical consideration of any testing program. The Standards for Educational and Psychological Testing defined this as the degree to which students' scores would be the same across multiple administrations of the same assessment (AERA/APA/NCME, 2014). Part of building reliability evidence is examining the scoring processes to ensure consistency and accuracy of the methods.

The testing program analyzed scoring data for accuracy and reliability per AERA/APA/NCME (2014):

> **Standard 2.7** When subjective judgment enters into test scoring, evidence should be provided on both interrater consistency in scoring and within-examinee consistency over repeated measurements. A clear distinction should be made among reliability data based on (a) independent panel of raters scoring the same performances or products, (b) a single panel scoring successive performances or new products, and (c) independent panels scoring successive performances or products.

In each of the fourteen assessments, there were numerous open-ended items. As described above, these items were hand-scored by trained scorers. The scorers used rubrics to establish the value of each student's response to an item and to achieve consistency. All open-ended items were **double scored** and any discrepancies noted. Any response that did not receive an identical score from the two scorers was scored by the scoring manager. The project team psychometricians reviewed and analyzed all items to document the reliability. The goal of these analyses was to provide a thorough quality check and to assess the final reliability of the scores.

First, the psychometric team evaluated the scoring information to understand patterns in scoring. The first step was to analyze each item and calculate the percent agreement between scores on each item. Agreement was calculated as *exact* (the same score from each scorer) or *adjacent* (scores between the scorers differed by 1) between the first two scorers. Table 7.11 shows the consistency of the scorers and any variation in scoring. When combining exact and adjacent agreement categories, agreement ranged from 88% to 100%.

**Table 7.11: Assessments: Items by Percent of Scorer Agreement***

| Grade | Subject | Item | Maximum Points | n | Kappa | Percent Exact | Percent Adjacent | Percent Exact and Adjacent |
|---|---|---|---|---|---|---|---|---|
| 3 | HLA | 92 | 1 | 277 | 0.63 | 85 | 16 | 100 |
| 3 | HLA | 99 | 1 | 277 | 0.62 | 82 | 18 | 100 |
| 3 | HLA | 127 | 1 | 274 | 0.62 | 98 | 3 | 100 |

| Grade | Subject | Item | Maximum Points | n | Kappa | Percent Exact | Percent Adjacent | Percent Exact and Adjacent |
|---|---|---|---|---|---|---|---|---|
| 3 | HLA | 138 | 2 | 275 | 0.42 | 77 | 20 | 98 |
| 3 | HLA | 145 | 1 | 275 | 0.58 | 79 | 21 | 100 |
| 3 | HLA | 379 | 2 | 276 | **0.35** | 81 | 18 | 99 |
| 3 | HLA | 1020 | 2 | 276 | 0.44 | 81 | 17 | 98 |
| 3 | HLA | 1024 | 3 | 276 | 0.44 | **70** | 25 | 95 |
| 3 | HLA | 1284 | 2 | 274 | 0.46 | 76 | 22 | 98 |
| 3 | HLA | 394a | 2 | 273 | 0.55 | 72 | 25 | 97 |
| 3 | HLA | 394b | 2 | 273 | 0.46 | **65** | 33 | 98 |
| 3 | HLA | 394c | 1 | 273 | 0.47 | 81 | 19 | 100 |
| 4 | HLA | 11 | 1 | 253 | 0.83 | 96 | 4 | 100 |
| 4 | HLA | 17 | 1 | 253 | 0.85 | 93 | 8 | 100 |
| 4 | HLA | 35 | 2 | 253 | **0.38** | 80 | 18 | 98 |
| 4 | HLA | 42 | 3 | 253 | **0.36** | **61** | 34 | 95 |
| 4 | HLA | 1013 | 3 | 252 | 0.45 | **64** | 28 | 92 |
| 4 | HLA | 395a | 2 | 253 | **0.38** | **63** | 35 | 98 |
| 4 | HLA | 395b | 2 | 253 | **0.40** | **63** | 35 | 98 |
| 4 | HLA | 395c | 1 | 253 | 0.48 | 80 | 20 | 100 |
| 5 | HLA | 690 | 1 | 252 | 0.66 | 83 | 17 | 100 |
| 5 | HLA | 706 | 2 | 252 | 0.41 | 90 | 9 | 99 |
| 5 | HLA | 712 | 4 | 252 | **0.37** | **63** | 25 | 89 |
| 5 | HLA | 722 | 3 | 252 | 0.54 | **70** | 24 | 94 |
| 5 | HLA | 1030a | 2 | 252 | 0.43 | **67** | 32 | 99 |
| 5 | HLA | 1030b | 2 | 252 | **0.23** | **45** | 44 | 89 |
| 5 | HLA | 1030c | 1 | 252 | 0.40 | 70 | 30 | 100 |
| 6 | HLA | 643 | 3 | 165 | 0.54 | **67** | 29 | 96 |
| 6 | HLA | 664 | 3 | 165 | 0.43 | 72 | 21 | 93 |
| 6 | HLA | 666 | 4 | 164 | 0.52 | **69** | 21 | 90 |
| 6 | HLA | 680 | 4 | 165 | 0.58 | **68** | 30 | 98 |
| 6 | HLA | 694 | 2 | 164 | 0.53 | 82 | 18 | 99 |
| 6 | HLA | 1173 | 3 | 165 | 0.41 | **62** | 29 | 91 |
| 6 | HLA | 1031a | 2 | 164 | 0.52 | 75 | 23 | 98 |
| 6 | HLA | 1031b | 2 | 164 | 0.49 | **62** | 30 | 92 |
| 6 | HLA | 1031c | 1 | 164 | **0.38** | 70 | 30 | 100 |
| 7 | HLA | 762 | 1 | 163 | 0.85 | 93 | 7 | 100 |
| 7 | HLA | 770 | 2 | 162 | 0.50 | 80 | 17 | 98 |
| 7 | HLA | 808 | 4 | 163 | 0.47 | **60** | 30 | 90 |
| 7 | HLA | 872 | 4 | 162 | **0.38** | 70 | 22 | 92 |
| 7 | HLA | 878 | 3 | 163 | 0.40 | **66** | 29 | 94 |
| 7 | HLA | 889 | 3 | 162 | 0.49 | 74 | 20 | 93 |
| 7 | HLA | 1096 | 3 | 163 | 0.49 | **64** | 26 | 90 |
| 7 | HLA | 1097 | 3 | 163 | 0.53 | **66** | 30 | 96 |
| 7 | HLA | 1032a | 2 | 161 | 0.48 | 71 | 27 | 98 |
| 7 | HLA | 1032b | 2 | 161 | **0.34** | **53** | 40 | 93 |
| 7 | HLA | 1032c | 1 | 161 | **0.37** | **70** | 30 | 100 |
| 8 | HLA | 761 | 1 | 137 | 0.62 | 85 | 15 | 100 |
| 8 | HLA | 767 | 2 | 138 | **0.35** | **60** | 28 | 88 |
| 8 | HLA | 780 | 4 | 137 | 0.57 | 70 | 26 | 96 |
| 8 | HLA | 820 | 4 | 137 | 0.52 | **68** | 26 | 94 |
| 8 | HLA | 911 | 3 | 138 | 0.60 | 75 | 23 | 99 |
| 8 | HLA | 1214 | 4 | 137 | 0.41 | **61** | 31 | 91 |

| Grade | Subject | Item | Maximum Points | n | Kappa | Percent Exact | Percent Adjacent | Percent Exact and Adjacent |
|---|---|---|---|---|---|---|---|---|
| 8 | HLA | 1034a | 2 | 128 | **0.31** | **57** | 36 | 93 |
| 8 | HLA | 1034b | 2 | 128 | **0.30** | **48** | 39 | 88 |
| 8 | HLA | 1034c | 1 | 128 | **0.06** | **60** | 40 | 100 |
| 3 | MA | 233 | 2 | 275 | 0.82 | 99 | 1 | 100 |
| 3 | MA | 234 | 2 | 272 | 0.42 | 93 | 7 | 100 |
| 3 | MA | 235 | 2 | 272 | **0.37** | 89 | 10 | 98 |
| 4 | MA | 262 | 2 | 252 | 0.74 | 83 | 16 | 99 |
| 4 | MA | 375 | 2 | 252 | 0.74 | 85 | 15 | 100 |
| 4 | MA | 1010 | 3 | 252 | **0.29** | 97 | 3 | 100 |
| 5 | MA | 414 | 3 | 249 | 0.67 | 84 | 6 | 90 |
| 5 | MA | 435 | 3 | 246 | 0.67 | 81 | 16 | 98 |
| 5 | MA | 463 | 2 | 249 | 0.75 | 93 | 7 | 100 |
| 5 | MA | 464 | 3 | 246 | 0.80 | 92 | 8 | 100 |
| 5 | MA | 1093 | 2 | 248 | **0.27** | 86 | 12 | 98 |
| 6 | MA | 469 | 4 | 162 | 0.57 | 72 | 25 | 96 |
| 6 | MA | 491 | 3 | 163 | 0.58 | 74 | 21 | 95 |
| 6 | MA | 502 | 4 | 162 | 0.72 | 87 | 13 | 100 |
| 6 | MA | 1062 | 4 | 162 | 0.54 | 83 | 15 | 98 |
| 6 | MA | 1131 | 4 | 162 | 0.80 | 89 | 9 | 98 |
| 7 | MA | 467 | 3 | 161 | 0.63 | 92 | 8 | 99 |
| 7 | MA | 481 | 2 | 162 | 0.70 | 85 | 15 | 99 |
| 7 | MA | 547 | 3 | 162 | 0.49 | 78 | 20 | 98 |
| 7 | MA | 555 | 2 | 162 | 0.66 | 99 | 1 | 100 |
| 7 | MA | 562 | 2 | 161 | 0.72 | 83 | 16 | 99 |
| 8 | MA | 582 | 2 | 135 | 0.71 | 90 | 9 | 99 |
| 8 | MA | 583 | 2 | 135 | 0.90 | 95 | 4 | 99 |
| 8 | MA | 613 | 4 | 135 | 0.56 | 76 | 23 | 99 |
| 8 | MA | 618 | 1 | 135 | 0.97 | 99 | 2 | 100 |
| 8 | MA | 1135 | 2 | 135 | 0.90 | 98 | 2 | 100 |
| 8 | MA | 1138 | 2 | 135 | 0.49 | 96 | 3 | 99 |
| 8 | MA | 1140 | 1 | 136 | **0.34** | 93 | 7 | 100 |
| 5 | SC | 1315 | 4 | 251 | 0.43 | 70 | 25 | 95 |
| 5 | SC | 1331 | 3 | 251 | 0.54 | 72 | 26 | 98 |
| 5 | SC | 1334 | 3 | 251 | **0.31** | **67** | 30 | 97 |
| 5 | SC | 1341 | 3 | 524 | 0.60 | 72 | 26 | 98 |
| 5 | SC | 1350 | 4 | 251 | 0.47 | 74 | 21 | 95 |
| 5 | SC | 1356 | 2 | 521 | 0.62 | 75 | 24 | 99 |
| 5 | SC | 1372 | 4 | 251 | **0.40** | 74 | 23 | 98 |
| 8 | SC | 937 | 4 | 144 | 0.47 | **63** | 26 | 88 |
| 8 | SC | 945 | 4 | 143 | **0.38** | **65** | 28 | 93 |
| 8 | SC | 1114 | 3 | 143 | **0.26** | **50** | 46 | 95 |

*Items with Kappa values less than .40, or less than 70% exact agreement are highlighted in bold in the table.

Next, standardized reliability coefficients (i.e., Cohen's Kappa) were generated to assess the overall reliability of the scorers (Haertel, 2006). The Kappa statistics provide information on the degree to which scorers rate students' responses consistently. Calculation of Cohen's Kappa is performed according to the following formula:

$$\kappa = \frac{Pr(a) - Pr(e)}{1 - Pr(e)}$$

*Where Pr(a) represents the observed agreement, and Pr(e) represents agreement that would occur by chance (McHugh 2012).

Kappa values in Table 7.11 indicate that there was general agreement between the scorers for most items. Kappa values ranged between .06 and .97. One item had a value of less than .2. Values of .21 to .40 are considered fair, .41 to .60 is generally seen as moderate agreement, and .61 to .80 as substantial (Cohen, 1960).

The results showed that all items were within established criteria for percent agreement and Kappa. However, there were some items with results that were low. Items with Kappa values less than .40 or exact agreement percentages less than .70 are highlighted in bold.

These 40 items were examined by the UH staff to discern if there might be patterns or reasons for the inconsistencies between the scorers (e.g., ambiguity in the rubric). If specific reasons were found for low consistency, training for next year will be modified to ensure consistent scoring. In addition, UH staff have been purposeful about participants in these meetings, ensuring there is representations from a variety of schools and different islands to properly represent the variety of language that is present across schools. Double-blind scoring as well as the use of scoring managers and scoring administrators ensures that there is a general consensus between as many as four scorers, despite some inconsistencies between two different scorers. The low reliability of these few items should not impact the overall student scores because all items where the two scorers disagree are scored by the scoring manager. In the event that the three scorers cannot agree (i.e., when the two scorers and the scoring manager cannot achieve agreement for a minimum of two scorers) the UH staff resolves differences by using an additional scoring manager to achieve score consensus.

UH KĀʻEO assessment staff monitor the scoring of computer scored items. For each item, 10 percent of the total number of student responses are selected at random and manually checked against the answer keys. If any discrepancy exists, a thorough investigation is conducted until the underlying cause of the discrepancy is identified and all items are rescored.

# Chapter 8: Empirical Analyses: Validity

The 2021 validity analyses focused on generating statistics in support of content and internal validity. Analyses were all interpreted based on the 2021 context of Covid (see chapter 14). Because schools were disparately impacted by school closures, decreases in in-person learning and increases in virtual learning, and access to technology, there were a variety of impacts in terms of the amount and type of curriculum that was able to be taught compared to pre-pandemic years. As such, the KĀʻEO Assessment Team anticipated that some items might not function as well as in past years.

In order to achieve these goals and provide the greatest amount of information on the KĀʻEO, researchers generated multiple statistics on both items and the overall assessment. Researchers started out by employing Classical Test Theory (CTT) methods such as point biserial correlations, and p-value statistics. These statistics provide information about the items and assessment in an easy-to-understand metric. The analysis plan also mapped each analytic method to the US DOE peer review requirements.

## 8.1. Participation

Currently, there are 27 Hawaiian language immersion schools. Nineteen schools participated the 2021 operational assessments, with a resulting breakdown of students and participation by grade and subject presented in Table 8.1.

**Table 8.1: Participation by Subject and Grade**

| | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | | All Grades | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| HLA | 277 | 76.7% | 253 | 77.1% | 252 | 77.8% | 165 | 78.9% | 163 | 72.1% | 138 | 69.7% | 1248 | 75.8% |
| MA | 275 | 76.2% | 252 | 76.8% | 249 | 76.9% | 162 | 77.5% | 162 | 71.7% | 135 | 68.2% | 1235 | 75.0% |
| SC | -- | -- | -- | -- | 251 | 77.5% | -- | -- | -- | -- | 138 | 69.7% | 395 | 75.7% |
| Roster Count | 361 | | 328 | | 324 | | 209 | | 226 | | 198 | | 1646 | |

The demographic characteristics of the assessment test takers is shown in Table 8.2.

**Table 8.2: Demographics Frequency Table**

| | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | | All Students | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Language Background** | | | | | | | | | | | | | | |
| English | 321 | 88.9% | 295 | 89.7% | 286 | 88.5% | 183 | 87.6% | 205 | 91.1% | 168 | 84.8% | 1458 | 88.6% |
| French | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Hawaiian | 37 | 10.2% | 33 | 10.0% | 33 | 10.2% | 25 | 12.0% | 19 | 8.4% | 30 | 15.2% | 177 | 10.8% |
| Japanese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Portuguese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Spanish | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Tagalog | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **IEP** | | | | | | | | | | | | | | |
| N | 346 | 95.8% | 315 | 95.7% | 310 | 96.0% | 191 | 91.4% | 210 | 93.3% | 188 | 94.9% | 1560 | 94.8% |
| Y | 15 | 4.2% | 14 | 4.3% | 13 | 4.0% | 18 | 8.6% | 15 | 6.7% | 10 | 5.1% | 85 | 5.2% |
| **504 Plan** | | | | | | | | | | | | | | |
| N | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1599 | 97.2% |
| Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 46 | 2.8% |
| **Migrant** | | | | | | | | | | | | | | |
| N | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1621 | 98.5% |
| Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 24 | 1.5% |
| **Gender** | | | | | | | | | | | | | | |

| | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | | All Students | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F | 203 | 56.2% | 167 | 50.8% | 182 | 56.3% | 118 | 56.5% | 108 | 48.0% | 107 | 54.0% | 885 | 53.8% |
| M | 158 | 43.8% | 162 | 49.2% | 141 | 43.7% | 91 | 43.5% | 117 | 52.0% | 91 | 46.0% | 760 | 46.2% |
| **Free/Reduced Lunch** | | | | | | | | | | | | | | |
| N | 154 | 42.7% | 141 | 42.9% | 141 | 43.7% | 93 | 44.5% | 99 | 44.0% | 83 | 41.9% | 711 | 43.2% |
| Y | 207 | 57.3% | 188 | 57.1% | 182 | 56.3% | 116 | 55.5% | 126 | 56.0% | 115 | 58.1% | 934 | 56.8% |
| **Federal Ethnicity** | | | | | | | | | | | | | | |
| American Indian or Alaska Native | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 17 | 1.0% |
| Hispanic | 78 | 21.6% | 61 | 18.5% | 68 | 21.1% | 42 | 20.1% | 47 | 20.9% | 33 | 16.7% | 329 | 20.0% |
| Multiple | 40 | 11.1% | 34 | 10.3% | 41 | 12.7% | 21 | 10.0% | 13 | 5.8% | 18 | 9.1% | 167 | 10.2% |
| Pacific Islander | 232 | 64.3% | 222 | 67.5% | 207 | 64.1% | 141 | 67.5% | 160 | 71.1% | 139 | 70.2% | 1101 | 66.9% |
| White | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 27 | 1.6% |
| **State Ethnicity** | | | | | | | | | | | | | | |
| American Indian or Alaska Native | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Black | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Hispanic | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Japanese | -- | -- | 10 | 3.0% | 9 | 2.8% | -- | -- | -- | -- | -- | -- | 36 | 2.2% |
| Multiple | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Portuguese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 20 | 1.2% |
| Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 22 | 1.3% |
| White | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 90 | 5.5% |
| Chinese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 11 | 0.7% |
| Filipino | 12 | 3.3% | -- | -- | 13 | 4.0% | -- | -- | -- | -- | 10 | 5.1% | 57 | 3.5% |
| Native Hawaiian | 294 | 81.4% | 267 | 81.2% | 255 | 78.9% | 177 | 84.7% | 195 | 86.7% | 163 | 82.3% | 1351 | 82.1% |
| Part-Hawaiian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Korean | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Micronesian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Tongan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Guamanian/ Chamorro | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Other Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Other Pacific Islander | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 14 | 0.9% |
| **ALL** | | | | | | | | | | | | | | |
| Roster Number | 361 | 100.0% | 329 | 100.0% | 323 | 100.0% | 209 | 100.0% | 225 | 100.0% | 198 | 100.0% | 1645 | 100.0% |

## 8.2. Classical Test Theory (CTT) Analysis

Researchers examined the assessments and items using Classical Test Theory (CTT). Descriptive statistics were calculated for the total score on each assessment including case counts, mean, standard deviation, mean p-value, and alpha coefficient. Throughout these analyses, researchers conducted quality assurance checks to verify accuracy in coding data and examine any anomalies in the results. Students who omitted an individual item were treated as 'missing' the item response. Item statistics included point biserial correlations, proportion of students who answered the item correctly (p-value), and proportion of students in each of the response categories. All CTT analysis results presented here are for the final operational test forms. These analyses provided information about the difficulty of each item, the range of difficulty across the items, and the items' ability to discriminate between high and low performing students.

Analysts worked in teams of two to independently conduct the analyses which allowed for a comprehensive quality assurance check of the information. In general, the results indicated that the items were functioning well, and there was a range of item difficulty within each test form. Point biserial and item test correlations (studied item excluded) also indicated that most items were discriminating between high and low performing students. The individual items

that did not show strong point biserials were thoroughly reviewed by UH staff and identified for revision or deletion from the item bank.

### 8.2.1. *CTT Test Statistics*

Researchers examined the overall test statistics for the assessments (Table 8.3). The raw scores had a normal distribution with no evidence of floor or ceiling effects[2]. All assessments were difficult as evidenced by the test means, which ranged between 13 and 37 points. This difficulty was also reflected in the mean p-values .24 and .49. The alpha coefficients ranged from .69 to .91 which indicates the tests have good internal reliability. Comparing the means from this year to last year, the means were found to be fairly consistent (within 3 raw score points).

**Table 8.3: Summary Raw Scores Test Statistics for Operational Test**

| Subject | Grade | N Valid | N of items | Number of Points Possible | Mean | Std Deviation | Mean p-values | Cronbach's Alpha |
|---|---|---|---|---|---|---|---|---|
| **HLA** | 3 | 271 | 57 | 67 | 22.37 | 11.56 | 0.39 | 0.91 |
| **HLA** | 4 | 250 | 57 | 66 | 27.07 | 10.68 | 0.47 | 0.88 |
| **HLA** | 5 | 252 | 57 | 68 | 26.14 | 11.96 | 0.46 | 0.90 |
| **HLA** | 6 | 164 | 57 | 75 | 25.57 | 13.24 | 0.45 | 0.91 |
| **HLA** | 7 | 160 | 57 | 77 | 25.90 | 11.91 | 0.45 | 0.89 |
| **HLA** | 8 | 127 | 56 | 73 | 37.38 | 13.23 | 0.49 | 0.91 |
| **MA** | 3 | 272 | 55 | 58 | 19.18 | 7.84 | 0.35 | 0.85 |
| **MA** | 4 | 252 | 55 | 59 | 20.24 | 7.71 | 0.37 | 0.82 |
| **MA** | 5 | 246 | 58 | 66 | 20.37 | 8.48 | 0.35 | 0.82 |
| **MA** | 6 | 162 | 57 | 71 | 17.12 | 9.81 | 0.30 | 0.88 |
| **MA** | 7 | 161 | 56 | 63 | 13.49 | 5.53 | 0.24 | 0.69 |
| **MA** | 8 | 135 | 56 | 63 | 13.91 | 5.87 | 0.25 | 0.73 |
| **SC** | 5 | 251 | 53 | 69 | 18.95 | 8.45 | 0.36 | 0.82 |
| **SC** | 8 | 143 | 58 | 66 | 15.99 | 7.65 | 0.28 | 0.80 |

### 8.2.2. *CTT Item Analyses*

Item analysis results are discussed below for each grade and test form (see Appendix C for CTT statistics on all items). In general, an item is a candidate for review if its:

- Point biserial < .15
  - A point biserial correlation of <.05 is considered very poor
  - A point biserial correlation between .05 and .1 is considered poor
  - A point biserial correlation between .1 and .15 is considered marginal
- Difficulty p-value <.20 (very difficult) or >.95 (very easy)
- Omit rate is higher than 10%. Omit rates exceeding 10% and increasing toward the end of the test might indicate *speededness* (i.e., students did not have enough time to respond to all items).

[2] Floor and ceiling effects occur when many students score either at the lowest or highest scores, respectively of the assessment. This can compromise the accuracy of the assessment if students have a lower or higher achievement level than the test can actually measure.

These items were specifically reviewed by the UH staff to disposition the items (e.g., remove from the item pool). For example, items might be reviewed to determine if the item was unclear and whether the item could be revised. Items were reviewed with these considerations:

- Is the answer key correct (did we select the correct answer and is there only one correct answer – if there are two answers, we can recode the file so that students who picked either can receive the point) and was it coded correctly in scoring system?
- Is the item clearly worded?
- Does the item contain unnecessary or burdensome language/text?
- Does the item contain academic vocabulary that not all students might not have access to?
- Is there any reason that the item might be biased against certain groups (e.g., gender)?

The classical test theory information is described below and subsequent Rasch item statistics were reviewed for these items.

## Hawaiian Language Arts

### *Grade 3*

For grade 3 HLA, twenty items were flagged for CTT item review.

- One item was flagged for point biserial correlation between .05 and .1 (poor)
- One item was flagged for point biserial correlation between .1 and .15 (marginal)
- Three items were flagged for point biserial correlation of <.05 (very poor)
- Fifteen items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Nineteen of the items were retained and one item was identified for removal from the item pool (this item had not met other criteria such as IRT discrimination).

### *Grade 4*

For grade 4 HLA, thirteen items were flagged for CTT item review.

- One item was flagged for p-value <.2 (very difficult) and point biserial <.05 (very poor)
- One item was flagged for point biserial correlation between .05 and .1 (poor)
- Three items were flagged for point biserial correlation of <.05 (very poor)
- Four items were flagged for p-values <.2 (very difficult)
- Four items were flagged for point biserial correlation between .1 and .15 (marginal)

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### *Grade 5*

For grade 5 HLA, twelve items were flagged for CTT item review.

- One item was flagged for p-value <.2 (very difficult) and point biserial correlation between .05 and .1 (poor)
- One item was flagged for point biserial correlation of <.05 (very poor)
- Four items were flagged for point biserial correlation between .1 and .15 (marginal)

- Six items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### Grade 6

For grade 6 HLA, twenty items were flagged for CTT item review).

- Fifteen items were flagged for p-values <.2 (very difficult)
- Three items were flagged for point biserial correlation of <.05 (very poor)
- One item was flagged for point biserial correlation between .05 and .1 (poor)
- One item was flagged for point biserial correlation between .1 and .15 (marginal)

These items were reviewed to ensure they measured the construct and the response key was correct. Nineteen of the items were retained and one item was identified for revision and re-field testing.

### Grade 7

For grade 7 HLA, twenty-six items were flagged for CTT item review

- One item was flagged for point biserial correlation of <.05 (very poor)
- One item was flagged for point biserial correlation between .05 and .1 (poor)
- Two items were flagged for p-values <.2 (very difficult), and point biserial correlation between .1 and .15 (marginal).
- Three items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Five items were flagged for point biserial correlation between .1 and .15 (marginal)
- Fourteen items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### Grade 8

For grade 8 HLA, thirteen items were flagged for CTT item review.

- One item was flagged for point biserial correlation between .05 and .1 (poor)
- One item was flagged for p-values <.2 (very difficult), and point biserial correlation between .1 and .15 (marginal).
- Two items were flagged for point biserial correlation of <.05 (very poor)
- Three items were flagged for point biserial correlation between .1 and .15 (marginal)
- Six items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Twelve of the items were retained and one item was identified for spiraling out of the item pool.

## Mathematics

### *Grade 3*

For grade 3 mathematics, fourteen items were flagged for CTT item review.

- Eight items were flagged for p-values <.2 (very difficult)
- Two items were flagged for p-values <.2 (very difficult), and point biserial between .1 and .15 (marginal)
- One item was flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Three items were flagged for point biserial correlation between .1 and .15 (marginal)

These items were reviewed to ensure they measured the construct and the response key was correct. Thirteen of the items were retained and one item was identified to be spiraled out of the item pool.

### *Grade 4*

For grade 4 mathematics, seventeen items were flagged for CTT item review

- Four items were flagged for p-values <.2 (very difficult)
- One item was flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Four items were flagged for point biserial correlation of <.05 (very poor)
- Five items were flagged for point biserial correlation between .05 and .1 (poor)
- Three items were flagged for point biserial correlation between .1 and .15 (marginal)

These items were reviewed to ensure they measured the construct and the response key was correct. Sixteen of the items were retained and one item was identified to be spiraled out of the item pool.

### *Grade 5*

For grade 5 mathematics, twenty items were flagged for CTT item review.

- One item was flagged for p-values <.2 (very difficult), and point biserial between .1 and .15 (marginal)
- Two items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Three items were flagged for point biserial correlation of <.05 (very poor)
- Four items were flagged for point biserial correlation between .05 and .1 (poor)
- Six items were flagged for point biserial correlation between .1 and .15 (marginal)
- Ten items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Eighteen of the items were retained, one item was identified for spiraling out of the item pool and one item was marked to revise and re-field test.

### *Grade 6*

For grade 6 mathematics, twenty-one items were flagged for CTT item review.

- One item was flagged for point biserial correlation between .05 and .1 (poor)
- One item was flagged for p-values <.2 (very difficult), and point biserial between .05 and .1 (poor)
- Three items were flagged for point biserial correlation of <.05 (very poor)
- Three items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)

- Thirteen items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Nineteen of the items were retained, one item was identified for minor revisions and two items were marked to revise and re-field test.

### *Grade 7*

For grade 7 mathematics, thirty-seven items were flagged for CTT item review.

- Two items were flagged for p-values <.2 (very difficult), and point biserial between .05 and .1 (poor)
- Four item was flagged for p-values <.2 (very difficult), and point biserial between .1 and .15 (marginal)
- Four items were flagged for point biserial correlation between .1 and .15 (marginal)
- Six items were flagged for point biserial correlation of <.05 (very poor)
- Six items were flagged for point biserial correlation between .05 and .1 (poor)
- Seven items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Eight items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Thirty-two of the items were retained, two items were identified to spiral out of the item pool, and three items were marked to revise and re-field test.

### *Grade 8*

For grade 8 mathematics, thirty-eight items were flagged for CTT item.

- One item was flagged for p-values <.2 (very difficult), and point biserial between .05 and .1 (poor)
- Two items were flagged for p-values <.2 (very difficult), and point biserial between .1 and .15 (marginal)
- Three items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Three items were flagged for point biserial correlation between .05 and .1 (poor)
- Seven items were flagged for point biserial correlation of <.05 (very poor)
- Seven items were flagged for point biserial correlation between .1 and .15 (marginal)
- Fifteen items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Thirty-six of the items were retained one items was identified to spiral out of the item pool, and one items was marked to revise and re-field test.

## Science

### *Grade 5*

For grade 5 science, twenty-seven items were flagged for CTT item review.

- One item was flagged for point biserial correlation between .05 and .1 (poor)
- Two items were flagged for point biserial correlation between .1 and .15 (marginal)
- Two items were flagged for p-values <.2 (very difficult), and point biserial between .05 and .1 (poor)
- Four items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)

- Six items were flagged for point biserial correlation of <.05 (very poor)
- Twelve items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Twenty-one of the items were retained one items was identified for minor revisions, and five items was marked to revise and re-field test.

### *Grade 8*

For grade 8 science, thirty-three items were flagged for CTT item review.

- Two items were flagged for point biserial correlation of <.05 (very poor)
- Two items were flagged for point biserial correlation between .1 and .15 (marginal)
- Two items were flagged for p-values <.2 (very difficult), and point biserial between .05 and .1 (poor)
- Three items were flagged for p-values <.2 (very difficult), and point biserial between .1 and .15 (marginal)
- Four items were flagged for point biserial correlation between .05 and .1 (poor)
- Seven items were flagged for p-values <.2 (very difficult), and point biserial correlation of <.05 (very poor)
- Thirteen items were flagged for p-values <.2 (very difficult)

These items were reviewed to ensure they measured the construct and the response key was correct. Thirty-one of the items were retained, and two items were identified to spiral out of the item pool.

## 8.3. Item Response Theory Analyses

The CTT item and test statistics calculated above provide crucial information about the technical quality of the assessments and their items. In order to generate a more complete picture of the items and test forms, researchers conducted Rasch analyses. These analyses provide additional information about the item characteristics and test forms with regard to the technical quality of the items. Rasch methods generate information about the reliability of the assessment as well as the functionality of the items. This information includes statistics about the difficulty of an item, the degree to which an item fits the Rasch model, and reliability coefficients. While researchers focused primarily on the item characteristics, consideration was also given to the overall assessment in order to build an understanding of any issues or concerns that might need to be addressed before the operational assessment.

The Rasch analyses were conducted using Winsteps 5.1. Winsteps software was chosen because it has been used and refined for over thirty years and is well established in the education research and assessment community. Analyses were conducted based on the Rasch model which accounts for a single difficulty parameter. Other IRT models accommodate additional parameters (e.g., guessing); however, the sample size of the current assessment did not allow for these models to be implemented. Rasch modeling is a method that allows for a measurement model to be developed while accommodating the small sample sizes from the assessment.

Rasch models are logit linear models and are expressed in Winsteps as follows:

> "The dichotomous model:
> $\log_e(P_{ni1} / P_{ni0}) = B_n - D_i$
> The polytomous 'Partial Credit' model:
> $\log(P_{nij} / P_{ni(j-1)}) = B_n - D_i - F_{ij} = B_n - D_{ij}$

where

- $P_{nij}$ is the probability that person n encountering item i is observed in category j,
- $B_n$ is the 'ability' measure of person n,
- $D_i$ is the 'difficulty' measure of item i, the point where the highest and lowest categories of the item are equally probable,
- $F_j$ is the 'calibration' measure of category j relative to category j-1, the point where categories j-1 and j are equally probable" (p. 31, Linacre, 2012).

First, data files for the Rasch analysis were created in Stata (version 12) by one researcher and SPSS (version 24) by another researcher. By creating data files and conducting analyses independently, researchers were able to conduct quality checks of the analyses to ensure there were no coding errors, data cleaning concerns, or software issues. Second, Winsteps analyses were conducted independently by both researchers and results were matched to help ensure accuracy and technical quality. This thorough checking of the results ensured the veracity of the Rasch findings, which is critical for a high stakes assessment.

Researchers then analyzed each assessment by fitting the Rasch model to the examinee data. Using the joint maximum likelihood estimation process implemented by Winsteps, this analysis iteratively estimated item characteristics—difficulty parameters, standard errors, discrimination, and fit statistics—while also estimating student test scores. Rasch scores are often referred to as scaled scores. Through a process known as *calibration,* items (based on difficulty) and the students (based on performance) are placed on a scale where the increments of measurement are equal all along the scale.

### 8.3.1. *Test and Item Fit Statistics*

It was important to document how each assessment performed overall. These values can help inform whether any adjustments need to be made for the next year's assessment in areas such as item difficulty, number of items, and overall model fit. Researchers first examined the summary statistics generated by Winsteps for each assessment. These statistics include overall test and summary item fit statistics, person and test histograms, separation and reliability statistics, and the measure versus person statistics.

First, the results of the calibrations were checked. For each grade level, the calibration converged in a small number of iterations, suggesting good model fit. As a further quality control check, the item difficulties generated by Winsteps were cross-checked against the item difficulties generated by the CTT analyses, and these p-values agreed with each other. This is a further indication that the data are performing as expected.

Second, researchers generated descriptive statistics for each grade level and content area (Table 8.4). These descriptive statistics build information for the assessment team to understand the distribution of scores. In general, the descriptive statistics showed that the overall mean for each assessment is slightly negative indicating that the assessments were slightly difficult for the students. Logit means ranged from --1.59 to -0.38. If the assessment was perfectly matched to the students' ability, the overall mean would equal 0. If the person mean was greater than 2 or less than -2 we might consider the assessment too easy or difficult respectively (Green & Franton, 2002). Because these criteria were not exceeded, the psychometric team will continue to monitor these values and work with the UH staff to ensure the assessments do not fall outside these ranges.

### Table 8.4: Logit Score Summary Statistics

| Subject | Grade | N | Minimum | Maximum | Mean | Std. Deviation | SEM |
|---|---|---|---|---|---|---|---|
| **HLA** | 3 | 277 | -2.85 | 2.27 | -0.86 | 0.97 | 0.06 |
| **HLA** | 4 | 253 | -2.37 | 2.35 | -0.38 | 0.86 | 0.05 |
| **HLA** | 5 | 252 | -2.81 | 2.70 | -0.60 | 0.96 | 0.06 |
| **HLA** | 6 | 165 | -3.67 | 1.62 | -1.03 | 1.03 | 0.08 |
| **HLA** | 7 | 163 | -3.30 | 2.02 | -0.95 | 0.91 | 0.07 |
| **HLA** | 8 | 138 | -2.87 | 1.79 | -0.69 | 1.03 | 0.09 |
| **MA** | 3 | 275 | -2.48 | 2.66 | -0.86 | 0.83 | 0.05 |
| **MA** | 4 | 252 | -2.30 | 1.39 | -0.82 | 0.70 | 0.04 |
| **MA** | 5 | 249 | -2.09 | 1.67 | -0.86 | 0.67 | 0.04 |
| **MA** | 6 | 162 | -3.70 | 1.30 | -1.31 | 0.81 | 0.06 |
| **MA** | 7 | 162 | -3.00 | 1.12 | -1.58 | 0.55 | 0.04 |
| **MA** | 8 | 135 | -2.99 | 1.01 | -1.49 | 0.60 | 0.05 |
| **SC** | 5 | 251 | -3.24 | 0.75 | -1.04 | 0.72 | 0.05 |
| **SC** | 8 | 144 | -3.48 | 0.17 | -1.57 | 0.72 | 0.06 |

Third, summary item fit statistics were reviewed which describe the degree to which items fit the Rasch model and are functioning in a logical and predictable manner. For example, a test that is *not* functioning correctly might be evidenced by high achievement students scoring easy items incorrectly. Misfit items may result from confusing wording, unnecessary item complexity, or mismatch of the construct. Person fit similarly reflects the degree to which a respondent's choices are logical and consistent across items (Green & Franton, 2002). For the assessment, fit was examined by looking at summary infit and outfit values (Table 8.5). Mean square infit and outfit values should have means of approximately 1 (values substantially higher indicate outliers in the data and values substantially lower indicate dependency (Linacre, 2012)). Person and item statistics for these assessments were acceptable and had means very close to 1 (+/- .2). Appendix D has Winsteps Summary Output for all assessments.

### Table 8.5: IRT Summary Item Fit Statistics

| Subject | Grade | Person Infit | Person Outfit | Item Infit | Item Outfit |
|---|---|---|---|---|---|
| HLA | 3 | 1.00 | 0.97 | 0.99 | 0.97 |
| HLA | 4 | 1.01 | 1.00 | 0.99 | 1.00 |
| HLA | 5 | 1.01 | 1.00 | 0.99 | 1.00 |
| HLA | 6 | 1.01 | 1.00 | 1.00 | 1.00 |
| HLA | 7 | 0.98 | 1.02 | 1.00 | 1.02 |
| HLA | 8 | 0.98 | 1.04 | 0.99 | 1.04 |
| MA | 3 | 1.00 | 1.01 | 1.00 | 1.01 |
| MA | 4 | 1.00 | 1.00 | 1.00 | 1.00 |
| MA | 5 | 1.02 | 1.00 | 1.00 | 1.00 |
| MA | 6 | 0.97 | 1.00 | 1.00 | 1.00 |
| MA | 7 | 0.99 | 1.01 | 1.00 | 1.01 |
| MA | 8 | 1.00 | 0.99 | 1.00 | 0.99 |
| SC | 5 | 0.96 | 1.01 | 1.00 | 1.01 |
| SC | 8 | 0.98 | 1.04 | 1.00 | 1.04 |

Researchers also considered the items' distribution across students' abilities by examining histograms and item maps that compare these two sources of information (see Appendix E and F.). The histograms show how the items are

spread out across a range of difficulties that align with students' abilities. It is important in test development that items reflect a range of difficulties across students' abilities. For example, a test will be more accurate at measuring students' ability if items are not vastly more difficult or easy relative to the students' ability. Examination of the curves shows that:

- HLA good alignment between person and item histogram for all grades
- MA students were skewed towards the lower end of the item difficulty for all grades
- Science students were skewed towards the lower end of the item difficulty for all grades

Next, the item maps were reviewed which indicated how specific items are spread across student abilities. These maps in general show that there are sufficient items across the range of student abilities. In particular, the item maps show the difficulty of each score point which indicates that for many of the tests. The development team noted that there was a higher proportion of items in the center as well as at the upper (more difficult) end of the distribution. This was particularly true for grades 5-8 math and science. These issues were also noted during the 2018 field test and have started to be addressed through new item development. For the 2019 assessment, items were added to the grade 5-8 tests to increase the numbers of items by 10 percent to improve reliability and separation. Items were specifically written that were easier items in order to better match students' abilities. These additions improved the reliability and the UH assessment team will continue to focus on improving the distributions in the item map through new item development and field testing.

### 8.3.2. *Item Analysis*

The next step in the Rasch analysis was to examine the functioning of the items (see appendix G for Rasch item statistics). This analysis was conducted on the assessment using Winsteps software, which has the capacity to generate multiple statistics and output tables. For the purposes of this project, researchers focused their examination on several important criteria. These criteria included item fit statistics, which provide an indication of how well the item fits the Rasch model, and root mean square residual (RMSR), which provides information on the observed versus expected values. Results of the initial calibration for each grade level were examined to identify any instances that met the following indications of good model fit.

- General criteria and considerations for item analyses include (Linacre, 2012):
- Mean square infit between 0.6 and 1.4 (Underfit is indicated by values higher than the criteria and can indicate unusual response patterns while overfit can indicate redundancy in the items),
- Mean square outfit lower than 1.4 (values between 1.5 and 2.0 are generally considered as not degrading the measure),
- RASCH item discrimination typically between .5 and 2.0,
- Root mean square residual (RMSR) values close to 0. RMSR is a measure of the difference between the observed and expected values and is related to misfit,
- Rating scales functionality, and
- Differential Item Functioning (DIF) (which is addressed in Chapter 11: Fairness).

In general, the items fit the model well using the above criteria (see Appendix F) with a few exceptions as detailed below.

## Hawaiian Language Arts

### *Grade 3*

For grade 4 HLA, seven items did not meet the IRT item criteria.

- One item did not meet the criteria for infit, outfit or discrimination.
- One item did not meet the criteria for outfit.
- Two items did not meet the criteria for outfit and discrimination.
- Three items did not meet the discrimination criteria.

These items were reviewed to ensure they measured the construct and the response key was correct. While six of the items were retained, one item was identified for removal from the item pool (this item had not met other criteria such as point biserial).

### *Grade 4*

For grade 4 HLA, seven items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit and discrimination.
- Two items did not meet the criteria for outfit.
- Four items did not meet the discrimination criteria.

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### *Grade 5*

For grade 5 HLA, nine items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit and discrimination.
- Three items did not meet the criteria for outfit.
- Five items did not meet the discrimination criteria.

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### *Grade 6*

For grade 6 HLA, six items did not meet the IRT item criteria.

- One items did not meet the discrimination criteria.
- Two items did not meet the criteria for outfit and discrimination.
- Three items did not meet the criteria for outfit.

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### *Grade 7*

For grade 7 HLA, nine items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit and discrimination.
- Four items did not meet the discrimination criteria.

- Four items did not meet the criteria for outfit.

These items were reviewed to ensure they measured the construct and the response key was correct. All of the items were retained.

### *Grade 8*

For grade 8 HLA, twelve items did not meet the IRT item criteria.

- Two items did not meet the discrimination criteria.
- Five items did not meet the criteria for outfit.
- Five items did not meet the criteria for outfit and discrimination.

These items were reviewed to ensure they measured the construct and the response key was correct. Eleven of the items of the items were retained. One item will be spiraled out of the item pool.

## Mathematics

### *Grade 3*

For grade 3 Mathematics one item did not meet the IRT item criteria.

- One item did not meet the criteria for outfit.

These items were reviewed to ensure they measured the construct and the response key was correct. The item was retained.

### *Grade 4*

For grade 4 Mathematics six items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit.
- Five items did not meet the criteria for discrimination.

These items were reviewed to ensure they measured the construct and the response key was correct. The item was retained.

### *Grade 5*

For grade 5 Mathematics one items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit.

This item was reviewed to ensure they measured the construct and the response key was correct. The item was retained.

### *Grade 6*

For grade 6 Mathematics four items did not meet the IRT item criteria.

- Four items did not meet the criteria for outfit.
- Five items did not meet the criteria for discrimination.

These items were reviewed to ensure they measured the construct and the response key was correct. Three items will be retained. One item will be spiraled out of the item pool.

### *Grade 7*

For grade 7 Mathematics two items did not meet the IRT item criteria.

- One item did not meet the criteria for outfit.
- One item did not meet the IRT item criteria for discrimination.

These items were reviewed to ensure they measured the construct and the response key was correct. One item will be retained. One item will be spiraled out of the item pool.

### *Grade 8*

For grade 8 Mathematics two items did not meet the IRT item criteria.

- One items did not meet the criteria for outfit.
- One items did not meet the criteria for discrimination.

These items were reviewed to ensure they measured the construct and the response key was correct. All items will be retained.

## Science

### *Grade 5*

For grade 5 Science six items did not meet the IRT item criteria.

- Two items did not meet the criteria for discrimination.
- Four items did not meet the criteria for outfit.

These items were reviewed to ensure they measured the construct and the response key was correct. All items will be retained.

### *Grade 8*

For grade 8 Science eight items did not meet the IRT item criteria.

- One items did not meet the criteria for discrimination.
- Seven items did not meet the criteria for outfit.

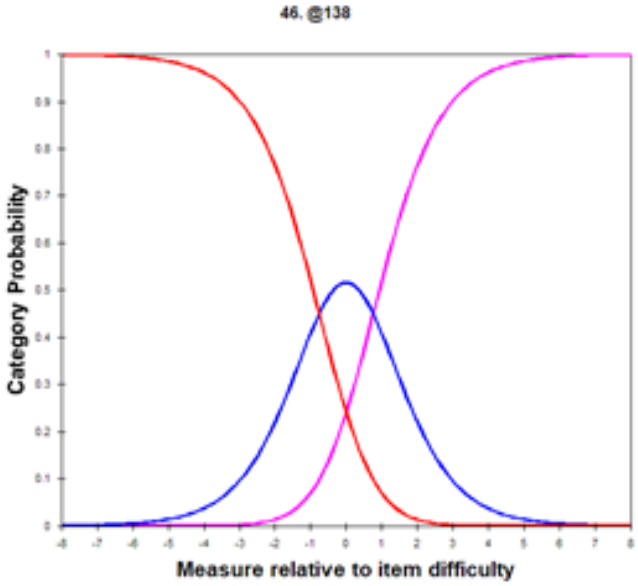
These items were reviewed to ensure they measured the construct and the response key was correct. Seven items will be retained. One item will be spiraled out of use.

#### 8.3.3. *Rating Scale Review*

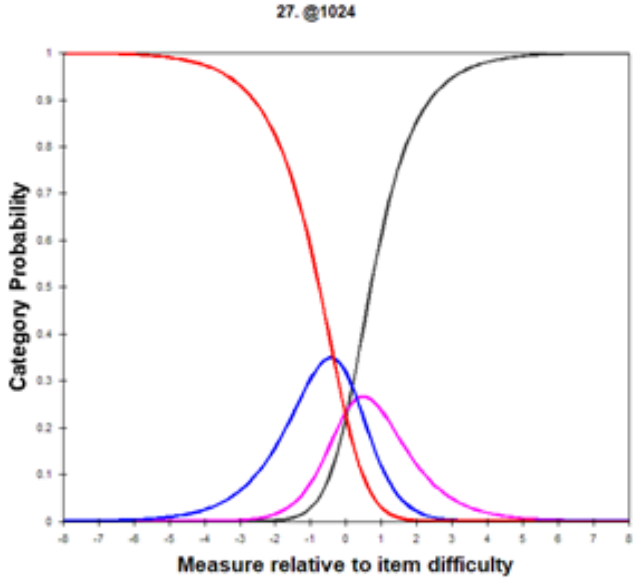
Finally, researchers examined the score point estimation for the open-ended items. This was accomplished by examining the item curves to ensure that each score point was correctly ordered and the score points functioned as expected. The graphs below show each item's score point and its respective correspondence to any increase in the overall respondent correct score (i.e., respondents with an overall higher score on the assessment should receive more points on open-ended items). The midpoint of each line on the graphs occurs where the probability is .5 for a respondent receiving that score level on the item given their overall score. This is an indication of the difficulty for each score point. For many of the open-ended items, the curves looked reasonable in terms of ordering, with the score points becoming sequentially more difficult (see Figure 8.1 for an example curve). However, some probability curves did not form distinct peaks, indicating lower differentiation between this category and the adjacent ones. In

addition, sometimes the score points did not have much separation in terms of difficulty (see Figure 8.2). These items will be monitored in future administrations to see if the curves improve or if revising the items is warranted (Table 8.4).

### Figure 8.1: Acceptable item response curve




### Figure 8.2: Item response curve for monitoring



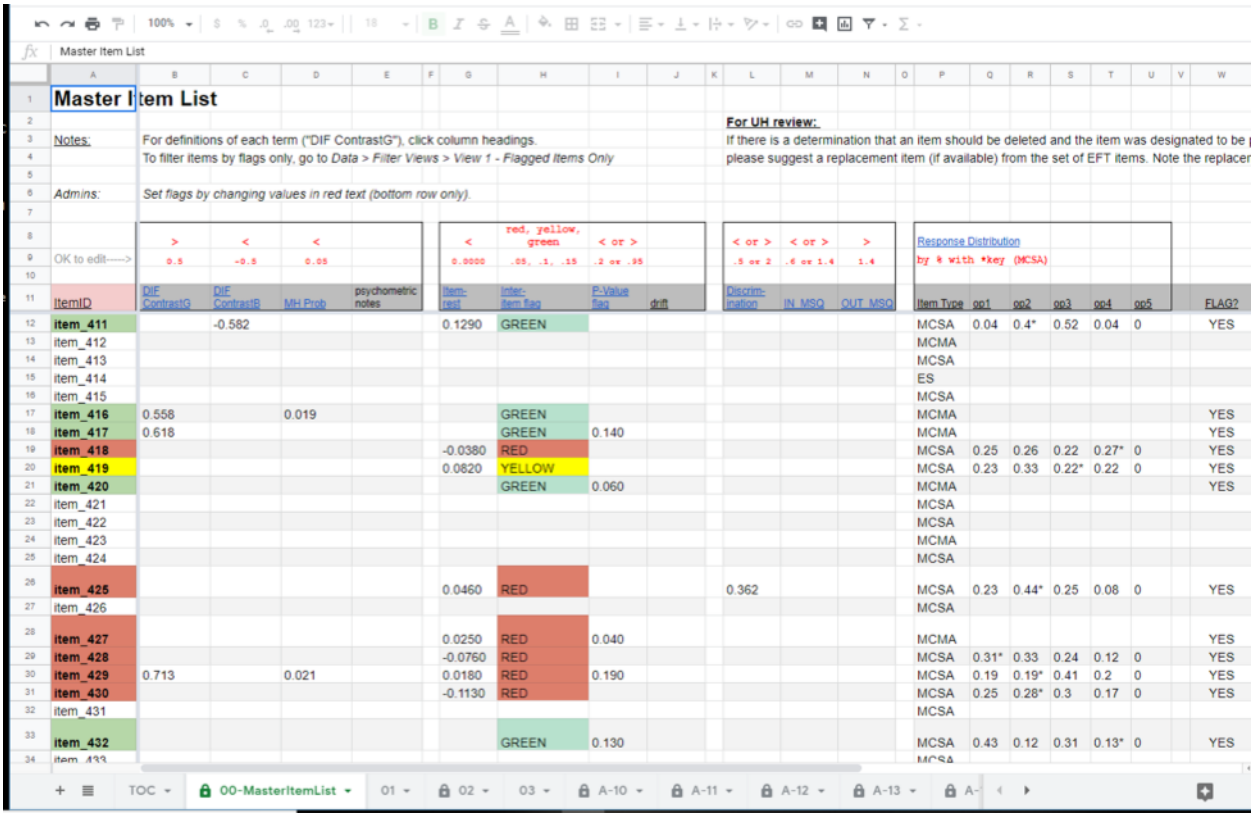
### Table 8.6: Item numbers for monitoring the rating scales

| Grade/Content | OP items with acceptable curves | Rating scales need monitoring |
|---|---|---|
| | **Hawaiian Language Arts** | |
| 3 | 379, 1284, 138, 394 (is improving relative to years prior) | 1024, 1020, |
| 4 | 35, 42, 395 | 1013 |
| 5 | 722, 706 | 712, 1030 |
| 6 | 1173, 666, 694, 1031 | 643, 664, 680, |
| 7 | 1097, 770 | 878, 808, 1096, 872, 889, 1032 |
| 8 | 911, 820, 1034 | 767, 870, 1214 |
| | **Mathematics** | |
| 3 | 235 | 233, 234 |
| 4 | 375, 262 | |
| 5 | 464 | 463, 414, 1093, 435 |
| 6 | 502, 491 | 469, 1131, 1062 |
| 7 | 562 | 481, 547 |
| 8 | 583, 582, 613 | 1135, 1138 |
| | Science | |
| 5 | 1334, 1331, 1356 | 1372, 1341, 1350, 1315 |
| 8 | | 937, 1114, 945 |

### 8.3.4. *Item Review*

All item data is placed by grade and content area in the KĀʻEO Item Review System (KIRS). This system automatically flags items that do not meet pre-specified criteria. The UH team then accesses the KIRS to review the items that are flagged and makes a determination about item revisions or deletion from the item bank. (see Figure 8.3).

### Figure 8.3: Item Review Ecosystem



## 8.4. Corrective Actions from Math, HLA and Science Assessments

Based on the review of the item statistics in 2016 through 2019, several items were determined to not be measuring the construct appropriately. As part of the KĀʻEO continuous improvement process (now documented formally via the use of *KĀʻEO Feedback Integration Forms*) new items were field tested in 2017, 2018, and 2019 and were functioning appropriately. These items were then added to the operational assessments.

## 8.5. Validity Based on Internal Structure

Types of validity evidence should align to the purposes and priorities of the assessment. As such, psychometricians often specify types of validity when evaluating an instrument. For example, **construct validity** addresses the degree to which the test conforms to or measures the underlying construct or trait that is the target of the measure. This is often a statistical argument that focuses on such evidence as internal consistency in scores, relationships of scores to external factors, and understanding score patterns. Evidence of internal consistency can support the claim that the test conforms to or measures the underlying construct or trait that is the target of the measure.

**Statistical Analyses of Assessment Data (Internal Structure):** These analyses examine the degree to which the assessment represents the reporting structure. Psychometricians conducted correlation analyses and dimensionality analyses to better understand the KĀʻEO assessment structure.

### 8.5.1. *Dimensionality*

Measurement research should include the consideration of unidimensionality to support score interpretation (Yu, Popp, DiGangi, & Jannash-Pennel, 2007; Tennant & Conaghan, 2007). It is assumed that the KĀʻEO assessments are unidimensional and measure a single content domain. In order to test this assumption, Winsteps was used to conduct a Principal Component Analysis (PCA) of item residuals with the Rasch model (Yu, Popp, DiGangi, & Jannash-Pennel, 2007; Linacre, 2012; Tennant & Conaghan, 2007). If the assessment is represented by only one dimension (e.g., unidimensional), the results will indicate a random pattern of residuals. However, if the initial eigenvalues are higher than what would be expected by chance (i.e., above 2), this could indicate the presence of a second underlying dimension thus necessitating further examination. This approach is considered robust to detecting multiple dimensions (Tennant & Conaghan, 2007) (see results in **Appendix J**).

The results suggested that each assessment had higher eigenvalues than might be attributed to chance (i.e., greater than 2). The results were examined for distinct content-related interpretations (Table 8.7). In general, the items loading positively on construct one consisted of items that were flagged for review in the Classical Test Theory analyses (e.g., low point biserial correlations) or the Rasch analyses (e.g., misfit the model).

**Table 8.7: Contrasts from Rasch Dimensionality Analysis**

| subject | grade | Eigenvalue | Dimension 1 Items Loading Positively on Contrast 1 | Dimension 1 Items loading negatively on contrast 1 | Notes |
|---|---|---|---|---|---|
| **HLA** | 3 | 3.0507 | 145, 91, 1024, 379, 1020, 1026 | 119, 1277, 123, 1022, 156, 130 | |
| **HLA** | 4 | 2.9101 | 20, 7, 64, 389, 42, 8 | 25, 55, 51, 1015, 57, 56 | |
| **HLA** | 5 | 2.7812 | 719, 712, 713, 696, 1222, 723 | 729, 716, 672, 1215, 1208, 724 | |
| **HLA** | 6 | 2.6823 | 680, 688, 694, 678, 653, 651 | 682, 661, 649, 638, 703, 659 | |
| **HLA** | 7 | 2.7543 | 888, 879, 877, 763, 1098, 777 | 1179, 1182, 887, 834, 902, 869 | |
| **HLA** | 8 | 3.0219 | 926, 826, 1078, 1092, 914, 893 | 917, 929, 1199, 1126, 921, 833 | |
| **MA** | 3 | 2.6857 | 185, 211, 217, 219, 1035, 223 | 172, 184, 198, 169, 229, 201 | |
| **MA** | 4 | 2.6615 | 1007, 265, 264, 268, 170, 164 | 377, 378, 109, 239, 267, 250 | |
| **MA** | 5 | 2.5093 | 414, 458, 452, 444, 424, 428 | 413, 1130, 412, 445, 453, 1202 | |
| **MA** | 6 | 2.9699 | 1062, 468, 1131, 571, 491, 502 | 577, 580, 526, 466, 514, 551 | |
| **MA** | 7 | 2.8562 | 559, 1234, 543, 477, 1134, 474 | 481, 498, 527, 562, 536, 552 | |
| **MA** | 8 | 2.7022 | 598, 530, 532, 607, 596, 548 | 612, 1274, 569, 618, 566, 614 | |
| **SC** | 5 | 2.6459 | 1374, 1333, 1348, 1361, 1326, 1337 | 1341, 1322, 1356, 1315, 1350, 1334 | |
| **SC** | 8 | 2.9108 | 946, 939, 936, 962, 987, 965 | 1257, 984, 970, 954, 972, 949 | |

It was important to understand if different constructs were being measured within a test, which would violate the assumption of unidimensionality; for example, whether the math test had subtests that focused heavily on reading. The items in each contrast were reviewed by project staff. UH staff noted that the items within the contrasts typically represent challenging vocabulary (e.g., unfamiliar words) or content (e.g., fractions). However, these differences were represented across both constructs and not embedded within a specific contrast. As a result, it was determined that it would not be productive to generate subtests to improve unidimensionality. The results for science indicated that there were no underlying dimensions and that the assessment was unidimensional.

### 8.5.2. *Correlations*

These analyses examined correlations between the assessment subdomains to examine if these factors correlate more highly with each other than with domains within a test of the other content area (e.g., algebra with measurement higher than algebra with reading literary text). Correlations were corrected for disattenuation to account for measurement error. Values were typically above .8 with 3 values falling below .8 between Heluhelu and Olelo, and Kakau and Olelo in grade 8 (disattenuated correlations are shaded in grey in Tables 8.6 - 8.8). These values show a strong relationship between the domains in each of the content areas as expected. With median values of .99 for math, 1.0 for HLA and .94 for science. It is important to note that disattenuated values greater than 1.00 indicate non-randomly distributed measurement error and these values are reported as 1 (Schumacker, 1996). The observed correlations were slightly lower with values ranging between .31 and .85.

**Table 8.8: HLA Observed and Disattenuated (in grey) Correlation Results for Subscores**

| Grade | Subscore | Ka_Olelo | Ka_Heluhelu | Ke Kakau | Ke Mele Oli |
|---|---|---|---|---|---|
| 3 | Ka_Olelo | -- | 0.90 | 0.97 | 0.97 |
| | Ka_Heluhelu | 0.66 | -- | 1.06 | 1.01 |
| | Ke_Kakau | 0.71 | 0.75 | -- | 0.98 |
| | Ke_Mele_Oli | 0.72 | 0.72 | 0.70 | -- |
| 4 | Ka_Olelo | -- | 0.82 | 1.02 | 0.83 |
| | Ka_Heluhelu | 0.58 | -- | 0.97 | 1.04 |
| | Ke_Kakau | 0.69 | 0.60 | -- | 0.89 |
| | Ke_Mele_Oli | 0.60 | 0.70 | 0.57 | -- |
| 5 | Ka_Olelo | -- | 0.93 | 1.03 | 0.99 |

| Grade | Subscore | Ka_Olelo | Ka_Heluhelu | Ke Kakau | Ke Mele Oli |
|---|---|---|---|---|---|
| | Ka_Heluhelu | 0.69 | -- | 1.02 | 0.96 |
| | Ke_Kakau | 0.69 | 0.73 | -- | 1.06 |
| | Ke_Mele_Oli | 0.67 | 0.69 | 0.69 | -- |
| 6 | Ka_Olelo | -- | 1.13 | 1.16 | 1.38 |
| | Ka_Heluhelu | 0.70 | -- | 1.07 | 1.19 |
| | Ke_Kakau | 0.72 | 0.85 | -- | 1.21 |
| | Ke_Mele_Oli | 0.62 | 0.69 | 0.71 | -- |
| 7 | Ka_Olelo | -- | 0.95 | 1.14 | 1.05 |
| | Ka_Heluhelu | 0.59 | -- | 1.05 | 0.90 |
| | Ke_Kakau | 0.69 | 0.79 | -- | 1.10 |
| | Ke_Mele_Oli | 0.46 | 0.49 | 0.58 | -- |
| 8 | Ka_Olelo | -- | 0.71 | 0.76 | 0.84 |
| | Ka_Heluhelu | 0.54 | -- | 1.05 | 0.94 |
| | Ke_Kakau | 0.56 | 0.85 | -- | 0.99 |
| | Ke_Mele_Oli | 0.48 | 0.57 | 0.59 | -- |

**Table 8.9: Math Observed and Disattenuated (in grey) Correlation Results for Subscores**

| Grade | Subscore | C1 | C2_C4 | C3 |
|---|---|---|---|---|
| 3 | C1 | -- | 0.97 | 0.82 |
| | C2_C4 | 0.69 | -- | 0.89 |
| | C3 | 0.50 | 0.50 | -- |
| 4 | C1 | -- | 0.92 | 0.99 |
| | C2_C4 | 0.59 | -- | 1.11 |
| | C3 | 0.53 | 0.53 | -- |
| 5 | C1 | - | 0.95 | 1.08 |
| | C2_C4 | 0.63 | - | 0.96 |
| | C3 | 0.58 | 0.47 | - |
| 6 | C1 | -- | 0.99 | 1.00 |
| | C2_C4 | 0.70 | -- | 1.04 |
| | C3 | 0.72 | 0.70 | -- |
| 7 | C1 | -- | 1.05 | 1.06 |
| | C2_C4 | 0.42 | -- | 1.06 |
| | C3 | 0.49 | 0.41 | -- |
| 8 | C1 | -- | 0.89 | 0.99 |
| | C2_C4 | 0.36 | -- | 1.23 |
| | C3 | 0.55 | 0.47 | -- |

**Table 8.10: Science Observed and Disattenuated (in grey) Correlation Results for Subscores**

| | Subscore | Halawai | Lalo | Luna |
|---|---|---|---|---|
| **5** | Lalo | -- | -- | 1.05 |
| | Luna | -- | 0.71 | -- |
| **8** | Halawai | -- | 1.04 | 0.81 |
| | Lalo | 0.67 | -- | 0.83 |
| | Luna | 0.31 | 0.35 | -- |

### 8.5.3. *Validity Based on Relationship with External Variables*

It is also important to consider the relationship between the assessment and scores from other tests of the same content area and/or tests of different content areas. These analyses provide information with regard to the degree to which the assessment reflects key content by relating scores to other variables. This type of evidence is typically generated by examining the relationships between assessment scores and scores from other similar assessments (e.g., the state assessment system and NAEP, TIMSS, college-readiness assessments, NWEA). However, there are no similar Hawaiian language assessments by which to make these comparisons. Future studies are planned to

examine concurrent/external validity by collecting information from teachers and students about achievement and factors related to achievement.

In order to generate information regarding validity related to external variables, correlations were generated between subscores in math and HLA and science. Disattenuated results are in Table 8.11. In general, the subscore correlations were lower than .80 math, HLA, and science (median value of the correlations across grades was .75) relative to the correlations seen between the math subscores and HLA subscores reported above (median values were approximately 1.0 for corrected correlations). There was a pattern of higher correlations between the HLA subscores and the math domain of "Communicating Reasoning" with correlations between .89 and 1.0. These higher correlations might be attributed to relationships between the two constructs; however, has identified the need to improve the reliability of C3 which might also improve the correlations across subscores (by reducing the impact of the disattenuation correction).

**Table 8.11: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in blue) for Subscores Across subjects: Grade 3**

| | C1 | C2_C4 | C3 | MA OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.76 | 0.96 | 0.83 | 1.16 | 0.77 | 0.75 | 0.82 | 0.75 | 0.78 |
| C2_C4 | 0.69 | 0.67 | 0.89 | 1.14 | 0.84 | 0.91 | 0.91 | 0.88 | 0.89 |
| C3 | 0.50 | 0.50 | 0.48 | 1.07 | 0.57 | 0.73 | 0.74 | 0.70 | 0.70 |
| MA OP | 0.94 | 0.86 | 0.69 | 0.85 | 0.78 | 0.82 | 0.86 | 0.80 | 0.82 |
| Ka Olelo | 0.58 | 0.60 | 0.35 | 0.63 | 0.77 | 0.89 | 0.97 | 0.97 | 1.03 |
| Ka Heluhelu | 0.55 | 0.63 | 0.42 | 0.63 | 0.66 | 0.70 | 1.06 | 1.01 | 1.12 |
| Ke Kakau | 0.60 | 0.63 | 0.43 | 0.67 | 0.71 | 0.75 | 0.71 | 0.98 | 1.14 |
| Ke Mele Oli | 0.55 | 0.61 | 0.41 | 0.63 | 0.72 | 0.72 | 0.69 | 0.72 | 1.07 |
| HLA OP | 0.65 | 0.70 | 0.46 | 0.72 | 0.86 | 0.90 | 0.91 | 0.86 | 0.91 |

**Table 8.12: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in blue) for Subscores Across subjects: Grade 4**

| | C1 | C2_C4 | C3 | MA OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.73 | 0.92 | 0.99 | 1.18 | 0.66 | 0.61 | 0.73 | 0.59 | 0.68 |
| C2_C4 | 0.59 | 0.57 | 1.11 | 1.19 | 0.65 | 0.74 | 0.70 | 0.73 | 0.71 |
| C3 | 0.53 | 0.53 | 0.40 | 1.35 | 0.91 | 0.91 | 1.06 | 0.79 | 0.95 |
| MA OP | 0.91 | 0.81 | 0.77 | 0.82 | 0.72 | 0.71 | 0.80 | 0.67 | 0.75 |
| Ka Olelo | 0.50 | 0.43 | 0.50 | 0.57 | 0.77 | 0.82 | 1.02 | 0.83 | 1.10 |
| Ka Heluhelu | 0.42 | 0.45 | 0.46 | 0.52 | 0.58 | 0.65 | 0.97 | 1.04 | 1.03 |
| Ke Kakau | 0.48 | 0.41 | 0.52 | 0.56 | 0.69 | 0.60 | 0.59 | 0.89 | 1.20 |
| Ke Mele Oli | 0.42 | 0.45 | 0.41 | 0.50 | 0.60 | 0.70 | 0.57 | 0.69 | 1.02 |
| HLA OP | 0.55 | 0.50 | 0.56 | 0.64 | 0.90 | 0.78 | 0.87 | 0.80 | 0.88 |

**Table 8.13: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in bold blue) for Subscores Across subjects: Grade 5**

| | C1 | C2_C4 | C3 | Math OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP | Lalo | Luna | Science OP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.73 | 0.95 | 1.08 | 1.19 | 0.78 | 0.83 | 0.88 | 0.84 | 0.84 | 0.83 | 0.80 | 0.81 |
| C2_C4 | 0.63 | 0.60 | 0.96 | 1.16 | 0.68 | 0.81 | 0.85 | 0.78 | 0.79 | 0.85 | 0.75 | 0.80 |
| C3 | 0.58 | 0.47 | 0.40 | 1.34 | 0.78 | 0.86 | 1.00 | 0.96 | 0.91 | 0.98 | 0.90 | 0.94 |
| Math OP | 0.92 | 0.82 | 0.77 | 0.82 | 0.75 | 0.83 | 0.90 | 0.85 | 0.84 | 0.86 | 0.80 | 0.84 |
| Ka Olelo | 0.56 | 0.44 | 0.41 | 0.57 | 0.70 | 0.93 | 1.03 | 0.99 | 1.05 | 0.92 | 0.87 | 0.89 |
| Ka Heluhelu | 0.63 | 0.56 | 0.48 | 0.67 | 0.69 | 0.79 | 1.02 | 0.96 | 1.09 | 0.99 | 0.96 | 0.97 |
| Ke Kakau | 0.60 | 0.53 | 0.51 | 0.65 | 0.69 | 0.73 | 0.64 | 1.06 | 1.19 | 1.07 | 1.02 | 1.04 |

| | C1 | C2_C4 | C3 | Math OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP | Lalo | Luna | Science OP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ke Mele Oli | 0.58 | 0.49 | 0.49 | 0.62 | 0.67 | 0.69 | 0.69 | 0.66 | 1.08 | 0.95 | 1.02 | 0.96 |
| HLA OP | 0.68 | 0.58 | 0.54 | 0.72 | 0.84 | 0.92 | 0.91 | 0.83 | 0.90 | 1.00 | 0.97 | 0.98 |
| Lalo | 0.61 | 0.57 | 0.53 | 0.68 | 0.67 | 0.76 | 0.74 | 0.67 | 0.82 | 0.75 | 1.05 | 1.23 |
| Luna | 0.53 | 0.45 | 0.44 | 0.57 | 0.56 | 0.66 | 0.64 | 0.64 | 0.72 | 0.71 | 0.60 | 1.23 |
| Science OP | 0.62 | 0.57 | 0.54 | 0.69 | 0.68 | 0.78 | 0.76 | 0.71 | 0.84 | 0.96 | 0.87 | 0.82 |

### Table 8.14: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in blue) for Subscores Across subjects: Grade 6

| | C1 | C2_C4 | C3 | MA OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.74 | 0.99 | 1.00 | 1.13 | 0.84 | 0.82 | 0.88 | 1.01 | 0.83 |
| C2_C4 | 0.70 | 0.66 | 1.04 | 1.15 | 0.87 | 0.82 | 0.88 | 0.94 | 0.83 |
| C3 | 0.72 | 0.70 | 0.68 | 1.16 | 0.99 | 0.89 | 0.91 | 1.06 | 0.89 |
| MA OP | 0.91 | 0.88 | 0.90 | 0.88 | 0.89 | 0.84 | 0.89 | 1.00 | 0.85 |
| Ka Olelo | 0.50 | 0.49 | 0.57 | 0.58 | 0.48 | 1.13 | 1.16 | 1.38 | 1.21 |
| Ka Heluhelu | 0.63 | 0.59 | 0.66 | 0.70 | 0.70 | 0.79 | 1.07 | 1.19 | 1.11 |
| Ke Kakau | 0.68 | 0.64 | 0.68 | 0.75 | 0.72 | 0.85 | 0.81 | 1.21 | 1.12 |
| Ke Mele Oli | 0.57 | 0.50 | 0.57 | 0.61 | 0.62 | 0.69 | 0.71 | 0.42 | 1.29 |
| HLA OP | 0.69 | 0.65 | 0.70 | 0.76 | 0.80 | 0.94 | 0.96 | 0.80 | 0.91 |

### Table 8.15: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in blue) for Subscores Across subjects: Grade 7

| | C1 | C2_C4 | C3 | MA OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.48 | 1.05 | 1.06 | 1.50 | 0.73 | 0.73 | 0.68 | 0.54 | 0.68 |
| C2_C4 | 0.42 | 0.34 | 1.06 | 1.57 | 0.88 | 0.88 | 0.94 | 1.15 | 0.92 |
| C3 | 0.49 | 0.41 | 0.45 | 1.33 | 0.84 | 0.81 | 0.94 | 0.54 | 0.83 |
| Ka Olelo | 0.87 | 0.76 | 0.74 | 0.69 | 0.79 | 0.78 | 0.81 | 0.70 | 0.77 |
| Ka Heluhelu | 0.36 | 0.36 | 0.40 | 0.46 | 0.50 | 0.95 | 1.14 | 1.05 | 1.13 |
| Ke Kakau | 0.45 | 0.45 | 0.48 | 0.57 | 0.59 | 0.78 | 1.05 | 0.90 | 1.10 |
| Ke Mele Oli | 0.40 | 0.47 | 0.53 | 0.57 | 0.69 | 0.79 | 0.73 | 1.10 | 1.18 |
| HLA OP | 0.23 | 0.41 | 0.22 | 0.36 | 0.46 | 0.49 | 0.58 | 0.38 | 1.16 |
| Ka Olelo | 0.45 | 0.50 | 0.52 | 0.60 | 0.75 | 0.91 | 0.95 | 0.67 | 0.89 |

### Table 8.16: Correlations between Observed and Disattenuated (in grey) and Cronbach's Alpha (in blue) for Subscores Across subjects: Grade 8

| | C1 | C2_C4 | C3 | MA OP | Ka Olelo | Ka Heluhelu | Ke Kakau | Ke Mele Oli | HLA OP | Halawai | Ko Lalo | Luna | SC OP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0.58 | 0.89 | 0.99 | 1.34 | 0.63 | 0.77 | 0.79 | 0.85 | 0.79 | 0.84 | 0.81 | 0.55 | 0.80 |
| C2_C4 | 0.36 | 0.28 | 1.23 | 1.56 | 0.77 | 0.91 | 1.16 | 1.03 | 1.03 | 1.17 | 1.13 | 0.86 | 1.13 |
| C3 | 0.55 | 0.47 | 0.52 | 1.30 | 0.75 | 0.78 | 0.86 | 0.92 | 0.83 | 0.90 | 0.85 | 0.52 | 0.84 |
| MA OP | 0.87 | 0.70 | 0.80 | 0.73 | 0.69 | 0.80 | 0.89 | 0.91 | 0.85 | 0.93 | 0.89 | 0.61 | 0.88 |
| Ka Olelo | 0.41 | 0.34 | 0.46 | 0.50 | 0.71 | 0.71 | 0.76 | 0.84 | 0.83 | 0.66 | 0.62 | 0.65 | 0.64 |
| Ka Heluhelu | 0.54 | 0.43 | 0.51 | 0.62 | 0.54 | 0.82 | 1.05 | 0.94 | 1.09 | 0.96 | 0.98 | 0.65 | 0.95 |
| Ke Kakau | 0.54 | 0.54 | 0.55 | 0.67 | 0.56 | 0.85 | 0.78 | 0.99 | 1.14 | 0.99 | 1.01 | 0.60 | 0.98 |
| Ke Mele Oli | 0.44 | 0.36 | 0.44 | 0.52 | 0.48 | 0.57 | 0.59 | 0.45 | 1.06 | 0.86 | 0.90 | 0.93 | 0.90 |
| HLA OP | 0.57 | 0.52 | 0.57 | 0.69 | 0.67 | 0.94 | 0.96 | 0.67 | 0.91 | 0.95 | 0.96 | 0.66 | 0.94 |
| Halawai | 0.49 | 0.47 | 0.50 | 0.60 | 0.42 | 0.66 | 0.67 | 0.44 | 0.69 | 0.58 | 1.04 | 0.81 | 1.22 |
| Lalo | 0.53 | 0.50 | 0.52 | 0.64 | 0.44 | 0.75 | 0.75 | 0.51 | 0.78 | 0.67 | 0.71 | 0.83 | 1.26 |
| Luna | 0.21 | 0.23 | 0.19 | 0.26 | 0.28 | 0.30 | 0.27 | 0.31 | 0.32 | 0.31 | 0.35 | 0.25 | 1.12 |
| SC OP | 0.55 | 0.53 | 0.54 | 0.67 | 0.48 | 0.77 | 0.77 | 0.54 | 0.80 | 0.83 | 0.95 | 0.50 | 0.80 |

Finally, the team matched the students' scores for the two cohorts for which there were data. Cohort 1 included students in grade 3 in 2017, grade 4 in 2018, grade 5 in 2019 and grade 7 in 2021. Cohort 2 included students in grade 3 in 2018, grade 4 in 2019, and grade 5 in 2021. Correlations were generated to examine the relationships between their scores (Table 8.17). The correlations tended to be highest between the scores within a content area (e.g., between HLA tests) and between HLA and science (.72 to .87). Scores between math and HLA were generally lower especially across grade levels (.58 to .74).

**Table 8.17: Correlations between students' scores across years**

| Grade/ Content | GR3 MA | GR4 HLA | GR4 MA | GR5 HLA | GR5 MA | GR 7 HLA | GR7 MA |
|---|---|---|---|---|---|---|---|
| Cohort 1 | | | | | | | |
| 2017 GR3 HLA | 0.75 | 0.77 | 0.62 | 0.71 | 0.60 | 0.59 | 0.49 |
| 2017 GR3 MA | -- | 0.74 | 0.77 | 0.65 | 0.69 | 0.53 | 0.52 |
| 2018 GR4 HLA | -- | -- | 0.74 | 0.79 | 0.63 | 0.66 | 0.49 |
| 2018 GR4 MA | -- | -- | -- | 0.65 | 0.75 | 0.49 | 0.58 |
| 2019 GR5 HLA | -- | -- | -- | -- | 0.67 | 0.70 | 0.47 |
| 2019 GR5 MA | -- | -- | -- | -- | -- | 0.60 | 0.68 |
| 2021 GR7 HLA | -- | -- | -- | -- | -- | -- | 0.57 |
| Cohort 2 | | | | | | | |
| 2018 GR3 HLA | 0.67 | 0.76 | 0.69 | 0.71 | 0.63 | -- | -- |
| 2018 GR3 MA | -- | 0.56 | 0.74 | 0.57 | 0.63 | -- | -- |
| 2019 GR4 HLA | -- | -- | 0.74 | .078 | 0.62 | -- | -- |
| 2019 GR4 MA | -- | -- | -- | 0.69 | 0.70 | -- | -- |
| 2021 GR7 HLA | -- | -- | -- | -- | 0.73 | -- | -- |

# Chapter 9: Reliability

Reliability and precision of assessment scores are a critical consideration of any testing program. The Standards for Educational and Psychological Testing defines this as the degree to which students' scores would be the same across multiple administrations of the same assessment (AERA/APA/NCME, 2014). Building evidence in support of reliability includes evaluating reliability statistics, generating estimates of classification consistency and accuracy, and examining the scoring processes to ensure consistency and accuracy of the scores provided.

The testing program analyzed operational test data for accuracy and reliability per AERA/APA/NCME (2014):

> **Standard 2.0** Appropriate evidence of reliability/precision should be provided for the interpretation for each intended score use.

This standard explicitly states that the reliability of the test should align with the uses of the test scores. As such, assessments with outcomes that are associated with high stakes decisions should demonstrate higher reliability. One of the purposes of the Kaiapuni Assessment of Educational Outcomes (KĀʻEO) is that the results be used for accountability and therefore analyses were conducted to demonstrate reliability in several ways.

## 9.1. Classical Test Theory Statistics

The first reliability analyses focused on Classical Test Theory (CTT) methods. These analyses included generating item p-values, point biserial correlations, and alpha if item removed (how the alpha values would change if the item was removed from the test) statistics for all items on each test. Item statistics showed that the items were functioning in a consistent manner to support the overall test reliability. Test level statistics were also computed for each test, including mean p-values, alpha coefficients, and mean scores (Table 9.1). Alpha values ranged from .69 to .91 and mean p-values ranged from .24-.49. These values indicate that each test has good internal reliability but also that these tests tended to be slightly difficult for students.

In addition, the average raw score SEM was calculated using the formula (where $\sigma_X$ is the raw test score standard deviation and $\rho_{XX}$ is the reliability):

$$\sigma_E = \sigma_X \sqrt{1-\rho_{XX}}$$

**Table 9.1: Overall Reliability by Test**

| subject | grade | N Valid | N of items | Number of Points Possible | Mean | Std Deviation | Mean p-values | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|---|
| HLA | 3 | 271 | 57 | 67 | 22.37 | 11.56 | 0.39 | 0.91 | 3.56 |
| HLA | 4 | 250 | 57 | 66 | 27.07 | 10.68 | 0.47 | 0.88 | 3.65 |
| HLA | 5 | 252 | 57 | 68 | 26.14 | 11.96 | 0.46 | 0.90 | 3.82 |
| HLA | 6 | 164 | 57 | 75 | 25.57 | 13.24 | 0.45 | 0.91 | 3.93 |
| HLA | 7 | 160 | 57 | 77 | 25.90 | 11.91 | 0.45 | 0.89 | 4.04 |
| HLA | 8 | 127 | 56 | 73 | 37.38 | 13.23 | 0.49 | 0.91 | 3.97 |
| MA | 3 | 272 | 55 | 58 | 19.18 | 7.84 | 0.35 | 0.85 | 3.03 |
| MA | 4 | 252 | 55 | 59 | 20.24 | 7.71 | 0.37 | 0.82 | 3.31 |
| MA | 5 | 246 | 58 | 66 | 20.37 | 8.48 | 0.35 | 0.82 | 3.58 |
| MA | 6 | 162 | 57 | 71 | 17.12 | 9.81 | 0.30 | 0.88 | 3.47 |

| subject | grade | N Valid | N of items | Number of Points Possible | Mean | Std Deviation | Mean p-values | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|---|
| MA | 7 | 161 | 56 | 63 | 13.49 | 5.53 | 0.24 | 0.69 | 3.09 |
| MA | 8 | 135 | 56 | 63 | 13.91 | 5.87 | 0.25 | 0.73 | 3.06 |
| SC | 5 | 251 | 53 | 69 | 18.95 | 8.45 | 0.36 | 0.82 | 3.55 |
| SC | 8 | 143 | 58 | 66 | 15.99 | 7.67 | 0.28 | 0.80 | 3.42 |

The reliability analyses also provide information on the degree to which the assessments were reliable for demographic subgroups. Cronbach alpha statistics and SEMs were calculated for each subgroup that showed consistency in reliability across the subgroups (Table 9.2), with reliability generally ranging from .8-.9 which was similar to the overall assessments. The only lower reliabilities were observed for students with IEPs in grades 4, 6, and 7 (.58, .61, and .35 respectively) and boys in grade 7 math (.61). After discussions with HIDOE's Technical Advisory Committee (TAC), the hypothesis is that these lower reliabilities are most likely the result of range restriction or the assessments being very difficult. These values will be monitored in future administrations.

### Table 9.2: Overall Reliability by Subgroup

| Subject | Grade | Category | Group | Valid n | Raw Score Mean | Raw Score SD | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|
| HLA | 3 | Language Background | English | 252 | 21.77 | 11.37 | 0.90 | 3.52 |
| HLA | 3 | Language Background | Hawaiian | 16 | 25.75 | 12.01 | 0.91 | 3.65 |
| HLA | 3 | FRL | N | 121 | 26.13 | 12.77 | 0.92 | 3.72 |
| HLA | 3 | FRL | Y | 154 | 18.85 | 9.24 | 0.87 | 3.38 |
| HLA | 3 | Gender | F | 154 | 24.14 | 12.09 | 0.91 | 3.59 |
| HLA | 3 | Gender | M | 116 | 19.45 | 10.20 | 0.89 | 3.44 |
| HLA | 3 | Federal Ethnicity | Hispanic | 54 | 20.15 | 7.94 | 0.81 | 3.50 |
| HLA | 3 | Federal Ethnicity | Multiple | 35 | 26.46 | 13.98 | 0.93 | 3.75 |
| HLA | 3 | Federal Ethnicity | Pacific Islander | 175 | 21.75 | 11.77 | 0.91 | 3.49 |
| HLA | 3 | State Ethnicity | Filipino | 11 | 22.82 | 14.79 | 0.94 | 3.62 |
| HLA | 3 | State Ethnicity | Native Hawaiian | 217 | 21.50 | 11.10 | 0.90 | 3.49 |
| HLA | 3 | State Ethnicity | White | 12 | 22.50 | 12.85 | 0.92 | 3.66 |
| HLA | 4 | IEP | N | 236 | 27.72 | 10.57 | 0.88 | 3.66 |
| HLA | 4 | IEP | Y | 14 | 16.21 | 5.42 | 0.63 | 3.32 |
| HLA | 4 | FRL | N | 106 | 29.85 | 10.84 | 0.88 | 3.71 |
| HLA | 4 | FRL | Y | 144 | 25.03 | 10.12 | 0.87 | 3.61 |
| HLA | 4 | Gender | F | 130 | 30.04 | 10.74 | 0.88 | 3.69 |
| HLA | 4 | Gender | M | 120 | 23.86 | 9.67 | 0.86 | 3.59 |
| HLA | 4 | Federal Ethnicity | Hispanic | 47 | 25.11 | 9.30 | 0.85 | 3.64 |
| HLA | 4 | Federal Ethnicity | Multiple | 27 | 30.89 | 9.52 | 0.84 | 3.82 |
| HLA | 4 | Federal Ethnicity | Pacific Islander | 165 | 26.48 | 11.00 | 0.89 | 3.63 |
| HLA | 4 | State Ethnicity | Native Hawaiian | 199 | 26.13 | 10.81 | 0.89 | 3.63 |
| HLA | 4 | State Ethnicity | White | 17 | 30.88 | 9.36 | 0.85 | 3.64 |
| HLA | 5 | Language Background | English | 235 | 25.92 | 11.73 | 0.89 | 3.81 |
| HLA | 5 | IEP | N | 241 | 26.68 | 11.88 | 0.90 | 3.82 |
| HLA | 5 | IEP | Y | 11 | 14.36 | 6.55 | 0.70 | 3.56 |
| HLA | 5 | FRL | N | 114 | 28.86 | 12.74 | 0.91 | 3.82 |
| HLA | 5 | FRL | Y | 138 | 23.90 | 10.81 | 0.88 | 3.80 |
| HLA | 5 | Gender | F | 142 | 28.15 | 11.99 | 0.90 | 3.81 |

| Subject | Grade | Category | Group | Valid n | Raw Score Mean | Raw Score SD | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|
| HLA | 5 | Gender | M | 110 | 23.55 | 11.45 | 0.89 | 3.78 |
| HLA | 5 | Federal Ethnicity | Hispanic | 55 | 24.84 | 11.04 | 0.89 | 3.73 |
| HLA | 5 | Federal Ethnicity | Multiple | 36 | 33.28 | 12.24 | 0.90 | 3.90 |
| HLA | 5 | Federal Ethnicity | Pacific Islander | 155 | 24.83 | 11.76 | 0.90 | 3.80 |
| HLA | 5 | State Ethnicity | Filipino | 12 | 34.42 | 12.37 | 0.91 | 3.71 |
| HLA | 5 | State Ethnicity | Native Hawaiian | 194 | 24.84 | 11.55 | 0.89 | 3.78 |
| HLA | 5 | State Ethnicity | White | 13 | 37.00 | 12.54 | 0.91 | 3.78 |
| HLA | 6 | Language Background | English | 148 | 25.58 | 13.10 | 0.91 | 3.90 |
| HLA | 6 | Language Background | Hawaiian | 15 | 25.40 | 15.51 | 0.93 | 4.08 |
| HLA | 6 | IEP | N | 150 | 26.79 | 13.03 | 0.91 | 3.95 |
| HLA | 6 | IEP | Y | 14 | 12.50 | 7.40 | 0.83 | 3.09 |
| HLA | 6 | FRL | N | 75 | 27.45 | 13.96 | 0.92 | 4.02 |
| HLA | 6 | FRL | Y | 89 | 23.99 | 12.48 | 0.91 | 3.83 |
| HLA | 6 | Gender | F | 91 | 28.05 | 13.13 | 0.91 | 4.00 |
| HLA | 6 | Gender | M | 73 | 22.48 | 12.82 | 0.91 | 3.80 |
| HLA | 6 | Federal Ethnicity | Hispanic | 33 | 24.73 | 13.38 | 0.92 | 3.88 |
| HLA | 6 | Federal Ethnicity | Multiple | 17 | 25.12 | 12.85 | 0.91 | 3.90 |
| HLA | 6 | Federal Ethnicity | Pacific Islander | 110 | 25.58 | 13.31 | 0.91 | 3.95 |
| HLA | 6 | State Ethnicity | Native Hawaiian | 138 | 25.41 | 13.44 | 0.92 | 3.92 |
| HLA | 6 | State Ethnicity | White | 11 | 27.09 | 13.02 | 0.91 | 3.91 |
| HLA | 7 | Language Background | English | 152 | 25.88 | 11.91 | 0.89 | 4.04 |
| HLA | 7 | IEP | N | 147 | 26.84 | 11.59 | 0.88 | 4.07 |
| HLA | 7 | IEP | Y | 13 | 15.31 | 10.59 | 0.89 | 3.47 |
| HLA | 7 | FRL | N | 63 | 28.70 | 13.80 | 0.91 | 4.23 |
| HLA | 7 | FRL | Y | 97 | 24.08 | 10.17 | 0.85 | 3.90 |
| HLA | 7 | Gender | F | 81 | 30.07 | 11.10 | 0.86 | 4.12 |
| HLA | 7 | Gender | M | 79 | 21.62 | 11.23 | 0.89 | 3.81 |
| HLA | 7 | Federal Ethnicity | Hispanic | 32 | 27.88 | 13.18 | 0.90 | 4.17 |
| HLA | 7 | Federal Ethnicity | Pacific Islander | 115 | 25.15 | 11.11 | 0.87 | 3.97 |
| HLA | 7 | State Ethnicity | Native Hawaiian | 139 | 25.95 | 11.70 | 0.88 | 4.04 |
| HLA | 8 | Language Background | English | 116 | 27.79 | 13.00 | 0.91 | 3.95 |
| HLA | 8 | Language Background | Hawaiian | 11 | 23.00 | 15.45 | 0.93 | 4.08 |
| HLA | 8 | FRL | N | 56 | 31.11 | 13.43 | 0.91 | 4.09 |
| HLA | 8 | FRL | Y | 71 | 24.44 | 12.38 | 0.90 | 3.82 |
| HLA | 8 | Migrant | N | 124 | 27.41 | 13.31 | 0.91 | 3.95 |
| HLA | 8 | Gender | F | 67 | 30.24 | 14.78 | 0.92 | 4.09 |
| HLA | 8 | Gender | M | 60 | 24.18 | 10.47 | 0.87 | 3.75 |
| HLA | 8 | Federal Ethnicity | Hispanic | 19 | 29.11 | 13.72 | 0.91 | 4.16 |
| HLA | 8 | Federal Ethnicity | Multiple | 13 | 31.85 | 15.77 | 0.93 | 4.08 |
| HLA | 8 | Federal Ethnicity | Pacific Islander | 88 | 25.64 | 12.53 | 0.91 | 3.86 |
| HLA | 8 | State Ethnicity | Native Hawaiian | 102 | 25.93 | 12.60 | 0.90 | 3.91 |
| HLA | 8 | State Ethnicity | Samoan | -- | -- | -- | -- | -- |
| MA | 3 | Language Background | English | 252 | 19.15 | 7.77 | 0.85 | 3.02 |
| MA | 3 | Language Background | Hawaiian | 17 | 18.76 | 8.26 | 0.87 | 3.00 |
| MA | 3 | FRL | N | 120 | 21.54 | 9.09 | 0.89 | 3.02 |
| MA | 3 | FRL | Y | 151 | 17.34 | 6.11 | 0.76 | 3.01 |
| MA | 3 | Gender | F | 154 | 19.86 | 8.63 | 0.88 | 3.01 |

| Subject | Grade | Category | Group | Valid n | Raw Score Mean | Raw Score SD | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|
| MA | 3 | Gender | M | 117 | 18.32 | 6.62 | 0.79 | 3.03 |
| MA | 3 | Federal Ethnicity | Hispanic | 56 | 17.00 | 5.74 | 0.74 | 2.93 |
| MA | 3 | Federal Ethnicity | Multiple | 34 | 21.44 | 9.30 | 0.89 | 3.04 |
| MA | 3 | Federal Ethnicity | Pacific Islander | 175 | 19.25 | 8.01 | 0.86 | 3.04 |
| MA | 3 | State Ethnicity | Native Hawaiian | 219 | 18.75 | 7.68 | 0.85 | 3.02 |
| MA | 3 | State Ethnicity | White | 12 | 18.92 | 7.44 | 0.85 | 2.92 |
| MA | 4 | IEP | N | 238 | 20.57 | 7.77 | 0.82 | 3.30 |
| MA | 4 | IEP | Y | 14 | 14.71 | 3.73 | 0.30 | 3.12 |
| MA | 4 | FRL | N | 109 | 22.24 | 8.43 | 0.85 | 3.30 |
| MA | 4 | FRL | Y | 143 | 18.72 | 6.76 | 0.76 | 3.30 |
| MA | 4 | Gender | F | 132 | 21.41 | 8.43 | 0.85 | 3.32 |
| MA | 4 | Gender | M | 120 | 18.96 | 6.65 | 0.76 | 3.28 |
| MA | 4 | Federal Ethnicity | Hispanic | 48 | 18.81 | 6.79 | 0.77 | 3.23 |
| MA | 4 | Federal Ethnicity | Multiple | 28 | 22.00 | 9.12 | 0.87 | 3.30 |
| MA | 4 | Federal Ethnicity | Pacific Islander | 465 | 20.13 | 7.58 | 0.81 | 3.31 |
| MA | 4 | State Ethnicity | Native Hawaiian | 200 | 19.77 | 7.47 | 0.81 | 3.30 |
| MA | 4 | State Ethnicity | White | 18 | 21.33 | 8.07 | 0.83 | 3.29 |
| MA | 5 | Language Background | English | 229 | 20.11 | 8.33 | 0.82 | 3.56 |
| MA | 5 | Language Background | Hawaiian | 13 | 19.77 | 6.80 | 0.70 | 3.71 |
| MA | 5 | Language Background | Japanese | 13 | 39.50 | 6.36 | 0.65 | 3.75 |
| MA | 5 | IEP | N | 235 | 20.62 | 8.55 | 0.82 | 3.59 |
| MA | 5 | IEP | Y | 11 | 15.18 | 4.51 | 0.47 | 3.27 |
| MA | 5 | FRL | N | 112 | 22.47 | 9.15 | 0.84 | 3.66 |
| MA | 5 | FRL | Y | 134 | 18.62 | 7.47 | 0.78 | 3.49 |
| MA | 5 | Migrant | N | 242 | 20.43 | 8.53 | 0.82 | 3.58 |
| MA | 5 | Gender | F | 137 | 20.77 | 8.71 | 0.83 | 3.62 |
| MA | 5 | Gender | M | 109 | 19.87 | 8.19 | 0.81 | 3.52 |
| MA | 5 | Federal Ethnicity | Hispanic | 54 | 18.80 | 8.18 | 0.81 | 3.54 |
| MA | 5 | Federal Ethnicity | Multiple | 36 | 24.17 | 9.39 | 0.84 | 3.70 |
| MA | 5 | Federal Ethnicity | Pacific Islander | 150 | 19.89 | 8.23 | 0.81 | 3.55 |
| MA | 5 | State Ethnicity | Filipino | 12 | 23.17 | 7.99 | 0.78 | 3.74 |
| MA | 5 | State Ethnicity | Native Hawaiian | 188 | 19.71 | 8.28 | 0.82 | 3.55 |
| MA | 5 | State Ethnicity | White | 13 | 26.15 | 11.33 | 0.89 | 3.74 |
| MA | 6 | Language Background | English | 146 | 17.00 | 9.52 | 0.87 | 3.46 |
| MA | 6 | Language Background | Hawaiian | 15 | 18.67 | 12.75 | 0.92 | 3.52 |
| MA | 6 | IEP | N | 148 | 17.74 | 9.98 | 0.88 | 3.50 |
| MA | 6 | IEP | Y | 14 | 10.57 | 3.82 | 0.47 | 2.77 |
| MA | 6 | FRL | N | 75 | 19.00 | 11.55 | 0.91 | 3.52 |
| MA | 6 | FRL | Y | 87 | 15.51 | 7.71 | 0.81 | 3.40 |
| MA | 6 | Gender | F | 90 | 17.20 | 9.38 | 0.86 | 3.52 |
| MA | 6 | Gender | M | 72 | 17.03 | 10.38 | 0.89 | 3.39 |
| MA | 6 | Federal Ethnicity | Multiple | 16 | 17.63 | 9.84 | 0.87 | 3.56 |
| MA | 6 | Federal Ethnicity | Pacific Islander | 109 | 16.86 | 9.07 | 0.86 | 3.44 |
| MA | 6 | State Ethnicity | Native Hawaiian | 137 | 16.92 | 9.63 | 0.87 | 3.43 |
| MA | 6 | State Ethnicity | White | 11 | 20.45 | 11.54 | 0.89 | 3.88 |
| MA | 7 | Plan 504 | N | 153 | 13.68 | 5.56 | 0.69 | 3.10 |
| MA | 7 | FRL | N | 63 | 14.73 | 6.52 | 0.76 | 3.18 |

| Subject | Grade | Category | Group | Valid n | Raw Score Mean | Raw Score SD | Cronbach's Alpha | SEM |
|---|---|---|---|---|---|---|---|---|
| MA | 7 | FRL | Y | 98 | 12.69 | 4.65 | 0.58 | 3.03 |
| MA | 7 | Gender | F | 80 | 13.68 | 4.80 | 0.58 | 3.12 |
| MA | 7 | Gender | M | 81 | 13.31 | 6.20 | 0.76 | 3.04 |
| MA | 7 | Federal Ethnicity | Hispanic | 33 | 14.27 | 5.28 | 0.64 | 3.17 |
| MA | 7 | Federal Ethnicity | Pacific Islander | 115 | 13.11 | 5.58 | 0.70 | 3.05 |
| MA | 7 | State Ethnicity | Native Hawaiian | 140 | 13.44 | 5.61 | 0.70 | 3.09 |
| MA | 8 | Language Background | English | 120 | 14.24 | 5.89 | 0.73 | 3.08 |
| MA | 8 | Language Background | Hawaiian | 15 | 11.27 | 5.09 | 0.67 | 2.92 |
| MA | 8 | FRL | N | 60 | 15.22 | 6.32 | 0.76 | 3.12 |
| MA | 8 | FRL | Y | 75 | 12.87 | 5.29 | 0.68 | 3.01 |
| MA | 8 | Gender | F | 73 | 13.66 | 6.09 | 0.75 | 3.02 |
| MA | 8 | Gender | M | 62 | 14.21 | 5.62 | 0.70 | 3.10 |
| MA | 8 | Federal Ethnicity | Multiple | 14 | 17.07 | 9.56 | 0.89 | 3.17 |
| MA | 8 | Federal Ethnicity | Pacific Islander | 93 | 12.95 | 4.87 | 0.62 | 3.00 |
| MA | 8 | State Ethnicity | Native Hawaiian | 108 | 13.05 | 4.92 | 0.63 | 3.00 |
| SC | 5 | Language Background | English | 233 | 18.79 | 8.23 | 0.81 | 3.56 |
| SC | 5 | Language Background | Hawaiian | 13 | 18.92 | 9.55 | 0.88 | 3.32 |
| SC | 5 | IEP | N | 239 | 19.41 | 8.37 | 0.82 | 3.59 |
| SC | 5 | IEP | Y | 11 | 9.64 | 3.14 | 0.26 | 2.70 |
| SC | 5 | FRL | N | 113 | 20.65 | 9.10 | 0.84 | 3.64 |
| SC | 5 | FRL | Y | 137 | 17.61 | 7.63 | 0.79 | 3.48 |
| SC | 5 | Gender | F | 140 | 20.12 | 8.60 | 0.82 | 3.65 |
| SC | 5 | Gender | M | 110 | 17.54 | 8.06 | 0.82 | 3.43 |
| SC | 5 | Federal Ethnicity | Hispanic | 55 | 17.64 | 8.29 | 0.82 | 3.51 |
| SC | 5 | Federal Ethnicity | Multiple | 36 | 24.00 | 10.13 | 0.86 | 3.86 |
| SC | 5 | Federal Ethnicity | Pacific Islander | 153 | 18.25 | 7.73 | 0.80 | 3.49 |
| SC | 5 | State Ethnicity | Filipino | 12 | 23.83 | 7.88 | 0.76 | 3.89 |
| SC | 5 | State Ethnicity | Native Hawaiian | 192 | 18.22 | 7.95 | 0.81 | 3.50 |
| SC | 5 | State Ethnicity | White | 13 | 25.15 | 9.27 | 0.80 | 4.15 |
| SC | 8 | Language Background | English | 128 | 15.98 | 7.43 | 0.79 | 3.42 |
| SC | 8 | Language Background | Hawaiian | 15 | 16.07 | 9.66 | 0.88 | 3.38 |
| SC | 8 | FRL | N | 63 | 17.97 | 7.88 | 0.80 | 3.51 |
| SC | 8 | FRL | Y | 80 | 14.43 | 7.13 | 0.78 | 3.31 |
| SC | 8 | Gender | F | 79 | 16.78 | 8.19 | 0.82 | 3.48 |
| SC | 8 | Gender | M | 64 | 15.00 | 6.86 | 0.77 | 3.31 |
| SC | 8 | Federal Ethnicity | Hispanic | 21 | 17.38 | 6.82 | 0.74 | 3.49 |
| SC | 8 | Federal Ethnicity | Multiple | 16 | 17.56 | 8.37 | 0.81 | 3.62 |
| SC | 8 | Federal Ethnicity | Pacific Islander | 99 | 14.99 | 7.57 | 0.81 | 3.33 |
| SC | 8 | State Ethnicity | Filipino | 10 | 14.60 | 8.32 | 0.83 | 3.42 |
| SC | 8 | State Ethnicity | Native Hawaiian | 114 | 15.27 | 7.50 | 0.80 | 3.37 |

**Any group <10 was removed from the report. If only one category met this rule then the redacted number is easily calculated from other categories in the demographic group. In that case, category with the next fewest members was also removed.*

Statistics were also computed for all the subscales (Table 9.3). These alpha values generally ranged between .6 to .9, which exceeded the general guidance of .50 set for by the USDOE Institute for Education Sciences (WWC, 2017). The exceptions to this were the C1 in grade 7 mathematics, C2_C4 in grades 7 & 8 mathematics, C3 in grades 3,4,5 & 7 mathematics, Ka ʻŌlelo in grade 6 HLA, Ke Mele/ Oli in grades 6, 7 & 8 HLA, and ʻO Ko Luna in grade 8

science. The reason for these low values might be attributed to a small number of items (between 6 and 14) or to items that might be reducing reliability. The psychometric team identified items that could be removed in future administrations to improve reliability and will work with the UH team to add items to claims and domains. In addition, education disruptions related to the Covid pandemic contributed to decreases in overall scores and subscores on KĀ'EO. This in turn produced range restriction in the subscores impacted reliability. These values will also be monitored in future years as schools move forward from the pandemic's impacts.

**Table 9.3: Reliability by Subscale**

| subject | grade | Subscale | Total Possible Points | Raw Score Mean | Raw Score SD | Cronbach's Alpha |
|---|---|---|---|---|---|---|
| HLA | 3 | Ka Heluhelu | 23 | 7.11 | 3.62 | 0.70 |
| HLA | 3 | Ka 'Ōlelo | 11 | 4.42 | 2.74 | 0.77 |
| HLA | 3 | Ke Mele/Oli | 11 | 4.57 | 2.54 | 0.72 |
| HLA | 3 | Ke Kākau | 22 | 6.02 | 4.11 | 0.71 |
| HLA | 4 | Ka Heluhelu | 27 | 9.32 | 4.76 | 0.77 |
| HLA | 4 | Ka 'Ōlelo | 8 | 4.34 | 1.89 | 0.65 |
| HLA | 4 | Ke Mele/Oli | 9 | 5.50 | 2.29 | 0.69 |
| HLA | 4 | Ke Kākau | 22 | 7.84 | 3.54 | 0.59 |
| HLA | 5 | Ka Heluhelu | 26 | 8.62 | 4.77 | 0.79 |
| HLA | 5 | Ka 'Ōlelo | 9 | 4.53 | 2.30 | 0.70 |
| HLA | 5 | Ke Mele/Oli | 9 | 3.80 | 2.12 | 0.66 |
| HLA | 5 | Ke Kākau | 24 | 9.19 | 4.31 | 0.64 |
| HLA | 6 | Ka Heluhelu | 26 | 7.43 | 4.64 | 0.79 |
| HLA | 6 | Ka 'Ōlelo | 7 | 3.88 | 1.58 | 0.48 |
| HLA | 6 | Ke Mele/Oli | 9 | 3.42 | 2.04 | 0.42 |
| HLA | 6 | Ke Kākau | 33 | 10.83 | 6.22 | 0.81 |
| HLA | 7 | Ka Heluhelu | 31 | 7.63 | 4.86 | 0.78 |
| HLA | 7 | Ka 'Ōlelo | 7 | 2.88 | 1.58 | 0.50 |
| HLA | 7 | Ke Mele/Oli | 9 | 4.17 | 1.80 | 0.38 |
| HLA | 7 | Ke Kākau | 30 | 11.12 | 5.34 | 0.73 |
| HLA | 8 | Ka Heluhelu | 28 | 8.95 | 5.34 | 0.82 |
| HLA | 8 | Ka 'Ōlelo | 6 | 4.35 | 1.69 | 0.71 |
| HLA | 8 | Ke Mele/Oli | 6 | 2.72 | 1.24 | 0.45 |
| HLA | 8 | Ke Kākau | 33 | 11.24 | 6.33 | 0.78 |
| MA | 3 | C1 | 28 | 12.50 | 4.61 | 0.76 |
| MA | 3 | C2_C4 | 16 | 4.39 | 2.75 | 0.67 |
| MA | 3 | C3 | 14 | 2.29 | 1.68 | 0.48 |
| MA | 4 | C1 | 27 | 10.07 | 4.29 | 0.73 |
| MA | 4 | C2_C4 | 18 | 4.87 | 2.49 | 0.57 |
| MA | 4 | C3 | 15 | 5.31 | 2.32 | 0.40 |
| MA | 5 | C1 | 30 | 11.20 | 4.54 | 0.73 |
| MA | 5 | C2_C4 | 20 | 4.89 | 2.92 | 0.60 |
| MA | 5 | C3 | 16 | 4.28 | 2.49 | 0.40 |
| MA | 6 | C1 | 27 | 7.36 | 4.13 | 0.74 |
| MA | 6 | C2_C4 | 22 | 5.05 | 3.13 | 0.66 |
| MA | 6 | C3 | 22 | 4.71 | 3.66 | 0.69 |
| MA | 7 | C1 | 29 | 6.91 | 3.04 | 0.48 |
| MA | 7 | C2_C4 | 20 | 4.69 | 2.21 | 0.34 |
| MA | 7 | C3 | 14 | 1.89 | 1.66 | 0.45 |

| subject | grade | Subscale | Total Possible Points | Raw Score Mean | Raw Score SD | Cronbach's Alpha |
|---|---|---|---|---|---|---|
| MA | 8 | C1 | 28 | 7.19 | 3.35 | 0.58 |
| MA | 8 | C2_C4 | 22 | 3.94 | 2.01 | 0.28 |
| MA | 8 | C3 | 13 | 2.78 | 1.91 | 0.52 |
| SC | 5 | ʻO Ko Lalo | 13 | 13.40 | 5.91 | 0.75 |
| SC | 5 | ʻO Ko Luna | 33 | 5.55 | 3.16 | 0.60 |
| SC | 8 | ʻO Ko Lalo | 39 | 10.66 | 5.13 | 0.71 |
| SC | 8 | ʻO Ko Halawai | 14 | 3.97 | 2.52 | 0.56 |
| SC | 8 | ʻO Ko Luna | 13 | 1.61 | 1.27 | 0.29 |

### 9.1.1. *Rasch Statistics*

The psychometric team also considered the reliability of the assessments using the Rasch data. The Rasch modeling statistic called the separation index provides reliability information in standard error units. If the instrument has good person separation (i.e., above a 2.0), then it is highly likely the instrument is sufficiently sensitive to differentiate students (Linacre, 2012). For these assessments, person separation ranged from 1.32 to 3.23 (Table 9.6), suggesting that in general, the assessments are reliably measuring student ability. However, there are 4 assessments that the UH content development team will focus on building assessment items to improve separation (mathematics in grades 5, 7, and 8 and grade 8 science). The content development team has been successful in improving separation indices for these grade levels which increased notably from the 2018 field test (on average separation statistics improved by .3 across the grades 5-8 assessments). In addition, the assessments' alpha values range between .63 and .91 and in general exceeded the criteria of .8 (Linacre, 2012). With the exception of the four tests noted above, these statistics indicate good overall test reliability.

In addition, researchers examined the item summary statistics, which provide an indication that there was a sufficient range of item difficulties. Item reliability statistics were between .93 and .98 with separation values between 3.70 and 7.47 (Table 9.4). General criteria suggest that item reliability values below .9 and separation values below 3 might be indicative of the sample size being too small to confirm item difficulties. Good separation indicates that there are sufficient items and students to confirm the Rasch model. Grades 4, 5, 7 & 8 mathematics and grade 8 science did not meet the criteria for person separation or person reliability. (Appendix H). In particular, grades 7 and 8 math were low and decreased from 2019. These decreases could relate to score range restriction due to the pandemic disruptions and will be monitored in future years. For all tests that did not meet the criteria, items will be adjusted to improve range restriction and reliability.

**Table 9.4: Rasch Reliability Statistics**

| Subject | Grade | Person Separation | Person Reliability | Item Separation | Item Reliability |
|---|---|---|---|---|---|
| Criteria | | Above 2 | Above 0.8 | Above 3 | Above 0.9 |
| HLA | 3 | 2.83 | 0.89 | 7.14 | 0.98 |
| HLA | 4 | 2.65 | 0.88 | 6.64 | 0.98 |
| HLA | 5 | 2.94 | 0.90 | 6.57 | 0.98 |
| HLA | 6 | 3.14 | 0.91 | 5.91 | 0.97 |
| HLA | 7 | 2.86 | 0.89 | 5.79 | 0.97 |
| HLA | 8 | 3.08 | 0.90 | 5.54 | 0.97 |
| MA | 3 | 2.11 | 0.82 | 7.47 | 0.98 |
| MA | 4 | 2.00 | 0.80 | 6.01 | 0.97 |
| MA | 5 | 1.99 | 0.80 | 5.63 | 0.97 |
| MA | 6 | 2.25 | 0.84 | 4.15 | 0.95 |

| | | | | | |
|---|---|---|---|---|---|
| MA | 7 | 1.28 | 0.62 | 3.83 | 0.94 |
| MA | 8 | 1.43 | 0.67 | 3.70 | 0.93 |
| SC | 5 | 2.10 | 0.82 | 5.63 | 0.97 |
| SC | 8 | 1.92 | 0.79 | 4.10 | 0.94 |

## 9.2. Precision of Student Performance Score

These analyses examine the degree to which the assessment provides an adequate estimate of student achievement for the range of students taking the test (e.g., high achieving, low achieving). This includes examining the test information function (TIF) which provides important test information associated with students' scores, and the conditional standard error of measurement (CSEM) across students' scores.

### 9.2.1. *Standard Errors*

All tests have some degree of error which results in students scoring higher or lower than their "true ability." This error can result from numerous factors such as a student feeling ill on the test day or misunderstanding a test item. These factors are generally termed "measurement error." Tests should have low overall measurement error in order to generate accurate and reliable estimates of student ability. Researchers generated standard error of measurement (SEM) statistics associated with each scale score point (Appendix H). These values inform the team about the accuracy of the scale scores. For example, smaller standard errors would be expected at the middle of the distribution with higher values at the extremes. The SEM values provide an indication of how accurate the student's score is in relationship to his/her ability. An SEM value of 1 at a score of 50 would indicate that test developers are 68% sure that the student's true ability is between 49 and 51. This is of particular importance when applying cut scores, such as when we are assessing a student to be 'proficient.'

The importance of SEMs is that they should be lower at key points across the distribution of scores. This means that a criterion-referenced testing program should typically have smaller SEMs around the cut scores. For the 2019 assessment, the SEMs ranged from 12 to 29 (see Table).

**Table 9.5: Standard Errors at the Cut Points**

| Subject | Grade | Level 2 SE | Level 3 SE | Level 4 SE |
|---|---|---|---|---|
| HLA | 3 | 14.18 | 13.89 | 21.00 |
| HLA | 4 | 15.32 | 14.99 | 15.98 |
| HLA | 5 | 15.08 | 13.70 | 13.99 |
| HLA | 6 | 14.29 | 13.92 | 14.76 |
| HLA | 7 | 17.19 | 15.84 | 15.00 |
| HLA | 8 | 14.28 | 13.36 | 13.04 |
| MA | 3 | 13.65 | 12.44 | 12.45 |
| MA | 4 | 20.01 | 19.49 | 19.83 |
| MA | 5 | 22.04 | 19.24 | 18.90 |
| MA | 6 | 22.16 | 18.15 | 17.41 |
| MA | 7 | 28.53 | 25.63 | 24.63 |
| MA | 8 | 24.82 | 22.17 | 20.91 |
| SC | 8 | 21.67 | 19.40 | 18.30 |

### 9.2.2. *Test Information Function (TIF)*

The research team generated Test Information Functions (TIF). These analyses provide data about the information provided by the test across the range of scores (i.e., measure). The important considerations when examining TIF results are not necessarily the values but the shape of the distribution, in that each curve should peak at key points in the distribution (Linacre, 2012). In this case, the peaks should be approximately at the point where the proficiency cut score is located. The TIF graphs show that for each of these tests, the peak is approximately located at the cut score between level 2 and 3 (i.e., proficiency) (**Appendix I: Test Information Function Graphs**).

## 9.3. Classification Consistency and Classification Accuracy

Student scores from educational assessments are estimates of student ability in the measured domain. These estimates include some random variations, referred to as measure error. Measurement error can lead to errors when student scores are used to classify students into performance levels. For example, a student's true ability may be such that he or she belongs in the Kelakela performance level, but due to measurement error, his or her test score may be below the minimum score needed to be classified as Kelakela. As a result, the student is classified into a lower performance level.

Two measures are commonly used to assess the degree to which measurement error influences student classifications into performance levels. Classification consistency is a measure of how consistently students are classified into performance levels from two independent administrations of the same test or from two parallel forms. Classification accuracy is a measure of agreement between the classification based on students' true scores (a theoretical score without measurement error) and the classification based on students' observed scores (the score on the test).

Repeated administrations of the same test or administration of parallel forms are costly and burdensome. Classification consistency, therefore, is typically estimated from a single administration of a test. Similarly, a student's true score is unobservable, so classification accuracy is also estimated from a single administration of a test.

Analysis examined consistency and accuracy for the four KĀʻEO performance levels Hoʻomaka, Holomua, Mākaukau, Kelakela and for a dichotomous split between Holomua and Mākaukau.

### 9.3.1. *Method*

Classification consistency and classification accuracy were estimated for all grade levels and content areas for the 2021 operational KĀʻEO assessments using the BB-CLASS computer software (Brennan, 2004). Estimates for consistency and accuracy were estimated using the Livingston and Lewis (1995) procedures in BB-CLASS, because the assessments included polytomous items. Classification consistency and classification accuracy were estimated using the four-parameter beta distribution, because Livingston and Lewis (1995) focused their procedure on this distribution.

For each student, BB-CLASS calculates the expected score based on the analytic model. Across the entire sample, expected scores are compared to actual scores in a cross-classification table. Students whose expected and actual performance levels agree are considered accurately classified. With four performance levels, this means that the analysis fills in a 4 by 4 matrix of expected and actual scores (see Table 9.6 as an example).

### Table 9.6: Example of cross-classification table using four performance levels

| | Expected Kelakela | Expected Mākaukau | Expected Holomua | Expected Ho'omaka |
|---|---|---|---|---|
| Actual Kelakela | Accurate | | | |
| Actual Mākaukau | | Accurate | | |
| Actual Holomua | | | Accurate | |
| Actual Ho'omaka | | | | Accurate |

From the cross-classification table, BB-CLASS calculates the following indexes of consistency: proportion of consistent decisions, chance proportion of consistent decisions (the proportion of consistent decisions that can be expected to occur by chance), kappa (an index of agreement), and the probability of misclassification. For classification accuracy, BB-CLASS provides the following indices: the probability of correct classification, the false positive rate (the percentage of students classified in a performance level higher than expected by their true score), and the false negative rate (the percentage of students classified in a performance level lower than expected by their true score). For ease of interpretation, proportions and probabilities are converted to percentages in the tables below. BB-CLASS also provides two checks that the analytic procedure is functioning. Chi-square values are used to evaluate model fit.

**Results**

All the analyses ran well and checks of function and fit were well within expected values (Table 9.7). The sum of bivariate probabilities should be 1.00 or very close to 1.00. The chi-square values should not be overly large relative to their degrees of freedom (df). These values are the same for the analysis of four performance levels and the analysis of the proficient/non-proficient split.

### Table 9.7: Checks of Functioning and Fit with four performance levels

| Subject | Grade | Sum of bivariate probabilities | Likelihood Ratio | | Pearson | |
|---|---|---|---|---|---|---|
| | | | Chi-Square | Degrees of freedcom | Chi-Square | Degrees of freedcom |
| HLA | 3 | 1.00 | 107.91 | 68 | 92.9 | 68 |
| HLA | 4 | 1.00 | 80.51 | 67 | 65.4 | 67 |
| HLA | 5 | 1.00 | 58.34 | 65 | 63.44 | 65 |
| HLA | 6 | 1.00 | 47.10 | 67 | 46.19 | 67 |
| HLA | 7 | 1.00 | 68.26 | 75 | 84.73 | 75 |
| HLA | 8 | 1.00 | 61.68 | 70 | 50.31 | 70 |
| MA | 3 | 1.00 | 188.71 | 74 | 134.08 | 74 |
| MA | 4 | 1.00 | 100.00 | 62 | 77.41 | 62 |
| MA | 5 | 1.00 | 84.69 | 65 | 71.12 | 65 |
| MA | 6 | 1.00 | 69.42 | 69 | 118.81 | 69 |
| MA | 7 | 1.00 | 66.66 | 66 | 73.71 | 66 |
| MA | 8 | 1.00 | 68.83 | 68 | 70.63 | 68 |
| SC | 8 | 1.00 | 37.45 | 65 | 36.03 | 65 |
| SC | 8 | 1.00 | 44.87 | 61 | 41.66 | 61 |

For analysis on four performance levels, classification consistency and accuracy results were reasonable given the small sample size and the number of cells within the cross-classification matrix (Table 9.8 and Table 9.9). The proportion of consistent decisions ranged from 44.74% for grade 7 mathematics to 75.65% for grade 6 Hawaiian Language Arts (HLA). Quite consistently, the proportion of consistent decisions was higher for HLA than for mathematics. And generally, the proportion of consistent decisions was higher in the lower grade levels. The same was true for the probability of misclassification. Kappa values ranged from .22 for grade 7 mathematics to .68 for grade 3 HLA.

### Table 9.8: Classification Consistency Results for four performance levels

| Subject | Grade | Proportion of consistent decisions | Chance proportion of consistent decisions | Kappa | Probability of misclassification |
|---|---|---|---|---|---|
| HLA | 3 | 61.76% | 50.01% | 0.68 | 16.11% |
| HLA | 4 | 70.24% | 35.89% | 0.54 | 29.76% |
| HLA | 5 | 68.48% | 27.42% | 0.57 | 31.53% |
| HLA | 6 | 75.65% | 40.49% | 0.59 | 24.35% |
| HLA | 7 | 63.67% | 26.55 | 0.51 | 36.34% |
| HLA | 8 | 71.72% | 32.22% | 0.58 | 28.28% |
| MA | 3 | 63.59% | 33.86% | 0.45 | 36.41% |
| MA | 4 | 71.36% | 41.01% | 0.51 | 28.64% |
| MA | 5 | 61.10% | 33.14% | 0.42 | 38.90% |
| MA | 6 | 67.70% | 35.59% | 0.50 | 32.30% |
| MA | 7 | 44.74% | 33.37% | 0.22 | 52.26% |
| MA | 8 | 49.44% | 31.80% | 0.26 | 50.56% |
| SC | 8 | 57.91% | 27.72% | 0.42 | 42.10% |

Note. Grade 5 science is not included in analysis because in 2021 there was only a preliminary cut score for the nonproficient/proficient split.

The results for classification accuracy mirrored those for consistency. Grade 7 mathematics had the lowest probability of correct classification (59.89%) and grade 3 HLA had the highest (88.45%). The same was true for the false positive rate: grade 7 mathematics was 30.27%, and grade 3 HLA was 6.54%. The lowest false negative rate was for grade 3 HLA (5.01%), but the highest was for grade 8 SC (19.96%). In general, correct classification and false positive rates were better for HLA than for mathematics, but the false negative rates tended to be better for mathematics than for HLA.

### Table 9.9: Classification Accuracy Results for four performance levels

| Subject | Grade | Probability of correct classification | False positive rate | False negative rate |
|---|---|---|---|---|
| HLA | 3 | 88.45% | 6.54% | 5.01% |
| HLA | 4 | 77.22% | 12.82% | 9.96% |
| HLA | 5 | 77.16% | 12.34% | 10.50% |
| HLA | 6 | 81.63% | 9.78% | 8.60% |
| HLA | 7 | 72.93% | 14.24% | 12.84% |
| HLA | 8 | 77.96% | 11.41% | 10.63% |
| MA | 3 | 73.70% | 16.71% | 9.58% |
| MA | 4 | 79.05% | 12.87% | 8.09% |
| MA | 5 | 71.03% | 17.66% | 11.31% |
| MA | 6 | 76.67% | 15.60% | 7.73% |
| MA | 7 | 57.89% | 30.27% | 11.84% |
| MA | 8 | 59.28% | 28.21% | 12.52% |
| SC | 8 | 67.18% | 18.86% | 13.96% |

Note. Grade 5 science is not included in analysis because in 2021 there was only a preliminary cut score for the nonproficient/proficient split.

Analyses were also conducted to estimate classification consistency and accuracy using a proficient/non-proficient split (Table 9.10 and Table 9.11). This split was between the Mākaukau and the Hoʻomaka performance levels. As expected, consistency and accuracy were much higher than those for the classification into four categories.

In terms of consistency, the proportion of consistent decisions ranged from 84.99% for grade 8 MA to 95.12% for grade 3 HLA. Probability of misclassification was lowest for grade 3 HLA (5.88%) and highest for grade 8 mathematics (15.01%) and grade 8 science (15.00%). Across the tests, results for consistency were mixed but the mathematics tests tended to be slightly more consistent than the HLA tests when classifying students as either proficient or not proficient.

**Table 9.10: Classification Consistency Results for a proficient/non-proficient split**

| Subject | Grade | Proportion of consistent decisions | Chance proportion of consistent decisions | Kappa | Probability of misclassification |
|---|---|---|---|---|---|
| HLA | 3 | 95.12% | 74.27% | .77 | 5.88% |
| HLA | 4 | 87.23% | 57.06% | .70 | 12.78% |
| HLA | 5 | 88.02% | 53.34% | .74 | 11.98% |
| HLA | 6 | 90.51% | 58.19% | .77 | 9.49% |
| HLA | 7 | 85.65% | 50.74% | .71 | 14.35% |
| HLA | 8 | 88.39% | 53.76% | .75 | 11.61% |
| MA | 3 | 91.30% | 67.00% | .74 | 8.70% |
| MA | 4 | 91.66% | 70.43% | .72 | 8.35% |
| MA | 5 | 89.21% | 66.79% | .68 | 10.80% |
| MA | 6 | 93.35% | 71.30% | .77 | 6.65% |
| MA | 7 | 85.06% | 64.87% | .57 | 14.94% |
| MA | 8 | 84.99% | 63.62% | .59 | 15.01% |
| SC | 8 | 92.84% | 83.15% | .57 | 7.16% |
| SC | 8 | 85.00% | 54.21% | .67 | 15.00% |

Results for accuracy were also somewhat mixed across all 14 tests, but as with consistency, the mathematics tended to be slightly more accurate than the HLA tests when classifying students as either proficient or not proficient. The probability of correct classification was lowest for grade 8 mathematics (89.55) and highest for grade 3 HLA (95.85%). The false positive rate ranged from 2.39% for Grade 3 HLA to 8.36% for grade 7 mathematics. The false negative rate was lowest for grade 5 science (1.57%) and highest for grade 8 science (4.86%).

**Table 9.11: Classification Accuracy Results for a proficient/non-proficient split**

| Subject | Grade | Probability of correct classification | False positive rate | False negative rate |
|---|---|---|---|---|
| HLA | 3 | 95.85% | 2.39% | 1.76% |
| HLA | 4 | 90.92% | 5.06% | 4.02% |
| HLA | 5 | 91.47% | 4.73% | 3.80% |
| HLA | 6 | 93.28% | 3.41% | 3.31% |
| HLA | 7 | 89.75% | 5.48% | 4.77% |
| HLA | 8 | 91.75% | 4.31% | 3.94% |
| MA | 3 | 93.83% | 3.87% | 2.30% |
| MA | 4 | 94.08% | 3.62 % | 2.30% |
| MA | 5 | 92.46% | 4.45% | 3.09% |
| MA | 6 | 95.34% | 2.61% | 2.06% |
| MA | 7 | 89.39% | 8.36% | 2.25% |
| MA | 8 | 89.55% | 7.36% | 3.09% |
| **SC** | 5 | 94.85% | 3.58% | 1.57% |
| SC | 8 | 89.41% | 5.72% | 4.86% |

### 9.3.2. *Conclusions*

In general, the classification consistency and accuracy of the KĀ'EO was reasonable and as expected given the number of performance levels and sample size. Classification accuracy was good for the proficient/non-proficient split. All but one test had a probability of correct classification above 90%, and no test had a false negative rate over 5%.

# Chapter 10: Fairness

*Tests that impinge on the rights and life chances of individuals are inherently disputable*. (Cronbach, 1988, p. 6).

## 10.1. Fairness and Accessibility

Fairness and accessibility of the assessment are a critical consideration of any testing program. The Standards for Educational and Psychological Testing emphasize the importance of tests minimizing construct irrelevant variance for all groups of students to allow for valid interpretations to be made from the test scores (AERA/APA/NCME, 2014). Building evidence in support of fairness includes statistical analysis of item functioning for different groups of students (e.g., Differential Item Functioning) and understanding how students are thinking about the items (e.g., cognitive interviews).

The testing program analyzed operational test data fairness as defined by AERA/APA/NCME (2014):

> **Standard 3.0** All steps in the testing process, including test design, validation, development, administration, and scoring procedures, should be designed in such a manner as to minimize construct-irrelevant variance and to promote valid score interpretations for the intended uses for all examinees in the intended population (p. 63).

For the Kaiapuni Assessment of Educational Outcomes (KĀʻEO), fairness and accessibility were an integral part of the development process. An important factor for this assessment was language. Language is the marker of identity, and has a vision of the past, present and future: "Language not only transmits visions of the past but also expressions of social relationships, individual friendships as well as community knowledge, a wealth of organizing experiences, rules about social relationships plus ideas about art, craft, science, poetry, song, life, death and language itself." (Baker, 2011, p.45) Learning what Skutnabb-Kangas (2009) terms a mother-tongue language, such as the Hawaiian language, is an act of reconnecting with ancestors, understanding one's current place in the world as indigenous peoples, and imagining the future of our language, culture, and community through a Hawaiian-language lens. These benefits and rights have been confirmed by the UN Declaration on the Rights of Indigenous Peoples (2008).

The language diversity of the Kaiapuni students represents a range based on their home language and time of entry into the Kaiapuni system. However, all students in 3rd and 4th grade are educated exclusively in Hawaiian. The language acquisition of emerging bilingual students presents a challenge to test development but also an opportunity to explore ways to more appropriately engage and assess students. Research has shown that emerging bilinguals possess "cognitive and linguistic practices that differ from monolinguals" (Menken, Hudson, & Leung, 2014, p. 602) and that these traits and differences should be examined and evaluated independently in order to best understand their unique characteristics (Menken, et al., 2014; Mislevy & Duran, 2014). Further, Solano-Flores & Trumbull (2003) state that these specific and unique mental processes of bilingual students should be a foremost concern in test development to ensure students are interpreting the items as intended. In addition, research suggests that myriad problems can arise when students are taught in one academic language and tested in another. Therefore, a correspondence should exist between the language of assessment and the language of instruction (Abedi et al., 2004; Keiffer et al., 2009).

Accessibility for students with disabilities as well as students with varied Hawaiian language fluency is also a key factor in the development of the KĀʻEO. Assessment programs can often include items that are composed of complicated text and syntax. Through language and sentence modification, the assessment content can be made more accessible to students (Abedi, Hofstetter, & Lord, 2004). For example, research shows specific language modifications, such as reducing low frequency vocabulary and the use of the passive voice can improve scores for low and average ELL students (Abedi, Hofstetter, & Lord, 2004; Cavanaugh, 2008). This is one of the more effective modifications for emerging bilingual students. There is also little evidence that simplifying or modifying assessment language was a threat to validity (Keiffer et al., 2009). It is important to identify factors that may threaten validity, including students' level of language proficiency, differences in dialect, and differences in the school location if there are geographic differences based on the island students live on.

In addition, it is imperative that students with disabilities have opportunities to fully participate in the assessment. The KĀʻEO specifies accommodations for students with disabilities that mirror those used by the HIDOE for their statewide assessment programs. Students with a range of disabilities were considered when developing research focused on fairness and accessibility. Fairness and accessibility are monitored by the assessment program in several ways:

- Documentation of item writing and review: The KĀʻEO development included training in how to evaluate items for potential bias in order to explicitly support and guide educators who wrote and reviewed items. "Teachers can bring important information to the table concerning items and identifying potential sources of cultural and linguistic bias" (Trumbull & Solano Flores, 2011). This is most effective when teachers are trained specifically on what to look for with regard to bias, students with disabilities, and language. These aspects were included in item writing and review training. The training will continue to be revised as we understand more about the items through the validity studies (e.g., cognitive interview, alignment studies).

- Cognitive Interviews: Items are included on an ongoing basis in the assessment programs' cognitive testing analyses to evaluate differences in cognitive processes required by a subset of items. Based on the focus of the interviews, a variety of items are used and students are sampled based on different factors (e.g., different levels of Hawaiian language background, achievement levels) (see Cognitive Interview Chapter 8 in the 2016 and Chapter 10 in the 2018 Technical Reports). These cognitive interviews explore the thought processes that students use to solve complex problems and tasks that comprise the KĀʻEO. Cognitive interviews were conducted with students in 2015, 2016, and 2018. Cognitive interviews were not conducted in 2017 due to increased levels of item development for grades 5-8. In 2018, cognitive interviews were conducted in grades 5-8 and will resume when schools are reopened to visitors post pandemic.

## 10.2. Differential Item Functioning

The testing program conducted Differential Item Functioning (DIF) analyses to examine the degree to which individual items might have differential response patterns between demographic groups (e.g., boys versus girls). If a pattern emerged, items were examined for potential bias.

The sample size for the tests were notably low relative to statewide accountability assessments. Using Winsteps did allow the psychometric team to conduct DIF, and research supports the use of DIF for instruments of moderate length with the given sample size (Scott, Fayers, Aaronson, Bottomley, de Graeff, Groenvold, Gundy, Koller, Petersen, Sprangers, 2009). However, given the small sample size, the KĀʻEO Assessment Team focused on running DIF on only the gender and free or reduced-price lunch status subgroups, which were fairly balanced in

terms of numbers of students. Other subgroups were considered but due to the imbalance across the subgroups, the research team deemed that there were insufficient data (i.e., in 2016, approximately 97% of students were not on an IEP or 504 plan, only 1% were migrant, and 85% of students were Hawaiian or Pacific Islander).

DIF was conducted in the Winsteps program using the Mantel-Haenszel (MH) procedure and a DIF contrast (Linacre 2012). Appendix I provides the Winsteps DIF outputs. The MH procedure calculates the odds that two groups of students who are at the same level of achievement will answer the item correctly. The MH procedure can accommodate polytomous responses and the Winsteps procedures are robust for missing data. However, in the Rasch model, MH can over identify items with DIF and statistical methods should not be used with small sample sizes. Linacre (2012) proposed that the preferable method for identifying DIF is by using the contrast method. The DIF contrast conducted in Winsteps compares the difference between the average measure score for the two groups of interest.

For the current DIF study, the team conducted the analyses for each of the grade and content level tests (Table 10.1). Items were flagged for potential DIF if the DIF contrast exceeded .64 (Linacre, 2012). items were flagged as having a contrast greater than .64 or less than -.64.

Any item flagged was reviewed by the UH team with the goal of understanding any context or wording issues that may have caused the differences. Across the items, the team was unable to identify any reasons for the DIF. Several items that were flagged for DIF also had been reviewed during the Rasch and Classical Test Theory analyses and, as part of that process, were identified as candidates to be removed in future administrations

**Table 10.1: DIF Items and Review Results**

| Subject | Grade | Item Harder for Students eligible for FRL | Items Harder for Students not eligible for FRL | Item Harder for Girls | Items Harder for Boys |
|---|---|---|---|---|---|
| HLA | 3 | -- | 1026, 104, 113, 158 | 127, 1285, 94, 95, 104 | 119 |
| HLA | 4 | 1016 | 1017 | 8, 13, 1017 | 23, 56, 57, 62, 63 |
| HLA | 5 | 711, 1208 | -- | 1183 | 716, 1208 |
| HLA | 6 | 1172, 667, 676 | 668 | 647, 691, 651, 682, 667, 1170, 701, 700, 663 | 661, 687, 692 |
| HLA | 7 | 1118, 886, 843, 903, 876, 884 | 885, 774, 1178, 869, 870, 839, 834 | 762, 887, 875, 874 | 1185, 903, 879, 891, 870, 829, 876, 1104 |
| HLA | 8 | 785, 914, 810, 910 | 917, 929, 848, 793, 1079, 1199, 764, 778 | 802, 1210, 925, 924 | 867, 848, 916, 793, 1105, 1078, 764 |
| MA | 3 | 231, 995, 374, 209, 218, 185 | 992, 368 | 182, 1036 | 225, 172 |
| MA | 4 | 244, 259 | 109, 1005, 239, 1010, 242 | 252, 168, 1010 | 244, 154 |
| MA | 5 | 1217, 1136, 444, 420, 440, 443 | 417, 460 | 420, 1229 | 1130, 439 |
| MA | 6 | 585, 580, 1225, 512 | 553, 482 | 577, 478, 575, 521, 524 | 1256, 484, 567, 1225, 499, 571, 482 |
| MA | 7 | 1066, 1234, 555, 557, 501, 1264 | 475, 513, 492, 523, 527 | 555, 536, 561, 562 | 564, 1066, 559, 1234, 513, 471, 1241 |
| MA | 8 | 569, 601, 591, 1228, 588, 542, 586, 556, 532, 1140 | 531, 1273, 1269, 548, 1218 | 594, 569, 573, 531, 582, 598, 588, 1140 | 620, 1273, 576, 548, 591, 1218, 611 |
| SC | 5 | 1366, 1348 | 1357, 1360 | 1353, 1360 | 1357, 1337 |
| SC | 8 | 984, 949, 984, 949, 979 | 980, 958, 1110, 983, 1260, 1258, 961, 946, 1260, 1258, 961, 946, 944, 980, 958, 1110 | 984, 944, 945, 958, 1056, 984, 944, 958, 979, 1056 | 983, 951, 977, 1205, 986, 967, 980, 975, 983, 951, 977, 1258, 986, 967, 980, 975 |

UH staff conducted a review of potential bias of language used as well as content used for the question (i.e., knowledge or activities that traditionally were reserved for a specific gender or might be impacted by socio-economic status). First, this additional review found no apparent reason for gender bias. Two potential reasons for this lack of bias were identified. First, in the Hawaiian language, pronouns are not gender specific. For example, the word ʻo ia can mean he, she, or it and is dependent on the reader's interpretation or the context. Second, Hawaiian names in general are not gender specific, unless they are transliterations from an English name, and these types of names were not used on these questions. Because of this difference in language and the lack of gender-specificity, questions could potentially not be as prone to gender bias as they would be in English. UH staff will continue to review questions with potential gender bias during the item development process as well as in the analysis of future administrations of the assessment.

UH KĀʻEO assessment staff also reviewed these items for socio-economic bias and found no apparent reason for socio-economic bias towards non FRL students. In the review of items that were flagged as more difficult for FRL students, two potential reasons for this bias were identified. The first had to do with context, particularly for mathematics questions that were word problems or that had a context that may be unfamiliar for students from lower socio-economic backgrounds. While FRL students may not be as familiar to some of these contexts (i.e., flying in an airplane), these contexts are certainly familiar and should not have an impact on a student's understanding of a question. The second reason has to do with exposure to language. Many of the questions identified as being more difficult for FRL students included references and analysis of figurative language. Lower socio-economic students may have less exposure to language in general, and more figurative forms of the Hawaiian language in particular. This is not always the case but could be a reason for these items being flagged for this particular group. UH KĀʻEO assessment staff will continue to review questions with potential bias towards FRL students during the item development process, as well as in the analysis of future administrations of the assessment.

### 10.2.1. *DIF Based on Survey Results*

After completing the HLA or mathematics assessments, KĀʻEO students are administered a survey that asks about their Hawaiian Language usage (Table 10.2).

**Table 10.2: Survey Items used to Determine Hawaiian Language Usage**

| Item |
|---|
| When I'm with friends at school, we speak Hawaiian |
| When I'm with friends outside of school, we speak Hawaiian |
| I understand what my teacher says in Hawaiian |
| My teacher speaks Hawaiian in the classroom |
| I think in Hawaiian |
| When I'm with my family, we speak Hawaiian |
| I like to write letters or stories in Hawaiian |
| I like to read stories in Hawaiian |
| It is easier for me to speak Hawaiian rather than English |

The student responses were used to assign students a survey score on the RASCH logit metric. Any student with a logit score of less than 0 was categorized as having lower Hawaiian language usage. Any student with a logit score

greater or equal to zero was categorized as having Hawaiian language usage. Table 10.3 shows the items flagged for DIF based on students' rating of their Hawaiian Language usage. These results were interpreted given the current COVID-19 impacts

### Table 10.3: Hawaiian Language Usage DIF

| Grade | subject | Harder for students rating their HI low | Harder for students who rated their HI high |
|---|---|---|---|
| **3** | HLA | 89, 137, 156 | 95, 97, 384, 145 |
| **4** | HLA | 13, 54, 46 | 38 |
| **5** | HLA | 1215, 672, 718, 707, 1208 | 644, 636, 1222, 677, 625, 714, 684 |
| **6** | HLA | 691, 682, 692, 697, 669, 663 | 635, 1075, 1172, 674, 701 |
| **7** | HLA | 883, 1098, 811, 876 | 886, 903, 880, 1179 |
| **8** | HLA | 916, 793, 893, 905 | 772, 910, 1078, 917, 1127, 855, 764, 766 |
| **3** | MA | 1303, 215, 992, 233, 189 | 178, 198 |
| **4** | MA | 166, 103 | 170, 244, 1010, 240, 274, 258 |
| **5** | MA | 417, 1223, 420, 439, 429, 1093 | 414, 436 |
| **6** | MA | 577, 487, 575, 521 | 571, 482 |
| **7** | MA | 483, 559, 1247, 1252, 467, 471, 543, 1264 | 475, 516, 1066, 555, 513, 1244 |
| **8** | MA | 615, 1138, 582, 529, 556 | 604, 576, 1141, 1268 |
| **5** | SC | 1348, 1325, 1363 | 1369, 1327, 1366, 1370, 1368, 1318 |
| **8** | SC | 947, 984, 986, 1056, 1110, 975 | 971, 945, 958, 983, 951, 959 |

UH staff reviewed the items based on the students' survey response categorization and found that there was no discernable pattern for items flagged for lower or higher language use categorization. There were some questions that may have used higher level vocabulary or grammatical patterns, were word problems or extended response questions, as well as figurative language, but there was no pattern seen within an entire group of questions on one test or for either groups of students. If questions did use high level language, it was done in order to align with a content standard.

# Chapter 11: Scaling and Results

## 11.1. Scaling

Based on the results of the 2015 field test, researchers determined that Rasch analyses are appropriate for scaling test scores (e.g., the model converged with few iterations, test statistics were acceptable). The scaling process transforms the initial Rasch logit scale for the items and examinees into units of measurement that are more easily interpreted. The following criteria were used for creating the KĀ'EO test scales (Yen, 1991):

- Scale scores should be whole numbers.
- Scale scores scales need enough precision to handle the precision of the logit scores.
- Scale score scales need enough range, especially at the high end to allow for increase in difficulty of the tests over administrations and years.
- 3rd and 4th grade scales should be set so it's clear these tests are not on a vertical scale.
- Scales can be the same for the same grade in different content areas to aid in user friendliness, but the scales must meet other criteria.

Discussions between the psychometric staff and the project staff about scaling resulted in each grade level test form being transformed to have a mean of 500 and a standard deviation of 50. Table 11.1 shows the Rasch scaling constants used to place items and examinees on the KĀ'EO test scales for each year's test data.

**Table 11.1: Scaling Constants**

| Grade | Mean | Sd |
|---|---|---|
| **Mathematics** | | |
| 3 | 515.7501 | 39.4276 |
| 4 | 551.1439 | 68.0442 |
| 5 | 565.924 | 74.9049 |
| 6 | 644.0309 | 84.5304 |
| 7 | 580.8718 | 72.1669 |
| 8 | 611.5326 | 72.6965 |
| **Hawaiian Language Arts** | | |
| 3 | 528.7454 | 50.9541 |
| 4 | 514.1317 | 56.4491 |
| 5 | 527.8135 | 52.7446 |
| 6 | 537.5123 | 56.0902 |
| 7 | 562.559 | 60.5407 |
| 8 | 535.0402 | 52.4211 |
| **Science** | | |
| 5 | 571.9933 | 69.4905 |
| 8 | 612.6851 | 67.8289 |

As part of transforming the test forms to an interpretable scale, lowest obtainable scale scores (LOSS) and highest obtainable scale scores (HOSS) also need to be set. These scores help ensure that students who score very low or very high on the test do not receive scores that are also associated with an extremely large degree of error. The

following criteria were taken into account when making recommendations for the LOSS and HOSS for each grade level (Yen 1991):

Setting LOSS

- The LOSS should be low enough that is does not create a floor effect.
- The LOSS should be high enough that the SE for LOSS < 15 x Min (SE); this criterion can be difficult to meet for some tests.
- Usually the LOSS should be lower than the lowest number correct score but can be higher if this results in too high an SE.
- The SE should change smoothly over lower levels of the test.
- The LOSS gap (b/w LOSS and 1 item correct) should be in the same ballpark as the Penultimate Loss gap (b/w 1 item correct and 2 items correct).
- The LOSS gap should change smoothly over levels.

Setting HOSS

- The HOSS should be high enough that is does not create ceiling effects.
- The HOSS should be sufficiently high to allow for a high scale score at 1 item wrong.
- The HOSS should be low enough that the SE for Hoss < 10 x Min (SE).
- The SE should change smoothly over levels.
- The HOSS gap (b/w HOSS and 1 item wrong) should be in the same ballpark as the Penultimate HOSS gap (b/w 1 item wrong and 2 items wrong).
- The HOSS gap should change smoothly over levels; it is more difficult, and less important, to keep the gaps smooth over levels than it is to keep the SE(HOSS) values smooth over levels.

Table 11.2 provides for LOSS and HOSS for each grade level as well as score intervals for the performance levels. Values for LOSS and HOSS were set for the KĀ'EO test scales and remain constant across test administrations from year to year. The values for the HOSS were specifically set with the consideration that the testing program would need to accommodate potential improvements in performance on future operational administrations and to avoid ceiling effects in later years.

### Table 11.2: KĀ'EO Test Scale LOSS and HOSS

| Grade | LOSS (SE) | Level 1 | Level 2 | Level 3 | Level 4 | HOSS (SE) |
|---|---|---|---|---|---|---|
| **Mathematics** | | | | | | |
| **3** | 350 (~30) | LOSS-473 | 474-512 | 513-545 | 546-HOSS | 750 (~72) |
| **4** | 350 (~35) | LOSS-486 | 487-534 | 535-556 | 557-HOSS | 750 (~35) |
| **5** | 350 (~40) | LOSS-485 | 486-532 | 533-557 | 558-HOSS | 750 (~33) |
| **6** | 350 (~43) | LOSS-477 | 478-536 | 537-573 | 574-HOSS | 750 (~31) |
| **7** | 350 (~51) | LOSS-488 | 489-532 | 533-557 | 558-HOSS | 750 (~28) |
| **8** | 350 (~53) | LOSS-487 | 488-526 | 527-554 | 555-HOSS | 750 (~27) |
| **Hawaiian Language Arts** | | | | | | |
| **3** | 350 (~32) | LOSS-493 | 494-530 | 531-640 | 641-HOSS | 750 (~41) |
| **4** | 350 (~29) | LOSS-498 | 499-519 | 520-576 | 577-HOSS | 750 (~42) |
| **5** | 350 (~33) | LOSS-485 | 486-508 | 509-550 | 551-HOSS | 750 (~40) |
| **6** | 350 (~30) | LOSS-487 | 488-509 | 510-558 | 559-HOSS | 750 (~35) |
| **7** | 350 (~37) | LOSS-483 | 484-514 | 515-559 | 560-HOSS | 750 (~30) |
| **8** | 350 (~30) | LOSS-494 | 495-520 | 521-532 | 533-HOSS | 750 (~34) |
| **Science** | | | | | | |
| **5** | 300 (~54) | LOSS-569 | | 570-HOSS | | 750 (~32) |
| **8** | 350 (~49) | LOSS-497 | 498-526 | 527-554 | 555-HOSS | 750 (~26) |

It should be noted that scaling is sample dependent. When data is scaled from a sample to have a mean of 500, that mean is a local mean. The average score of the sample could be given any value - 500, 1000, 27.50 - but it will always be the average of that particular sample. So transforming a logit scale to a scale score does not mean those test scores are independent of that sample. This means that steps must be taken to ensure that scores from administrations across successive years have equivalent meaning in terms of achievement for the different samples of students who participate in each administration. This process is known as equating.

## Grades 3 and 4 Equating

The psychometric team equated scores from the 2021 operational tests in grades 3 and 4 for Hawaiian language arts, and mathematics to the KĀ'EO test scales established in 2016. The equating process places the operational tests onto the established scale for each respective grade and content area and helps ensure consistency in the interpretation of scores from one year to the next. For example, a student scale score of 500 on the 2021 operational test should mean the same in terms of achievement as a student scale score of 500 on the 2016 assessment.

Grade 3 and 4 operational test scores were equated to the established KĀ'EO test scales using an anchor item procedure—also known as common item linking—through the Rasch model and Winsteps program (Linacre, 2016). Anchor item equating uses known parameter values of items on the established scale to place items from a current administration onto the established scale.

Prior to the 2019 operational administration, all items from the test were used as anchors for the equating. Starting with the 2019 administration, the Hawaiian language arts and mathematics operational tests were updated by removing a selection of items and replacing these items with new items. Thus, anchor parameter estimates were not available for all items on these four operational tests. The 2019 operational tests were equated using a subset of items from the test, known as an anchor set.

The anchor sets for grades 3 and 4 Hawaiian language arts and mathematics will provide the foundation for equating for 2019 and beyond and will remain consistent from year to year. In general, the anchor sets were selected so that they represent a miniature version of the operational test, particularly in terms of the range of item difficulties and range of content. The following specific criteria were used to select the anchor sets.

The anchor sets were selected so that they represent the major content categories of the test (i.e., domains) in the same proportion as they are represented in the operational test. Ideally, this proportion is measured by the number of points rather than the number of items, with an allowable variance of ±10%. The anchor sets also were selected to span the range of difficulty of the operational test. In other words, the items included in the anchor sets varied in difficulty as the operational test items varied, except that the anchor sets do not include any items of extreme difficulty or easiness.

Other criteria for selecting the anchor sets included the following: The anchor sets include items from the different item types included in the operational test and in the same proportion (±10%). Extended response items, however, tend to be easily remembered by teachers and students, so the anchor sets do not include this item format unless this format was the only one assessing a particular domain. If anchor items are associated with a reading passage, the passage will be of average length avoiding extremely long or extremely short passages. The anchor sets also were selected so that they represent approximately 20% of the operational test in terms of the number of points.

In terms of performance characteristics, the anchor sets do not include any items that exhibit poor model fit, bias, DIF, or low discrimination. Anchor items are placed in the same relative position in each operational test administration, with a minimum of being in the same third of the test, but anchor items are placed at the very beginning or end of the test or any session. Finally, no changes are allowed to anchor items once they have been selected and administered. Neither changes in wording nor changes in the way the item is administered are allowed. Either of these could affect the item's performance characteristics.

Prior to the 2019 operational administration of the tests, an equating study was conducted using data from previous operational assessments to evaluate the anchor sets in terms of content, psychometric properties and the potential impact of their use for equating on student scores (Englert, 2018). The equating study found that the content of the anchor sets for grades 3 and 4 Hawaiian language arts and mathematics was typically within 5% of each content criteria relative to the operational test, with only two exceptions for grade 4 math and only one instance where the content exceeded the 10% criterion by 1%.

Item parameters (i.e., difficulty and discrimination) from 2016 and 2018 were compared to evaluate stability over time. In general, item parameters were stable, although the analyses revealed some items with poor fit that were eliminated as potential anchor items.

Test statistics and impact on scores of the anchor sets was evaluated by comparing results from the 2018 tests equated using all items (the previous method) and the same tests equated using only the anchor sets. Tests statistics (difficulty, model SE, and reliability) from the two methods of equated were compared for all four tests and found to be similar, especially in terms of the model SE and reliability. The overall test difficulty did change slightly across each test, with grade 3 and 4 HLA becoming slightly more difficult and grade 3 and 4 Math becoming slightly easier. These differences in difficulty were less than .05.

The final analysis focused on the degree to which the use of the selected anchor sets affected the performance level of students by applying cut scores to the data equated using the two methods. In grade 3 math and grade 4 HLA, the two equating methods resulted in all students being placed in the same performance level. Anchor set equating resulted in 11 students in grade 4 math increasing by one performance level, and in 17 students in grade 3 HLA decreasing one performance level. No students in these two tests changed from proficient to not-proficient or vice-versa as a result of the anchor set equating.

For the 2021operational analyses, anchor items were evaluated to ensure that they are functioning in the same manner across test administrations. For Hawaiian language arts and mathematics, items in the anchor sets were evaluated; for science, all items were used as anchors and evaluated. Evaluations included scatterplots of the best fit line to examine the degree to which the items fit across the two test administrations (see Englert, 2018). Also examined were other item indices, such as the difficulty parameter, p-values, and item correlations to evaluate item stability. If an item differs between its operational parameter estimates and its anchor estimates, it might indicate that the item is not suitable as an anchor item and should be considered for removal from the anchor set. The two administrations also were compared to examine the overall difficulty, test characteristic curves, changes in percentages of students in the performance levels, and estimates of classification consistency and classification accuracy. These examinations showed that the anchor set equating was functioning sufficiently well.

Using the anchor items for each respective test, and the appropriate scaling constants and LOSS and HOSS described above, each test was placed on to the established KĀʻEO test scale. Score distributions for each grade and content area along with measurement errors are provided in **Appendix G**.

## Grades 5, 6, 7 and 8 Equating

The psychometric team equated scores from the 2021 operational tests in grades 5, 6, 7, and 8 Hawaiian language arts, and mathematics; and grade 8 science to the KĀʻEO test scales established in 2019. The equating process places the operational tests onto the established scale for each respective grade and content area and helps ensure consistency in the interpretation of scores from one year to the next. For example, a student scale score of 500 on the 2021 operational test should mean the same in terms of achievement as a student scale score of 500 on the 2019 assessment.

Grades 5, 6, 7, and 8 Hawaiian language arts, and mathematics; and grade 8 science operational test scores were equated to the established KĀʻEO test scales using an anchor item procedure—also known as common item linking—through the Rasch model and Winsteps program (Linacre, 2016). Anchor item equating uses known parameter values of items on the established scale to place items from a current administration onto the established scale.

In 2021, all items from the Hawaiian Language Arts grades 6, 7, & 8, and from mathematics grades 5, 6, 7, & 8 tests were used as anchors for the equating. Due to a change in displacement from 2019 to 2021, one item was removed from the grade Hawaiian Language Arts anchor group and two items were removed from the grade 8 science anchor group.

After the 2022 administration, an anchor study will be conducted to determine the best items for an anchor set. Then starting with the 2023 administration, the Hawaiian language arts and mathematics operational tests will updated by removing a selection of items and replacing these items with new items. And the 2023 operational tests will be equated using a subset of items from the test, known as an anchor set.

Using the anchor items for each respective test, and the appropriate scaling constants and LOSS and HOSS described above, each test was placed on to the established KĀʻEO test scale. Score distributions for each grade and content area along with measurement errors are provided in **Appendix G**.

## 11.2. Quality Assurance and Forensic Analysis

After the 2021 data were scaled, the psychometric team conducted a series of checks on the data (See **Appendix K** for additional details). These checks provided greater detail to the HIDOE about the veracity of the results before reporting. The analyses included:

- Examination of proficiency level distributions from 2016, 2017, 2018, and 2019;
- Examination of the changes in school level percent proficient results from year to year to understand patterns in growth;
- Forensic analyses that included examining student response patterns by school, person fit statistics.

These results were provided to the HIDOE and UH KĀ‘EO assessment staff. While no definitive patterns could be seen in the test scores, these results could be used to inform future test administration training or monitoring.

## 11.3. Standard Setting Results

After the administration of the first operational assessment in 2019, the UH KĀ‘EO Assessment staff contracted with a leading national expert in standard setting, EdMetric (see Standard Setting report for a full description of the process, participants, and results).

## 11.4. Grades 3 - 8 Hawaiian Language Arts and Math & Grade 8 Science

The standard setting provided cut scores for each of four achievement levels: Ho‘omaka (Level 1), Holomua (Level 2), Mākaukau (Level 3), and Kelakela (Level 4). The cut score between Holomua and Mākaukau became the equivalent cut score for "proficient" in English language accountability tests. The results are reported below for each test and demographic reporting category for 2021.

## Table 11.3: Redacted State Report -Hawaiian Language Arts Grade 3

Hawaiian Language Arts Grade 3 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | n | % of Students in Level 1* Beginning | n | % of Students in Level 2* Developing | n | % of Students in Level 3* Proficient | n | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 277 | 477 | 51 | 188 | 67.9% | 47 | 17.0% | 41 | 14.8% | 1 | 0.4% |
| **Language Background** | | | | | | | | | | | | |
| English | | 257 | 476 | 50 | 179 | 69.6% | 42 | 16.3% | 35 | 13.6% | 1 | 0.4% |
| Hawaiian | | 18 | 492 | 49 | 8 | 44.4% | 5 | 27.8% | 5 | 27.8% | 0 | 0.0% |
| Samoan | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tagalog | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 122 | 495 | 54 | 65 | 53.3% | 25 | 20.5% | 31 | 25.4% | 1 | 0.8% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | n | % of Students in Level 1* Beginning | n | % of Students in Level 2* Developing | n | % of Students in Level 3* Proficient | n | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 277 | 477 | 51 | 188 | 67.9% | 47 | 17.0% | 41 | 14.8% | 1 | 0.4% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 57 | 468 | 37 | 44 | 77.2% | 10 | 17.5% | 3 | 5.3% | 0 | 0.0% |
| Multiple | 35 | 495 | 60 | 18 | 51.4% | 7 | 20.0% | 10 | 28.6% | 0 | 0.0% |
| Pacific Islander | 179 | 476 | 52 | 124 | 69.3% | 27 | 15.1% | 27 | 15.1% | 1 | 0.6% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | 11 | 479 | 64 | 7 | 63.6% | 1 | 9.1% | 3 | 27.3% | 0 | 0.0% |
| Hispanic | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Korean | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Micronesian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 224 | 475 | 49 | 159 | 71.0% | 35 | 15.6% | 29 | 12.9% | 1 | 0.4% |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | 12 | 479 | 54 | 8 | 66.7% | 2 | 16.7% | 2 | 16.7% | 0 | 0.0% |

** Total for all four achievement levels combined may not equal 100% due to rounding.*
*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.4: Redacted State Report -Hawaiian Language Arts Grade 4

Hawaiian Language Arts Grade 4 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 253 | 496 | 48 | 125 | 49.4% | 52 | 20.6% | 63 | 24.9% | 13 | 5.1% |
| **Language Background** | | | | | | | | | | | | |
| English | | 244 | 7 | 6 | 120 | 49.2% | 52 | 21.3% | 60 | 24.6% | 12 | 4.9% |
| Hawaiian | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 239 | 499 | 48 | 112 | 46.9% | 51 | 21.3% | 63 | 26.4% | 13 | 5.4% |
| | Y | 14 | 446 | 28 | 13 | 92.9% | 1 | 7.1% | 0 | 0.0% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 108 | 508 | 49 | 42 | 38.9% | 22 | 20.4% | 35 | 32.4% | 9 | 8.3% |
| | Y | 145 | 487 | 46 | 83 | 57.2% | 30 | 20.7% | 28 | 19.3% | 4 | 2.8% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 130 | 510 | 47 | 52 | 40.0% | 26 | 20.0% | 41 | 31.5% | 11 | 8.5% |
| Male | | 123 | 481 | 45 | 73 | 59.3% | 26 | 21.1% | 22 | 17.9% | 2 | 1.6% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 253 | 496 | 48 | 125 | 49.4% | 52 | 20.6% | 63 | 24.9% | 13 | 5.1% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 48 | 488 | 41 | 27 | 56.3% | 11 | 22.9% | 8 | 16.7% | 2 | 4.2% |
| Multiple | 27 | 514 | 41 | 7 | 25.9% | 11 | 40.7% | 7 | 25.9% | 2 | 7.4% |
| Pacific Islander | 167 | 493 | 51 | 89 | 53.3% | 29 | 17.4% | 41 | 24.6% | 8 | 4.8% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 202 | 491 | 49 | 110 | 54.5% | 37 | 18.3% | 45 | 22.3% | 10 | 5.0% |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | 17 | 514 | 40 | 5 | 29.4% | 5 | 29.4% | 6 | 35.3% | 1 | 5.9% |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.5: Redacted State Report -Hawaiian Language Arts Grade 5

Hawaiian Language Arts Grade 5 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 252 | 490 | 50 | 117 | 46.4% | 41 | 16.3% | 62 | 24.6% | 32 | 12.7% |
| **Language Background** | | | | | | | | | | | | |
| English | | 235 | 490 | 49 | 111 | 47.2% | 40 | 17.0% | 56 | 23.8% | 28 | 11.9% |
| French | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | 13 | 485 | 69 | 5 | 38.5% | 1 | 7.7% | 5 | 38.5% | 2 | 15.4% |
| Japanese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 241 | 493 | 49 | 108 | 44.8% | 39 | 16.2% | 62 | 25.7% | 32 | 13.3% |
| | Y | 11 | 439 | 34 | 9 | 81.8% | 2 | 18.2% | 0 | 0.0% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 114 | 501 | 53 | 43 | 37.7% | 17 | 14.9% | 33 | 28.9% | 21 | 18.4% |
| | Y | 138 | 481 | 46 | 74 | 53.6% | 24 | 17.4% | 29 | 21.0% | 11 | 8.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 142 | 499 | 49 | 57 | 40.1% | 24 | 16.9% | 38 | 26.8% | 23 | 16.2% |
| Male | | 110 | 479 | 50 | 60 | 54.5% | 17 | 15.5% | 24 | 21.8% | 9 | 8.2% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | Level 1* Beginning | *n* | Level 2* Developing | *n* | Level 3* Proficient | *n* | Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 252 | 490 | 50 | 117 | 46.4% | 41 | 16.3% | 62 | 24.6% | 32 | 12.7% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 55 | 486 | 47 | 27 | 49.1% | 13 | 23.6% | 10 | 18.2% | 5 | 9.1% |
| Multiple | 36 | 519 | 49 | 9 | 25.0% | 2 | 5.6% | 14 | 38.9% | 11 | 30.6% |
| Pacific Islander | 155 | 485 | 50 | 79 | 51.0% | 24 | 15.5% | 37 | 23.9% | 15 | 9.7% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | 12 | 522 | 51 | 2 | 16.7% | 0 | 0.0% | 5 | 41.7% | 5 | 41.7% |
| Hispanic | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 194 | 485 | 49 | 99 | 51.0% | 32 | 16.5% | 44 | 22.7% | 19 | 9.8% |
| Other Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.6: Redacted State Report -Hawaiian Language Arts Grade 6

Hawaiian Language Arts Grade 6 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 165 | 478 | 56 | 95 | 57.6% | 21 | 12.7% | 37 | 22.4% | 12 | 7.3% |
| **Language Background** | | | | | | | | | | | | |
| English | | 149 | 478 | 55 | 86 | 57.7% | 18 | 12.1% | 35 | 23.5% | 10 | 6.7% |
| Hawaiian | | 15 | 475 | 66 | 9 | 60.0% | 2 | 13.3% | 2 | 13.3% | 2 | 13.3% |
| Samoan | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 151 | 483 | 54 | 82 | 54.3% | 21 | 13.9% | 36 | 23.8% | 12 | 7.9% |
| | Y | 14 | 419 | 37 | 13 | 92.9% | 0 | 0.0% | 1 | 7.1% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 76 | 485 | 58 | 38 | 50.0% | 12 | 15.8% | 19 | 25.0% | 7 | 9.2% |
| | Y | 89 | 472 | 53 | 57 | 64.0% | 9 | 10.1% | 18 | 20.2% | 5 | 5.6% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 91 | 488 | 54 | 44 | 48.4% | 11 | 12.1% | 30 | 33.0% | 6 | 6.6% |
| Male | | 74 | 464 | 55 | 51 | 68.9% | 10 | 13.5% | 7 | 9.5% | 6 | 8.1% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 165 | 478 | 56 | 95 | 57.6% | 21 | 12.7% | 37 | 22.4% | 12 | 7.3% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Hispanic | 33 | 474 | 55 | 18 | 54.5% | 5 | 15.2% | 8 | 24.2% | 2 | 6.1% |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Pacific Islander | 111 | 478 | 56 | 67 | 60.4% | 11 | 9.9% | 25 | 22.5% | 8 | 7.2% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 139 | 477 | 56 | 82 | 59.0% | 15 | 10.8% | 32 | 23.0% | 10 | 7.2% |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | 11 | 484 | 55 | 6 | 54.5% | 1 | 9.1% | 3 | 27.3% | 1 | 9.1% |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.7: Redacted State Report -Hawaiian Language Arts Grade 7

Hawaiian Language Arts Grade 7 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 163 | 506 | 56 | 50 | 30.7% | 41 | 25.2% | 48 | 29.4% | 24 | 14.7% |
| **Language Background** | | | | | | | | | | | | |
| English | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 150 | 510 | 54 | 40 | 26.7% | 40 | 26.7% | 47 | 31.3% | 23 | 15.3% |
| | Y | 13 | 451 | 57 | 10 | 76.9% | 1 | 7.7% | 1 | 7.7% | 1 | 7.7% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 64 | 516 | 65 | 16 | 25.0% | 13 | 20.3% | 22 | 34.4% | 13 | 20.3% |
| | Y | 99 | 499 | 49 | 34 | 34.3% | 28 | 28.3% | 26 | 26.3% | 11 | 11.1% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 83 | 525 | 49 | 14 | 16.9% | 20 | 24.1% | 32 | 38.6% | 17 | 20.5% |
| Male | | 80 | 485 | 57 | 36 | 45.0% | 21 | 26.3% | 16 | 20.0% | 7 | 8.8% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 163 | 506 | 56 | 50 | 30.7% | 41 | 25.2% | 48 | 29.4% | 24 | 14.7% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 32 | 516 | 59 | 8 | 25.0% | 9 | 28.1% | 9 | 28.1% | 6 | 18.8% |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Pacific Islander | 118 | 502 | 53 | 38 | 32.2% | 30 | 25.4% | 36 | 30.5% | 14 | 11.9% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 142 | 506 | 55 | 42 | 29.6% | 38 | 26.8% | 42 | 29.6% | 20 | 14.1% |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.8: Redacted State Report -Hawaiian Language Arts Grade 8

Hawaiian Language Arts Grade 8 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 138 | 501 | 53 | 62 | 44.9% | 32 | 23.2% | 5 | 3.6% | 39 | 28.3% |
| **Language Background** | | | | | | | | | | | | |
| English | | 123 | 503 | 51 | 56 | 45.5% | 27 | 22.0% | 5 | 4.1% | 35 | 28.5% |
| Hawaiian | | 15 | 485 | 66 | 6 | 40.0% | 5 | 33.3% | 0 | 0.0% | 4 | 26.7% |
| | | | | | | | | | | | | |
| **IEP** | N | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| | Y | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| **504 Plan** | N | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| | Y | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| **Lunch Status** | N | 61 | 515 | 53 | 20 | 32.8% | 15 | 24.6% | 2 | 3.3% | 24 | 39.3% |
| | Y | 77 | 490 | 51 | 42 | 54.5% | 17 | 22.1% | 3 | 3.9% | 15 | 19.5% |
| **Migrant** | N | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| | Y | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| **Gender** | | | | | | | | | | | | |
| Female | | 75 | 509 | 58 | 31 | 41.3% | 14 | 18.7% | 3 | 4.0% | 27 | 36.0% |
| Male | | 63 | 491 | 44 | 31 | 49.2% | 18 | 28.6% | 2 | 3.2% | 12 | 19.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 138 | 501 | 53 | 62 | 44.9% | 32 | 23.2% | 5 | 3.6% | 39 | 28.3% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Asian | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Hispanic | 21 | 507 | 55 | 7 | 33.3% | 5 | 23.8% | 2 | 9.5% | 7 | 33.3% |
| Multiple | 15 | 514 | 61 | 6 | 40.0% | 2 | 13.3% | 1 | 6.7% | 6 | 40.0% |
| Pacific Islander | 95 | 495 | 51 | 48 | 50.5% | 23 | 24.2% | 2 | 2.1% | 22 | 23.2% |
| White | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Filipino | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Japanese | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Native Hawaiian | 110 | 496 | 51 | 53 | 48.2% | 27 | 24.5% | 3 | 2.7% | 27 | 24.5% |
| Part-Hawaiian | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Portuguese | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| Samoan | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |
| White | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ | □ |

* *Total for all four achievement levels combined may not equal 100% due to rounding.*

□ *Data masked to comply with reporting privacy guidelines.*

## Table 11.9: Redacted State Report -Mathematics Grade 3

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 275 | 487 | 34 | 110 | 40.0% | 107 | 38.9% | 41 | 14.9% | 17 | 6.2% |
| **Language Background** | | | | | | | | | | | | |
| English | | 255 | 487 | 34 | 101 | 39.6% | 101 | 39.6% | 38 | 14.9% | 15 | 5.9% |
| Hawaiian | | 18 | 483 | 36 | 9 | 50.0% | 5 | 27.8% | 3 | 16.7% | 1 | 5.6% |
| Samoan | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tagalog | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **IEP** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 121 | 497 | 39 | 37 | 30.6% | 43 | 35.5% | 28 | 23.1% | 13 | 10.7% |
| | Y | 154 | 479 | 27 | 73 | 47.4% | 64 | 41.6% | 13 | 8.4% | 4 | 2.6% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 156 | 489 | 37 | 62 | 39.7% | 55 | 35.3% | 27 | 17.3% | 12 | 7.7% |
| Male | | 119 | 483 | 29 | 48 | 40.3% | 52 | 43.7% | 14 | 11.8% | 5 | 4.2% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 275 | 487 | 34 | 110 | 40.0% | 107 | 38.9% | 41 | 14.9% | 17 | 6.2% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 56 | 477 | 26 | 29 | 51.8% | 21 | 37.5% | 5 | 8.9% | 1 | 1.8% |
| Multiple | 35 | 501 | 39 | 9 | 25.7% | 15 | 42.9% | 7 | 20.0% | 4 | 11.4% |
| Pacific Islander | 178 | 487 | 35 | 71 | 39.9% | 67 | 37.6% | 28 | 15.7% | 12 | 6.7% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 11 | 497 | 53 | 4 | 36.4% | 4 | 36.4% | 2 | 18.2% | 1 | 9.1% |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Korean | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Micronesian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Other Pacific Islander | 222 | 485 | 33 | 95 | 42.8% | 83 | 37.4% | 31 | 14.0% | 13 | 5.9% |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.10: Redacted State Report -Mathematics Grade 4

Mathematics Grade 4 Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 252 | 491 | 47 | 146 | 57.9% | 60 | 23.8% | 17 | 6.7% | 29 | 12.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 238 | 493 | 48 | 133 | 55.9% | 59 | 24.8% | 17 | 7.1% | 29 | 12.0% |
| | Y | 14 | 457 | 26 | 13 | 92.9% | 1 | 7.1% | 0 | 0.0% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 109 | 503 | 51 | 54 | 49.5% | 23 | 21.1% | 13 | 11.9% | 19 | 17.0% |
| | Y | 143 | 482 | 42 | 92 | 64.3% | 37 | 25.9% | 4 | 2.8% | 10 | 7.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 132 | 498 | 51 | 70 | 53.0% | 31 | 23.5% | 9 | 6.8% | 22 | 17.0% |
| Male | | 120 | 483 | 41 | 76 | 63.3% | 29 | 24.2% | 8 | 6.7% | 7 | 6.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 252 | 491 | 47 | 146 | 57.9% | 60 | 23.8% | 17 | 6.7% | 29 | 12.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 48 | 482 | 43 | 30 | 62.5% | 13 | 27.1% | 1 | 2.1% | 4 | 8.0% |
| Multiple | 28 | 501 | 56 | 13 | 46.4% | 7 | 25.0% | 3 | 10.7% | 5 | 18.0% |
| Pacific Islander | 165 | 491 | 46 | 98 | 59.4% | 38 | 23.0% | 12 | 7.3% | 17 | 10.0% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 200 | 488 | 46 | 121 | 60.5% | 48 | 24.0% | 12 | 6.0% | 19 | 10.0% |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | 18 | 498 | 48 | 8 | 44.4% | 6 | 33.3% | 2 | 11.1% | 2 | 11.0% |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.11: Redacted State Report -Mathematics Grade 5

Mathematics Grade 5 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 249 | 502 | 49 | 95 | 38.2% | 102 | 41.0% | 22 | 8.8% | 30 | 12.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | 232 | 500 | 49 | 92 | 39.7% | 94 | 40.5% | 21 | 9.1% | 25 | 11.0% |
| French | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | 13 | 500 | 40 | 3 | 23.1% | 8 | 61.5% | 1 | 7.7% | 1 | 8.0% |
| Japanese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 238 | 503 | 49 | 89 | 37.4% | 97 | 40.8% | 22 | 9.2% | 30 | 13.0% |
| | Y | 11 | 471 | 33 | 6 | 54.5% | 5 | 45.5% | 0 | 0.0% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 113 | 514 | 51 | 35 | 31.0% | 44 | 38.9% | 15 | 13.3% | 19 | 17.0% |
| | Y | 136 | 491 | 45 | 60 | 44.1% | 58 | 42.6% | 7 | 5.1% | 11 | 8.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 140 | 503 | 50 | 53 | 37.9% | 56 | 40.0% | 10 | 7.1% | 21 | 15.0% |
| Male | | 109 | 499 | 48 | 42 | 38.5% | 46 | 42.2% | 12 | 11.0% | 9 | 8.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 249 | 502 | 49 | 95 | 38.2% | 102 | 41.0% | 22 | 8.8% | 30 | 12.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 54 | 492 | 49 | 22 | 40.7% | 25 | 46.3% | 3 | 5.6% | 4 | 7.0% |
| Multiple | 36 | 524 | 53 | 7 | 19.4% | 18 | 50.0% | 3 | 8.3% | 8 | 22.0% |
| Pacific Islander | 153 | 499 | 48 | 66 | 43.1% | 56 | 36.6% | 14 | 9.2% | 17 | 11.0% |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | 12 | 518 | 47 | 3 | 25.0% | 4 | 33.3% | 2 | 16.7% | 3 | 25.0% |
| Hispanic | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 191 | 497 | 48 | 80 | 41.9% | 75 | 39.3% | 16 | 8.4% | 20 | 10.0% |
| Other Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.12: Redacted State Report -Mathematics Grade 6

Mathematics Grade 6 Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 162 | 488 | 55 | 71 | 43.8% | 63 | 38.9% | 13 | 8.0% | 15 | 9.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | 146 | 487 | 54 | 63 | 43.2% | 59 | 40.4% | 11 | 7.5% | 13 | 9.0% |
| Hawaiian | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 75 | 497 | 62 | 29 | 38.7% | 30 | 40.0% | 5 | 6.7% | 11 | 15.0% |
| | Y | 87 | 479 | 47 | 42 | 48.3% | 33 | 37.9% | 8 | 9.2% | 4 | 5.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 90 | 488 | 54 | 36 | 40.0% | 37 | 41.1% | 9 | 10.0% | 8 | 9.0% |
| Male | | 72 | 487 | 58 | 35 | 48.6% | 26 | 36.1% | 4 | 5.6% | 7 | 10.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 162 | 488 | 55 | 71 | 43.8% | 63 | 38.9% | 13 | 8.0% | 15 | 9.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Hispanic | 33 | 481 | 61 | 19 | 57.6% | 9 | 27.3% | 3 | 9.1% | 2 | 6.0% |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Pacific Islander | 109 | 487 | 53 | 45 | 41.3% | 46 | 42.2% | 9 | 8.3% | 9 | 8.0% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 137 | 487 | 55 | 60 | 43.8% | 54 | 39.4% | 12 | 8.8% | 11 | 8.0% |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | 11 | 506 | 63 | 3 | 27.3% | 5 | 45.5% | 1 | 9.1% | 2 | 18.0% |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

## Table 11.13: Redacted State Report -Mathematics Grade 7

Mathematics Grade 7 — Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 162 | 503 | 47 | 71 | 43.8% | 52 | 32.1% | 24 | 14.8% | 15 | 9.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 149 | 504 | 48 | 64 | 43.0% | 47 | 31.5% | 24 | 16.1% | 14 | 9.0% |
| | Y | 13 | 494 | 31 | 7 | 53.8% | 5 | 38.5% | 0 | 0.0% | 1 | 8.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 64 | 513 | 54 | 23 | 35.9% | 20 | 31.3% | 12 | 18.8% | 9 | 14.0% |
| | Y | 98 | 497 | 41 | 48 | 49.0% | 32 | 32.7% | 12 | 12.2% | 6 | 6.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 80 | 506 | 43 | 34 | 42.5% | 23 | 28.8% | 17 | 21.3% | 6 | 8.0% |
| Male | | 82 | 501 | 51 | 37 | 45.1% | 29 | 35.4% | 7 | 8.5% | 9 | 11.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 162 | 503 | 47 | 71 | 43.8% | 52 | 32.1% | 24 | 14.8% | 15 | 9.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 33 | 510 | 46 | 13 | 39.4% | 9 | 27.3% | 6 | 18.2% | 5 | 15.0% |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Pacific Islander | 116 | 500 | 48 | 52 | 44.8% | 40 | 34.5% | 16 | 13.8% | 8 | 7.0% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 141 | 502 | 48 | 61 | 43.3% | 46 | 32.6% | 22 | 15.6% | 12 | 9.0% |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

* *Total for all four achievement levels combined may not equal 100% due to rounding.*

◻ *Data masked to comply with reporting privacy guidelines.*

## Table 11.14: Redacted State Report -Mathematics Grade 8

Mathematics Grade 8 | Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 135 | 505 | 44 | 50 | 37.0% | 52 | 38.5% | 19 | 14.1% | 14 | 10.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | 120 | 508 | 43 | 41 | 34.2% | 48 | 40.0% | 18 | 15.0% | 13 | 11.0% |
| Hawaiian | | 15 | 483 | 42 | 9 | 60.0% | 4 | 26.7% | 1 | 6.7% | 1 | 7.0% |
| | | | | | | | | | | | | |
| **IEP** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 60 | 516 | 43 | 17 | 28.3% | 25 | 41.7% | 11 | 18.3% | 7 | 12.0% |
| | Y | 75 | 497 | 42 | 33 | 44.0% | 27 | 36.0% | 8 | 10.7% | 7 | 9.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 73 | 503 | 45 | 29 | 39.7% | 30 | 41.1% | 8 | 11.0% | 6 | 8.0% |
| Male | | 62 | 508 | 43 | 21 | 33.9% | 22 | 35.5% | 11 | 17.7% | 8 | 13.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 135 | 505 | 44 | 50 | 37.0% | 52 | 38.5% | 19 | 14.1% | 14 | 10.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 21 | 510 | 47 | 8 | 38.1% | 5 | 23.8% | 5 | 23.8% | 3 | 14.0% |
| Multiple | 14 | 526 | 64 | 3 | 21.4% | 7 | 50.0% | 0 | 0.0% | 4 | 29.0% |
| Pacific Islander | 93 | 499 | 38 | 38 | 40.9% | 39 | 41.9% | 11 | 11.8% | 5 | 5.0% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 108 | 499 | 39 | 45 | 41.7% | 42 | 38.9% | 15 | 13.9% | 6 | 6.0% |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

** Total for all four achievement levels combined may not equal 100% due to rounding.*

*◻ Data masked to comply with reporting privacy guidelines.*

### Table 11.15: Redacted State Report -Science Grade 8

Science Grade 8 Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 138 | 514 | 49 | 50 | 36.2% | 39 | 28.3% | 19 | 13.8% | 30 | 22.0% |
| **Language Background** | | | | | | | | | | | | |
| English | | 123 | 514 | 47 | 43 | 35.0% | 36 | 29.3% | 17 | 13.8% | 27 | 22.0% |
| Hawaiian | | 15 | 509 | 63 | 7 | 46.7% | 3 | 20.0% | 2 | 13.3% | 3 | 20.0% |
| | | | | | | | | | | | | |
| **IEP** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 61 | 526 | 49 | 14 | 23.0% | 20 | 32.8% | 9 | 14.8% | 18 | 30.0% |
| | Y | 77 | 504 | 46 | 36 | 46.8% | 19 | 24.7% | 10 | 13.0% | 12 | 16.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 75 | 519 | 51 | 24 | 32.0% | 21 | 28.0% | 12 | 16.0% | 18 | 24.0% |
| Male | | 63 | 507 | 45 | 26 | 41.3% | 18 | 28.6% | 7 | 11.1% | 12 | 19.0% |

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 138 | 514 | 49 | 50 | 36.2% | 39 | 28.3% | 19 | 13.8% | 30 | 22.0% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 21 | 523 | 42 | 5 | 23.8% | 7 | 33.3% | 3 | 14.3% | 6 | 29.0% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | 15 | 528 | 48 | 3 | 20.0% | 5 | 33.3% | 2 | 13.3% | 5 | 33.0% |
| Pacific Islander | 95 | 506 | 50 | 42 | 44.2% | 26 | 27.4% | 11 | 11.6% | 16 | 17.0% |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 110 | 509 | 49 | 46 | 41.8% | 32 | 29.1% | 12 | 10.9% | 20 | 18.0% |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Part-Hawaiian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

* *Total for all four achievement levels combined may not equal 100% due to rounding.*

◻ *Data masked to comply with reporting privacy guidelines.*

## 11.5. Grade 5 Science

Due to the COVID-19 pandemic the initial grade 5 standard setting provided cut scores for each of two achievement levels: Holomua (Level 2), and Mākaukau (Level 3)). The cut score between Holomua and Mākaukau became the equivalent cut score for "proficient" in English language accountability tests. After the 2022 administration, cuts scores will be reestablished for the four KAEO achievement levels. The results are reported below for each test and demographic reporting category for 2021.

### Table 11.16: Redacted State Report -Science Grade 5

* *Total for all four achievement levels combined may not equal 100% due to rounding.*

◻ *Data masked to comply with reporting privacy guidelines.*

# Chapter 12: Reporting

Each year, the KĀʻEO program provides a host of reports for distribution to parents, schools, and the community. The results of the assessment are delivered in the form of Student Reports, School Reports, Roster Reports, Roster Tables, and State Reports, and each report type is provided in parallel versions: Hawaiian and English. The production and distribution of these reports follows a standard protocol for both public and internally released state- and school-level report documents. Each of these formats is described below, along with its distribution protocol(s).

Parents receive student-level information about their student(s) via **Student Reports**. A report document is provided for each KĀʻEO content area assessed (Hawaiian Language Arts, Mathematics, and Science). Prior to 2021, these reports displayed information that allowed parents to compare their own student's scores with average (mean) scale scores calculated at the school and state level; for 2021, however, Student Report designs were modified to include information about the impacts of COVID-19; data previously used to compare the student's scale score to school- and state-level scores was omitted in light of the impacts of the pandemic.

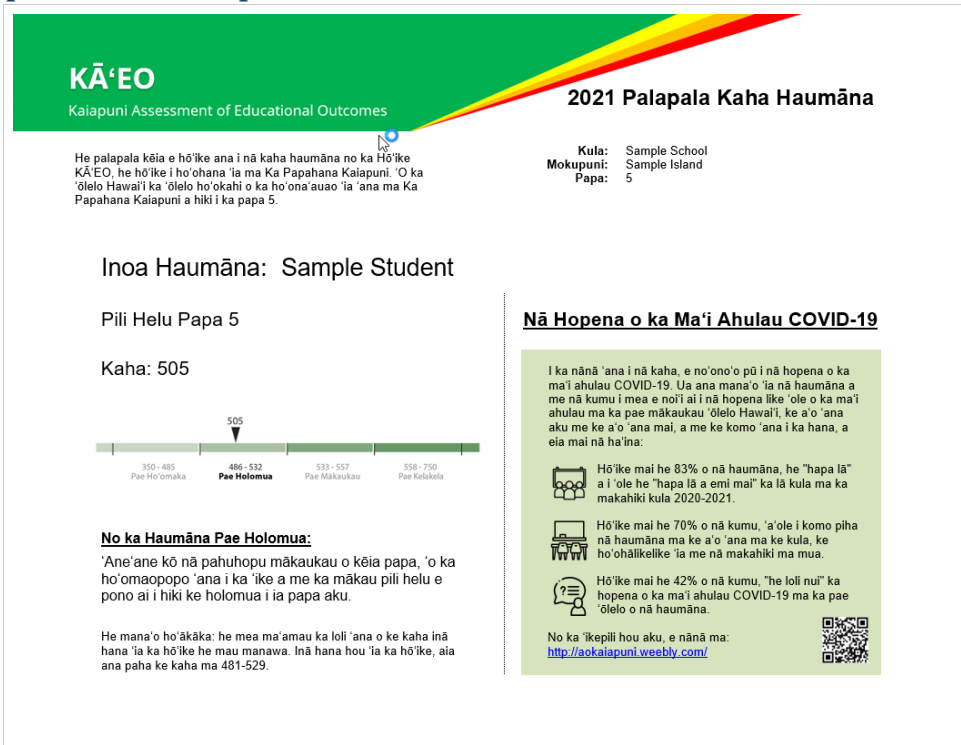
Schools receive student-level information via **Roster Reports**. Each roster report provides a list of students for the school, along with the relevant scale scores and performance levels for each content area and grade levels assessed via KĀʻEO. Schools are also provided with an electronic (MS Excel) version of the Roster Reports in spreadsheet form. These electronic files are known as **Roster Tables**.

Schools are also provided with **School Reports**, which show both school- and state-level information in the form of average (mean) scale scores for each content area and grade level assessed.

**State Reports** are provided only to the state (HIDOE). They show both aggregated and disaggregated assessment performance for key demographics such as free/reduced lunch, gender, IEP, federal/state ethnicities, et cetera. These reports are provided in both confidential/redacted and unredacted forms. Parents and schools do not have the opportunity to view State Reports until they are publicly released (in redacted form) by the state.

**Each report type is designed, produced, and supplied to KĀʻEO-participating schools in both Hawaiian and English versions Figure 12.1 and**
Figure 12.2 illustrate the dual-language design of the KĀʻEO reporting system.

## Figure 12.1: Example of Student Reports in Hawaiian



KĀʻEO

Kaiapuni Assessment of Educational Outcomes

2021 Palapala Kaha Haumāna

He palapala kēia e hōʻike ana i nā kaha haumāna no ka Hōʻike KĀʻEO, he hōʻike i hoʻohana ʻia ma Ka Papahana Kaiapuni. ʻO ka ʻōlelo Hawaiʻi ka ʻōlelo hoʻokahi o ka hoʻonaʻauao ʻia ʻana ma Ka Papahana Kaiapuni a hiki i ka papa 5.

**Kula:** Sample School
**Mokupuni:** Sample Island
**Papa:** 5

Inoa Haumāna: Sample Student

Pili Helu Papa 5

Kaha: 505

505

350 - 485 Pae Hoʻomaka | **486 - 532 Pae Holomua** | 533 - 557 Pae Mākaukau | 558 - 750 Pae Kelakela

**No ka Haumāna Pae Holomua:**

ʻAneʻane kō nā pahuhopu mākaukau o kēia papa, ʻo ka hoʻomaopopo ʻana i ka ʻike a me ka mākau pili helu e pono ai i hiki ke holomua i ia papa aku.

He manaʻo hoʻākāka: he mea maʻamau ka loli ʻana o ke kaha inā hana ʻia ka hōʻike he mau manawa. Inā hana hou ʻia ka hōʻike, aia ana paha ke kaha ma 481-529.

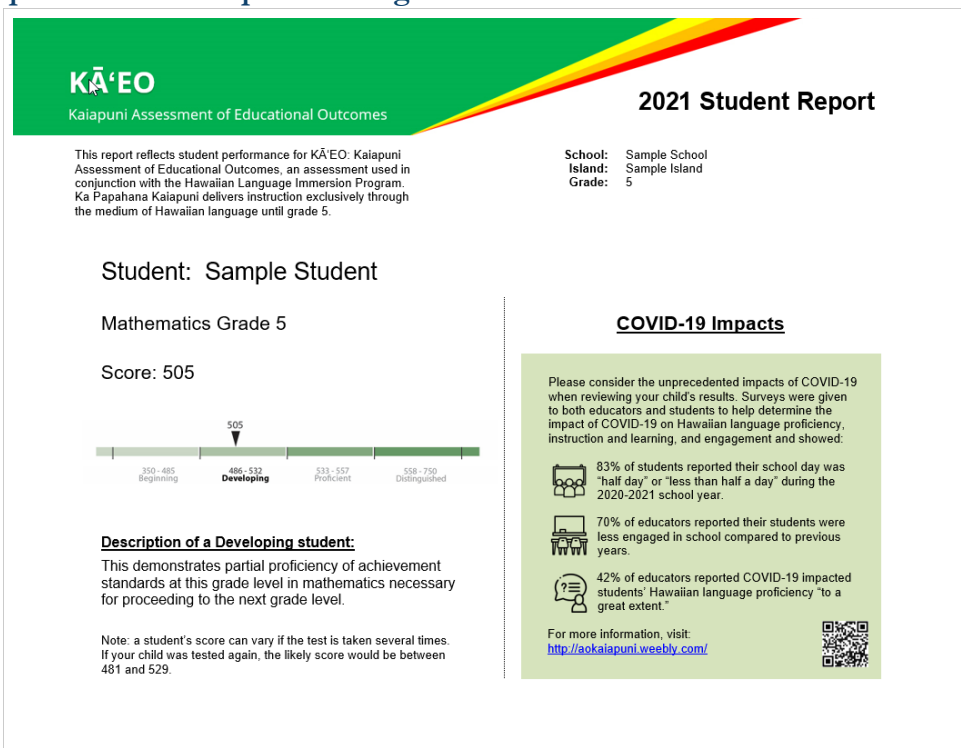
**Nā Hopena o ka Maʻi Ahulau COVID-19**

I ka nānā ʻana i nā kaha, e noʻonoʻo pū i nā hopena o ka maʻi ahulau COVID-19. Ua ana manaʻo ʻia nā haumāna a me nā kumu i mea e noʻiʻi ai i nā hopena like ʻole o ka maʻi ahulau ma ka pae mākaukau ʻōlelo Hawaiʻi, ke aʻo ʻana aku me ke aʻo ʻana mai, a me ke komo ʻana i ka hana, a eia mai nā haʻina:

- Hōʻike mai he 83% o nā haumāna, he "hapa lā" a i ʻole he "hapa lā a emi mai" ka lā kula ma ka makahiki kula 2020-2021.
- Hōʻike mai he 70% o nā kumu, ʻaʻole i komo piha nā haumāna ma ke aʻo ʻana ma ke kula, ke hoʻohālikelike ʻia me nā makahiki ma mua.
- Hōʻike mai he 42% o nā kumu, "he loli nui" ka hopena o ka maʻi ahulau COVID-19 ma ka pae ʻōlelo o nā haumāna.

No ka ʻikepili hou aku, e nānā ma:
http://aokaiapuni.weebly.com/

## Figure 12.2: Example of Student Reports in English



KĀʻEO

Kaiapuni Assessment of Educational Outcomes

2021 Student Report

This report reflects student performance for KĀʻEO: Kaiapuni Assessment of Educational Outcomes, an assessment used in conjunction with the Hawaiian Language Immersion Program. Ka Papahana Kaiapuni delivers instruction exclusively through the medium of Hawaiian language until grade 5.

**School:** Sample School
**Island:** Sample Island
**Grade:** 5

Student: Sample Student

Mathematics Grade 5

Score: 505

505

350 - 485 Beginning | **486 - 532 Developing** | 533 - 557 Proficient | 558 - 750 Distinguished

**Description of a Developing student:**

This demonstrates partial proficiency of achievement standards at this grade level in mathematics necessary for proceeding to the next grade level.

Note: a student's score can vary if the test is taken several times. If your child was tested again, the likely score would be between 481 and 529.

**COVID-19 Impacts**

Please consider the unprecedented impacts of COVID-19 when reviewing your child's results. Surveys were given to both educators and students to help determine the impact of COVID-19 on Hawaiian language proficiency, instruction and learning, and engagement and showed:

- 83% of students reported their school day was "half day" or "less than half a day" during the 2020-2021 school year.
- 70% of educators reported their students were less engaged in school compared to previous years.
- 42% of educators reported COVID-19 impacted students' Hawaiian language proficiency "to a great extent."

For more information, visit:
http://aokaiapuni.weebly.com/

The relevant KĀʻEO reporting formats have been provided consistently to parents, schools, and the state since the first operational administration of KĀʻEO in 2016. Likewise, the KĀʻEO reporting system has implemented improvements each year since inception, such as the use of report templates customized to each school's level of

participation in the KĀʻEO program (2021) or the delivery of student-level data in a more timely manner (e.g., schools can receive Roster Table reports in spreadsheet form well before the PDF versions are made available).

In 2021, electronic files containing PDF versions of Student, School, and Roster Reports were distributed directly to schools using a secure electronic delivery system, and these files were designed to be physically printed. Roster Tables, which were provided as MS Excel files only and not designed for physical printing, were also delivered as part of each school's reporting package.

The logistical plan for report distribution required each school to access its own secure online file download location. Each school was provided with a unique URL link and a unique password to access the reports electronically, and access was monitored via auditing tools available within the secure delivery system.

As a matter of policy, KĀʻEO reporting protocol follows HIDOE policy, which requires official approval by the HIDOE Superintendent. Upon approval, actual report production with live data begins; until then, all reporting and data aggregation work is considered preliminary and part of a preparatory stage.

Each year, the key milestones of the KĀʻEO report distribution protocol include:

- early delivery of Roster Tables in Excel format to each school via secure file transfer service;
- production of all report types in PDF form: Student, Roster, School, and State Reports;
- delivery, either via FedEx (physical) or electronic (PDF) format, of a reporting package including Student, School, and Roster Reports to each school that participated in the assessment; and
- delivery, via secure electronic means, of State Reports with state-level data to UH exclusively, in both redacted and confidential formats (both in Hawaiian and English).

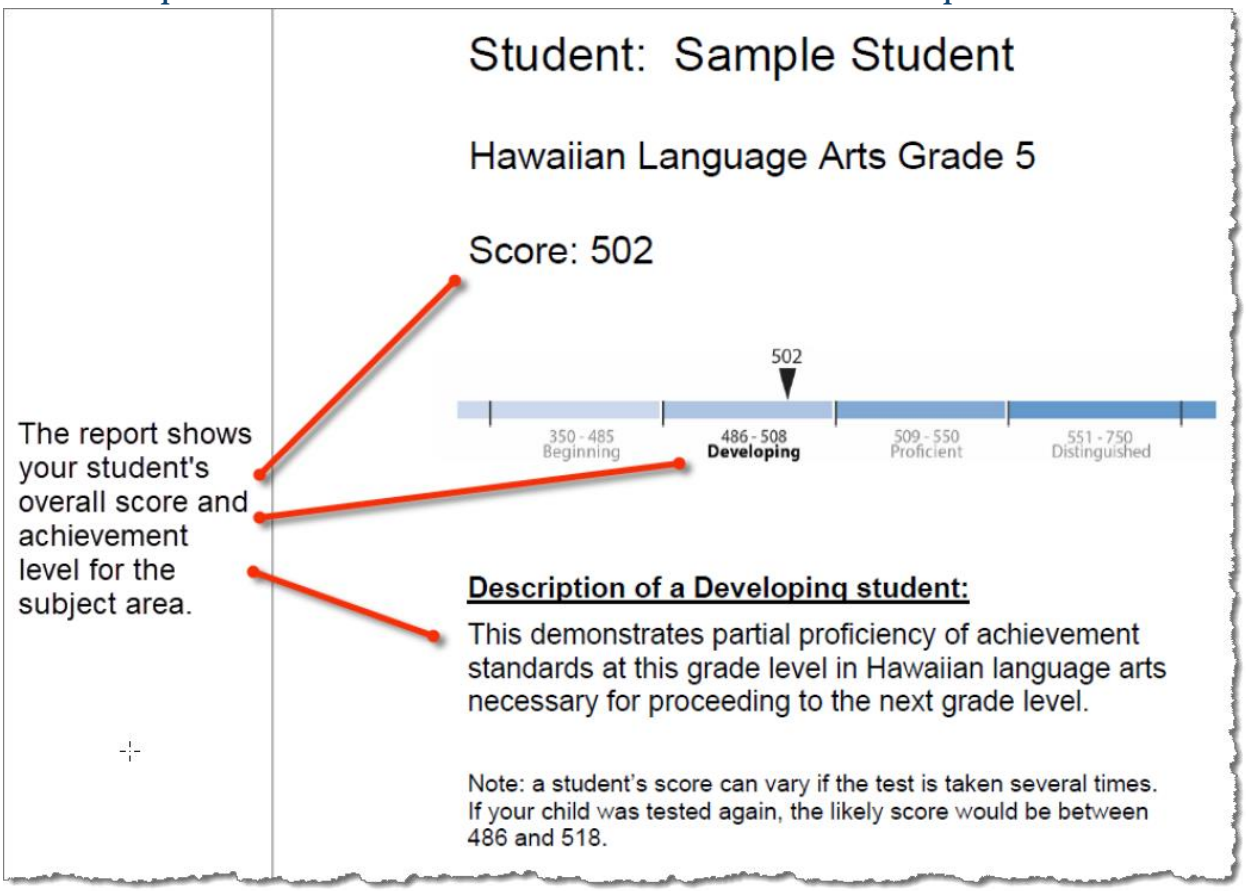
## 12.1. Student Reports

From inception, KĀʻEO reports were designed to communicate an overall scale score along with a relevant KĀʻEO achievement level. The overall score indicates how the student performed on the entire test in a scale score metric. These scores are then assigned to a performance level as shown in Figure 12.3. These performance levels were established following the 2016 administration of KĀʻEO (grades 3-4 mathematics and HLA), 2017 (grade 4 science), and 2019 (grades 5-8 mathematics and HLA, grade 8 science). Cut score recommendations were made based on the results of standard-setting workshops which takes place during the summer of the first operational field test. Recommended cut scores were approved by the HIDOE Superintendent and remain in place for subsequent years.

For 2021, achievement level information is communicated using both graphics and text, as shown in the screen shot example of Figure 12.3.. Both Hawaiian and English versions of the reports use the associated terms for the achievement levels (for example, Hawaiian reports show Hoʻomaka, Holomua, Mākaukau, and Kelakela) and the student's scale score is indicated both numerically and graphically for each content area (Hawaiian language arts, mathematics, and science).

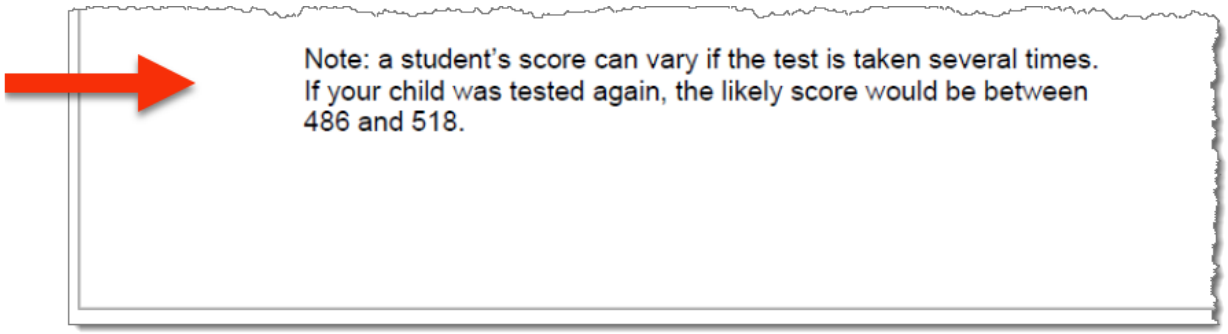
Figure 12.4 illustrates how KĀʻEO Student Reports show scale scores with a prominent visual indicator on the report. In this example, the overall score is 502, which is in Level 2 (Developing/Pae Holomua).

**Figure 12.3: Example of Scale Scores and Performance Levels on Student Reports**




A reference to SEM is also represented via text near the bottom of each Student Report, as shown Figure 12.4. Users are provided with a note of explanation about the potential for variability of student scores (which represents the SEM) and its applicability to their own student's score. This information is displayed near the bottom of the KĀʻEO Student Reports.

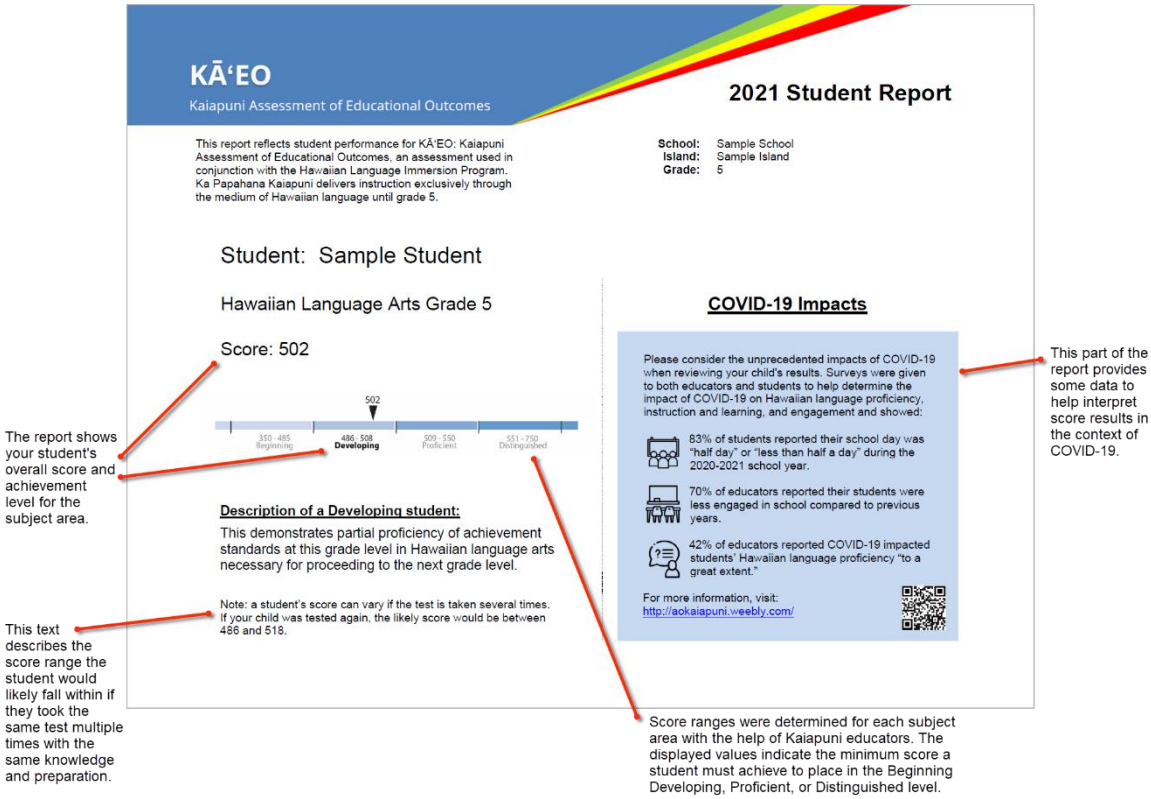
**Figure 12.4: Example of SEM reference in Student Reports**



## 12.2. Interpretive Guide

Teachers and administrators in Kaiapuni schools are encouraged to discuss results with their students' families. To this end, interpretive guides are provided to schools to facilitate these discussions ( Figure 12.5).

**Figure 12.5: Example of Interpretive Guide**




There may be occasions when students or parents do not agree with their (or their child's) assessment results. In that case, students or parents have the right to protest such scores. The KĀʻEO program follows HIDOE's process for protesting assessment scores if and when these events occur.

## 12.3. Other Report Types

KĀʻEO reporting also includes Roster Reports, which contain the same essential elements as the Student Reports (scale scores and performance levels) grouped for an entire school/classroom. The graphic representations of the Roster Reports for 2021 are shown in Figure 12.6 and Figure 12.7.

## Figure 12.6: Example of a Roster Report, page 1

**KĀʻEO**

**2021 Roster Report**

Kaiapuni Assessment of Educational Outcomes

This report reflects school-level performance for KĀʻEO: Kaiapuni Assessment of Educational Outcomes, an assessment administered in conjunction with the Hawaiian Language Immersion Program. For more information about the program, see: http://aokaiapuni.weebly.com/.

**School:** Sample School
**Island:** Sample Island
**Grade:** 5

**Participation Level: HIGH**

Thank you for participating in KĀʻEO in 2021. Over 95% of students at your school participated in the assessment. This level of participation will allow you to make informed decisions about the achievement level of your students.

**95-100%**
participation

**IMPORTANT**

Please consider the unprecedented impacts of Covid-19 when reviewing these results. The degree to which your school was able to engage students, cover your standard curriculum, and provide instruction may impact your scores.

These results should be used with multiple sources of evidence (such as formative assessments, attendance, and previous summative assessment results) in considering student achievement. This approach will allow you to use the data to plan in a manner that is most productive for your school community.

If you have questions, please contact: hsa@k12.hi.us

**Scores and Achievement Levels by Student and Content Area**

Sample School
Grade 5

| | Hawaiian Language Arts | | Mathematics | |
|---|---|---|---|---|
| **Student** | Scale Score | Achievement Level | Scale Score | Achievement Level |
| **Sample Student 1** | **400** | Beginning | **470** | Beginning |
| **Sample Student 2** | **450** | Beginning | **480** | Beginning |

1 of 2

## Figure 12.7: Example of a Roster Report, page 2

**Scores and Achievement Levels by Student and Content Area**

Sample School
Grade 5

| | Hawaiian Language Arts | | Mathematics | |
|---|---|---|---|---|
| **Student** | Scale Score | Achievement Level | Scale Score | Achievement Level |
| **Sample Student 3** | **470** | Beginning | **490** | Developing |
| **Sample Student 4** | **470** | Beginning | **490** | Developing |
| **Sample Student 5** | **490** | Developing | **500** | Developing |
| **Sample Student 6** | **490** | Developing | **500** | Developing |
| **Sample Student 7** | **490** | Developing | **500** | Developing |
| **Sample Student 8** | **490** | Developing | **500** | Developing |
| **Sample Student 9** | **540** | Proficient | **580** | Distinguished |
| **Sample Student 10** | **590** | Distinguished | **600** | Distinguished |

2 of 2

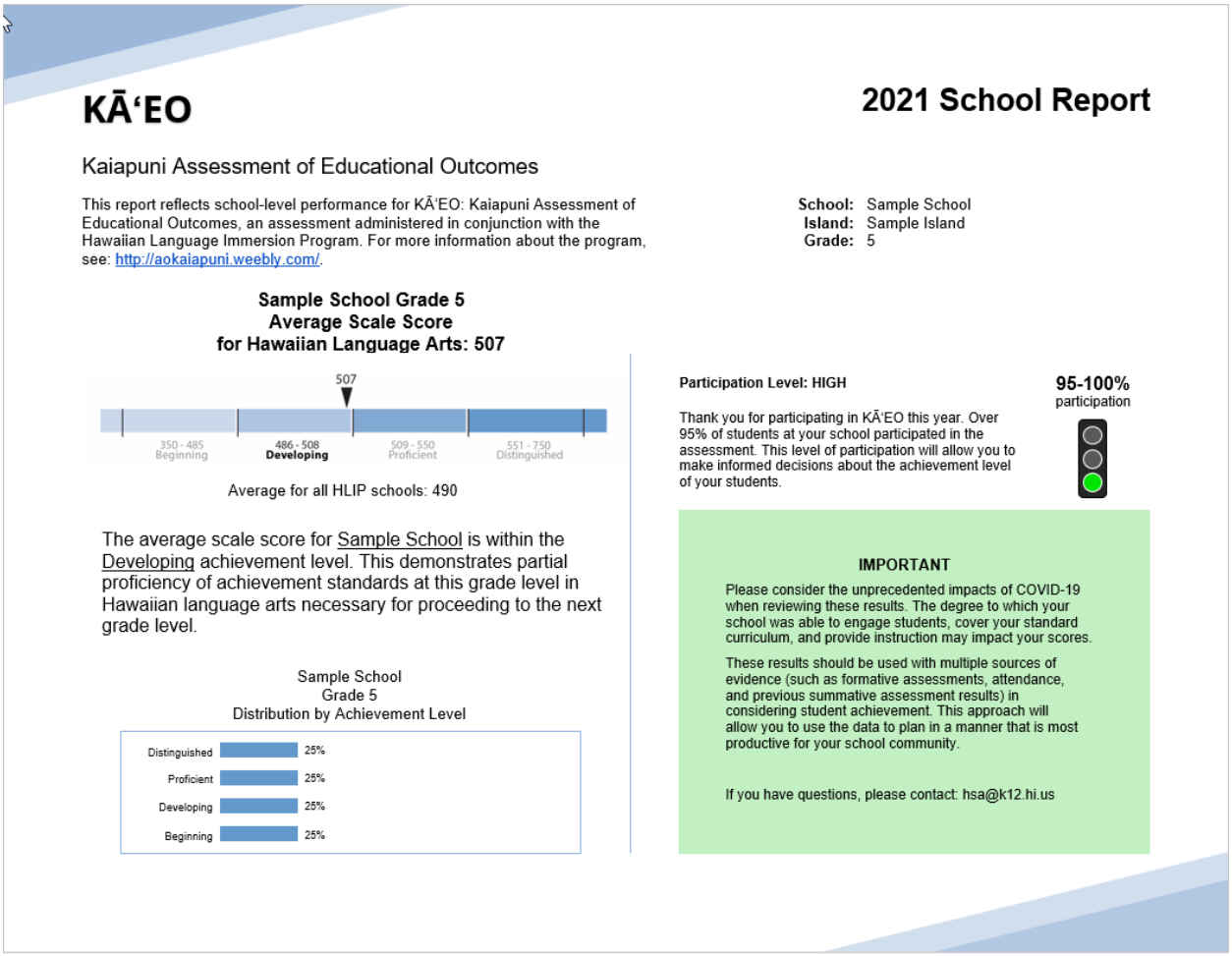
Roster reports allow schools and/or teachers to make a simultaneous comparison of student scale scores and performance levels for both Hawaiian language arts and mathematics. Separate roster reports for science are provided to make similar comparisons but are produced only for those grade levels in which the science assessment is administered.

Roster Reports for 2021 also included information about the school's participation level in the program. Schools were categorized into High (95-100%), Medium (85-95%), and Low (75-85%) rates of participation, and schools with participation rates less than 75% received a report document that contained no average scale score or score distributions. High, Medium, and Low participation rates were indicated using a standard stoplight visual representation system (green, yellow, pink) along with written guidance to help users interpret the school's average scale score in light of its participation level.

School reports for KĀ'EO display distribution of students by achievement level (as a percentage of 100% total for all four levels) along with an average (mean) scale score for the school's students at the relevant grade level.

Textual guidance, along with the graphic representations made in school summary reports for KĀ'EO in 2021, are illustrated in Figure 12.8.

**Figure 12.8: Example of a School Report**



Like the Roster Reports for 2021, School Reports also included information about the school's participation level in the program and were categorized into High (95-100%), Medium (85-95%), and Low (75-85%) rates of participation. Schools with participation rates less than 75% received a report document that contained no average scale score or score distributions. High, Medium, and Low participation rates received the same written guidance displayed on Roster Reports to help users interpret the school's average scale score in light of its participation level.

**State Reports** are also produced as part of the KĀ'EO reporting package to show state-level summary data (Figure 12.9 and Figure 12.10). State level data is presented in aggregated groups that include gender, ethnicity, SES, and other categories. Data is reported in standard report tables that include the percentage of students at each performance level. Notes about rounding and the use of the mathematical median are included to help qualify the data presented:

### Figure 12.9: Example of a State Report (page 1 of 2)

**KĀ'EO**

Kaiapuni Assessment of Educational Outcomes

2021 State Report

This report reflects state-level performance for the 2021 administration of KĀ'EO: Kaiapuni Assessment of Educational Outcomes, an assessment used in conjunction with the Hawaiian Language Immersion Program.

**School:** All Schools
**Island:** All Islands
**Grade:** 5

Hawaiian Language Arts Grade 5

Summary Data - Spring 2021

| | | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | | 252 | 490 | 50 | 117 | 46.4% | 41 | 16.3% | 62 | 24.6% | 32 | 12.7% |
| **Language Background** | | | | | | | | | | | | |
| English | | 235 | 490 | 49 | 111 | 47.2% | 40 | 17.0% | 56 | 23.8% | 28 | 11.9% |
| French | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hawaiian | | 13 | 485 | 69 | 5 | 38.5% | 1 | 7.7% | 5 | 38.5% | 2 | 15.4% |
| Japanese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | | |
| **IEP** | N | 241 | 493 | 49 | 108 | 44.8% | 39 | 16.2% | 62 | 25.7% | 32 | 13.3% |
| | Y | 11 | 439 | 34 | 9 | 81.8% | 2 | 18.2% | 0 | 0.0% | 0 | 0.0% |
| **504 Plan** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Lunch Status** | N | 114 | 501 | 53 | 43 | 37.7% | 17 | 14.9% | 33 | 28.9% | 21 | 18.4% |
| | Y | 138 | 481 | 46 | 74 | 53.6% | 24 | 17.4% | 29 | 21.0% | 11 | 8.0% |
| **Migrant** | N | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | Y | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| **Gender** | | | | | | | | | | | | |
| Female | | 142 | 499 | 49 | 57 | 40.1% | 24 | 16.9% | 38 | 26.8% | 23 | 16.2% |
| Male | | 110 | 479 | 50 | 60 | 54.5% | 17 | 15.5% | 24 | 21.8% | 9 | 8.2% |

* Total for all four achievement levels combined may not equal 100% due to rounding.
◻ Data masked to comply with reporting privacy guidelines.

(page 1 of 2)

* Total for all four achievement levels combined may not equal 100% due to rounding.

## Figure 12.10: Example of a State Report (page 2 of 2)

**KĀ'EO**

Kaiapuni Assessment of Educational Outcomes

2021 State Report

This report reflects state-level performance for the 2021 administration of KĀ'EO: Kaiapuni Assessment of Educational Outcomes, an assessment used in conjunction with the Hawaiian Language Immersion Program.

**School:** All Schools
**Island:** All Islands
**Grade:** 5

Hawaiian Language Arts Grade 5

Summary Data - Spring 2021

| | Number of Students Tested | Average Scale Score | Std. Dev. | *n* | % of Students in Level 1* Beginning | *n* | % of Students in Level 2* Developing | *n* | % of Students in Level 3* Proficient | *n* | % of Students in Level 4* Distinguished |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total (All HLIP Schools)** | 252 | 490 | 50 | 117 | 46.4% | 41 | 16.3% | 62 | 24.6% | 32 | 12.7% |
| **Federal Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Hispanic | 55 | 486 | 47 | 27 | 49.1% | 13 | 23.6% | 10 | 18.2% | 5 | 9.1% |
| Multiple | 36 | 519 | 49 | 9 | 25.0% | 2 | 5.6% | 14 | 38.9% | 11 | 30.6% |
| Pacific Islander | 155 | 485 | 50 | 79 | 51.0% | 24 | 15.5% | 37 | 23.9% | 15 | 9.7% |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| | | | | | | | | | | | |
| **State Ethnicity** | | | | | | | | | | | |
| American Indian or Alaska Native | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Black | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Chinese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Filipino | 12 | 522 | 51 | 2 | 16.7% | 0 | 0.0% | 5 | 41.7% | 5 | 41.7% |
| Hispanic | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Japanese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Multiple | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Native Hawaiian | 194 | 485 | 49 | 99 | 51.0% | 32 | 16.5% | 44 | 22.7% | 19 | 9.8% |
| Other Asian | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Other Pacific Islander | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Portuguese | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Samoan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| Tongan | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |
| White | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ | ◻ |

* Total for all four achievement levels combined may not equal 100% due to rounding.
◻ Data masked to comply with reporting privacy guidelines.

**(page 2 of 2)**

# Chapter 13: Continuous Improvement

The high stakes nature of the assessment program necessitates a careful and thorough analysis and verification process. Each phase of the proposed analyses is critical to build evidence about the assessment. Throughout these analyses, researchers worked in parallel to conduct quality assurance checks to verify accuracy in coding data and to examine any anomalies in the results. Results from the analyses continue to inform improvements to the testing processes.

Assessment programs should be continually monitored for quality and relevance. Kaiapuni Assessment of Educational Outcomes (KĀʻEO) will consider multiple forms of evidence in an effort to ensure quality and promote continuous improvement throughout the life of the program.

## 13.1. Communication with the Technical Advisory Committees (TACs)

The KĀʻEO program works closely with the Hawaiʻi Department of Education (HIDOE) TAC and provides progress reports twice a year. The committees are composed of technical staff who guide and advise the program. Meeting minutes, agendas, PowerPoints, and follow-up actions are documented.

## 13.2. Item Data Reviews

Periodic data reviews are an important part of the continuous improvement process. With each new administration, KĀʻEO developers gain access to new information about new field test items as well as operational items with a well-established "data history." These reviews are typically conducted shortly after new item data becomes available, and may be conducted in conjunction with or prior to the test form selection process described in Chapter 5.

## 13.3. Feedback Integration Documents

KĀʻEO developers utilize a continuous improvement process that may be documented in a variety of ways, including the use of a Feedback Integration Plan (FIP). The FIP document(s) allow KĀʻEO developers to receive feedback or recommended actions in almost any form (e.g., alignment studies, cognitive labs, internal item data reviews, external reviews) and a dedicated plan for tracking the action steps and progress needed to reconcile or fully address the feedback given. Action steps may require any number of specific changes such as blacklisting items, modifying the next round of field test content, modifying or updating item development procedures or processes, and/or making changes to any existing criteria for future KĀʻEO test form selections.

## 13.4. Inventory Audits and Other Item Quality Measures

Item quality can be a relatively subjective determination which can become a matter of reinterpretation over time. To this end, KĀʻEO's item bank (referred to internally as "the item inventory") is subject to periodic review and reconsideration from one administrative year to the next. Audits may be conducted as part of this review to identify items which may be subject to content drift due to age, overuse, alignment drift, and/or clarifications or refinements in the way KĀʻEO Student Learning Objectives are interpreted over time.

## 13.5. Item Refreshing

The KĀʻEO is a relatively new assessment system and, as such, a primary focus of our ongoing work will be to build an item bank. On a yearly basis, we will embed field test items (5-10 items) in the operational assessment. This will ensure that the burden to schools is small while still allowing for increases in the number of items in the item bank.

Assessment programs often provide multiple forms of a test within or between school years. While the KĀʻEO assessment does not use multiple forms, we refresh the assessment by adding in new items. In 2017, we started an embedded field test of items in the operational assessment. Approximately 10% of each operational test form will include embedded field test items. These items were checked for model fit and functionality but were not included in the calculation of student scores. Once items are field tested, they will be available for selection in future operational tests and later administrations. The result will be that each operational test will have a portion of new items every year. This approach will allow for new items to be spiraled in each year in order to help ensure items are not overexposed. Item refreshing was placed on hold in 2021 on the recommendation of HIDOE's TAC members. This allowed for the tests to be slightly shorter to allow higher participation while also creating stable test forms to better understand how students were being impacted by pandemic learning models (see Chapter 14 for more details).

## 13.6. Anchor Set Equating

Spiraling in new items will mean that anchor equating with all items on the test will not be possible without potentially introducing item drift. Anchor equating, therefore, is conducted using a subset of items or an anchor set. The anchor set provides the foundation for the equating moving forward and will remain consistent from year to year. Prior to administering the 2019 KĀʻEO assessments, anchor sets were selected for grades 3 and 4. In 2022, anchor items will be selected for grades 5-8 and an equating study will be conducted to demonstrate the efficacy of the anchor set.

## 13.7. Item Bias and Sensitivity Review

Methods have long been established by testing organizations to study item accessibility and fairness using panels of experts (AERA/APA/NCME, 2014). Panels typically review items with consideration for fairness issues related to such topics as gender bias, socio-economic bias, and linguistic bias, as well as accessibility and universal design. The item review undertaken for the Kaiapuni Assessment of Educational Outcomes (KĀʻEO) certainly included definitions and examples from industry best practices. However, the KĀʻEO panels also took a more comprehensive approach to the review in order to provide space for Kaiapuni educators to consider how these issues might be represented in an assessment developed in the Hawaiian language and grounded in Hawaiian wisdom and culture. For example, in Hawaiian language, pronouns and given names tend to be gender neutral. The panel members were asked to consider gender bias knowing that the presentation in items might be more subtle necessitating deeper conversations amongst the members.

An item review meeting was held June 2020. A panel of Kaiapuni school educators conducted a thorough review of all items to identify issues about bias/fairness/sensitivity and accessibility. The items reviewed were embedded field test and operational items that were selected for the canceled operational 2020 test forms. The goal of the review was to guide future item development by identifying items that reviewers considered to be potentially biased, contain sensitive content, or had accessibility concerns; and then identifying the characteristics could be causing these issues.

The review included Kaiapuni school educators, assessment consultants, and University of Hawaiʻi (UH) staff. Kaiapuni educators provided expert judgments in the form of ratings on bias/fairness/sensitivity and accessibility. Twenty-seven Kaiapuni educators participated in the review. The educators teach in schools from all five islands where Kaiapuni schools are located and have experience teaching in Kaiapuni schools and teaching KĀ'EO assessment subjects. These 27 teachers were divided into 4 review panels by grade level bands and content areas.

The online item review workshop began with assessment experts providing a half day training. The training was divided into two sections: bias/fairness/sensitivity and accessibility. Both sections were organized so that participants received the content information as a whole group, reviewed sample items in their assigned panels and then returned to the larger group to debrief on their small panel discussion and questions. After training, participants broke up into assigned small groups and reviewed all of the items on their assigned content area assessments. An online review tool gave panelists access to the items and provided space for panelists to record individual ratings for bias, fairness, sensitivity and accessibility and a single place for comments. During the item review, if a participant flagged an item as 2 (potential issues) or 3 (significant issues), facilitators prompted panelists to discuss their ratings and were encouraged to provide a comment to support their rating(s). Given the context of the project to focus on bias/fairness/sensitivity and accessibility in the context of the Hawaiian language and culture, the ratings allowed individual panel members to highlight items for discussion. The comments indicated that the panelists discussed issues related to understanding how the items reflected cultural and linguistic considerations. These ratings did not necessarily indicate an issue with the item but instead presented an opportunity to jointly interpret the item for any concerns related to bias or accessibility. This provided a rich source of data for item developers to consider for future item development and when revising current items.

After the review meeting, analysts examined the information provided by panelists in their review sheets. Analysts used the individual ratings to calculate median item fairness and accessibility ratings. The analysts then qualitatively categorized and coded panelists comments. Both the item and the comment analysis are presented by individual assessment and overall for each subject area.

**Math Results**

Two panels reviewed the mathematics assessments. Both the grade 3-5 math and the grade 6-8 math panels were comprised of seven teachers each. For all the math assessments, over 87% of items had a median rating of 1 (no issues) for both bias/fairness/sensitivity and accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the math assessment were most frequently categorized as issues with clarity/directions, language/linguistics, visual/clutter, and answer choices.

**Hawaiian Language Arts (HLA) Results**

Two panels reviewed the HLA assessments. The grade 3-5 HLA panel consisted of seven teachers and the grade 6-8 math panel consisted of six teachers. For all the HLA assessments, over 87% of items had a median rating of 1 (no issues) for bias/fairness/sensitivity and over 76% had a median rating of 1 (no issues) for accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the HLA assessment were most frequently categorized as issues with language/linguistics, answer choices, clarity/directions, geographic issues, sensitive issue, and task knowledge.

**Science Results**

Two panels reviewed the science assessments. Both the grade 5 and grade 8 panels consisted of seven teachers each. For both the science assessments, over 89% of items had a median rating of 1 (no issues) for both bias/fairness/sensitivity and accessibility. The comments associated with panelists of ratings of 2 (potential issue) or 3 (significant issues) for the science assessment were most frequently categorized as issues with visual/clutter, answer choices, clarity/directions, geographic, language/linguistics, sensitive issue, standard, and task knowledge.

**Conclusions**

The goal of the workshop was to provide additional information to the KĀ'EO assessment team about the items. The team reviewed all the findings and specifically considered the panelists comments to determine the follow-up action. In addition, the assessment team revised the item content specifications (including item and test specifications, and accessibility guidelines) to clarify visuals, color choices, font sizes, consistency with regard to the visual elements in math and science (charts, graphs, labels for visual elements), and language consistency between stimulus and answer choice in all content areas.

## 13.8. Cognitive Interview Analysis and Summary

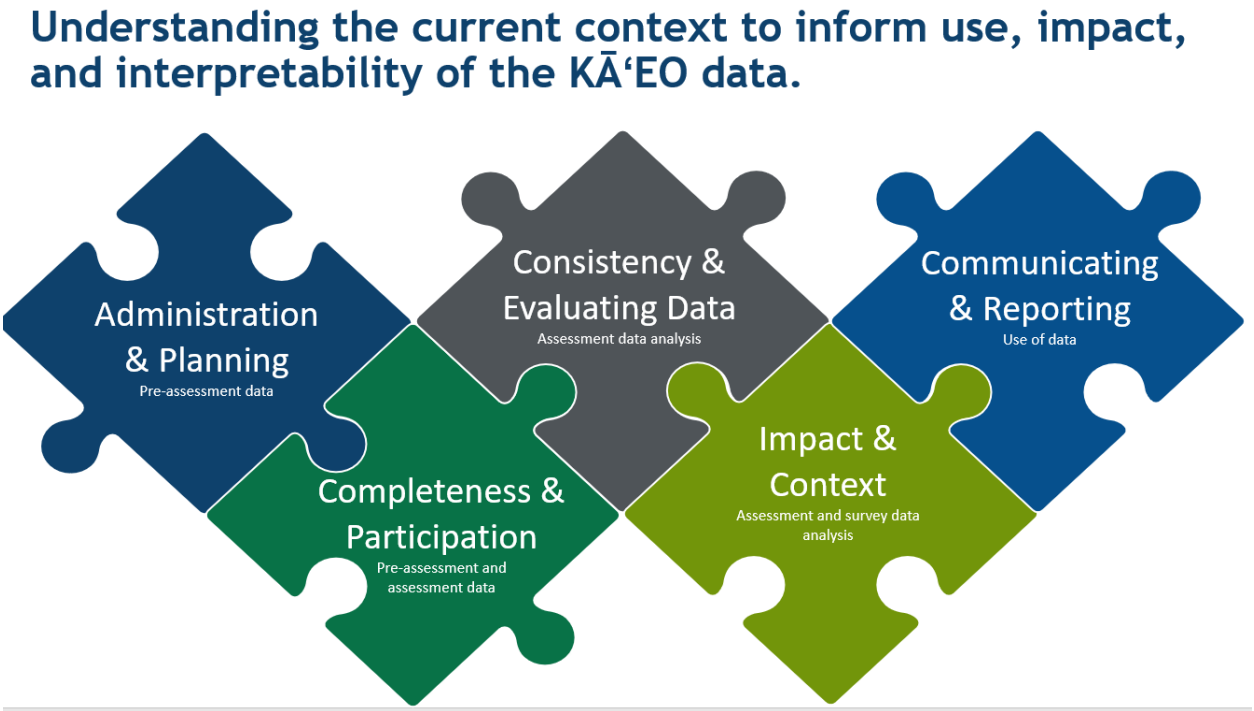
Cognitive interviews were conducted in 2019-2020. Cognitive interviews were not conducted in 2020-2021 because of COVID. They will restart when schools reopen to visitors.

# Chapter 14: Considerations for the 2021 administration Related to COVID-19

## 14.1. Guiding Framework

During this unprecedented year, the technical team worked with HIDOE's Technical Advisory Committee (TAC) to plan for analyses that would support the use of the results (Figure 14.1). We proposed a framework outlined in Table 14.1 to structure our analyses. This framework was derived from several sources and modified to reflect the context of the Kaiapuni schools. These sources include Domaleski, Boyer, & Evans (2020) in their report to CCSSO on evaluating assessment data for accountability and Keng & Marion's (2020) description in their National Academy of Education report on assessment comparability. In addition, Dadey, Keng, Boyer, & Marion (2021) delineate operational versus investigative analyses, which are important considerations to the KĀ'EO program. We also included research on opportunity to learn (OTL) because of the critical nature of understanding the relationship between the current context and the assessment results (Floden, 2002; Gee, 2008; Marion, 2020). Finally, we considered questions posed in Marion, Domaleski, and D'Brot (2021). The KĀ'EO team considered these works collectively in the development of a framework to focus our data collection and analyses to allow for a structured analytical progression when evaluating data. The goal of the analyses was to provide HIDOE with sufficient information to make decisions about the use and reporting of test scores.

**Figure 14.1: Framework**



### Table 14.1: Framework for 2021 analyses

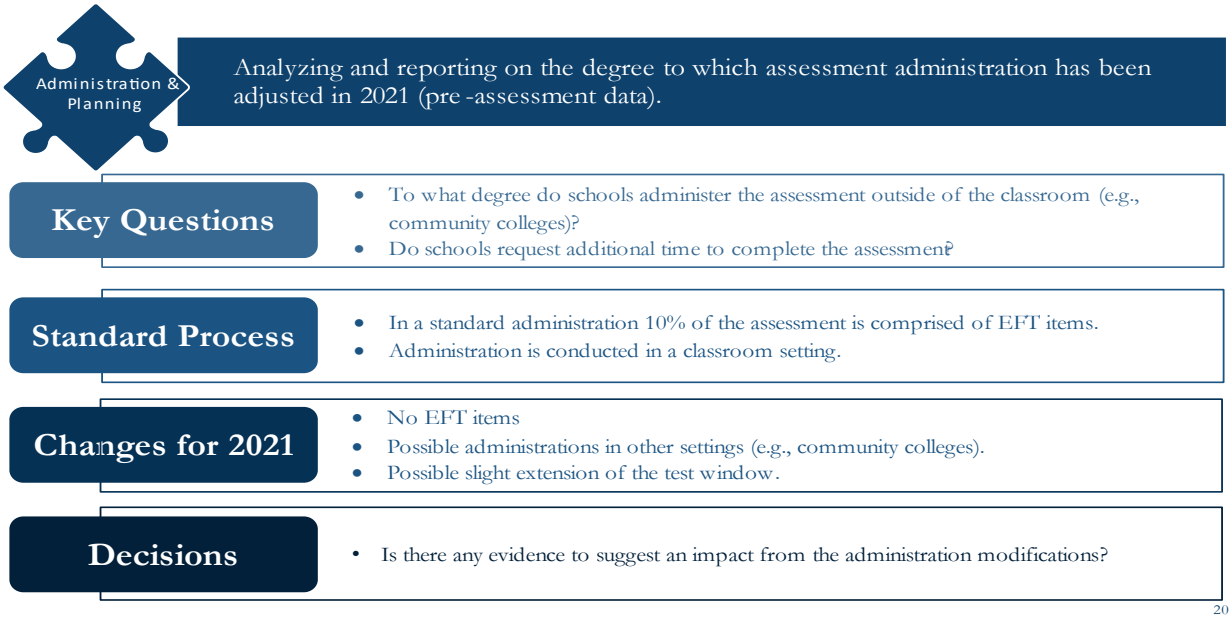
| Evaluation category | Key questions | Standard Context | Context changes for 2021 | Decisions | Summary |
|---|---|---|---|---|---|
| Administration /Planning | • To what degree do schools administer the assessment outside of the classroom (e.g., community colleges)?<br>• To what degree do schools request additional time to complete the assessment? | • In a standard administration 10% of the assessment is comprised of EFT items.<br>• Administration is conducted in a classroom setting. | • No EFT items<br>• No changes in administration settings.<br>• No extension of the test window. | • Is there any evidence to suggest an impact from the administration modifications? | • There were no foreseeable issues related to administration. |
| Completeness /Participation | • What are our overall participation rates and does participation vary by demographics?<br>• Are there increased numbers of individual students who are have missing data or are not meeting valid attempt rules? | • Participation rates by year<br>• Missing data in student responses<br>• Data cleaning processes that identify duplicate data or numbers of students who do not meet valid attempt rules | • Participation rates relative to historic participation decreased by school<br>• There were no differences in demographics between 2019 and 2021<br>• Generate summary lists of comparisons for HIDOE | • Is there any impact from the participation rate to state's ability to make use of the results (for example, are missing data not random?)?<br>• Is the sample size sufficient to conduct IRT/CTT analyses? | • Participation rate varied by school but not demographics<br>• Participation might impact reporting<br>• The sample size was sufficient for analysis. |
| Consistency/ Evaluating data | • Are the test characteristics in 2021 comparable to historic data?<br>• Are items functioning in a manner that is comparable to historic data? | • Test level CTT and IRT information (e.g., reliability, error, score distributions, dimensionality, classification consistency)<br>• Item level information (e.g., fit, DIF, difficulty, discrimination). | • Examine the test functioning relative to historic data (e.g., has reliability decreased?)<br>• Examine item functionality relative to historic data (e.g., are there increased items not meeting acceptability criteria? Has difficulty changed?). | • Do the data converge and fit the model appropriately?<br>• Is reliability and error acceptable? | • Test and item characteristics were comparable.<br>• Data fit the model |
| Impact/ Context | • What do the OTL data tell us about student learning from the spring of 2020-2021?<br>• How do we report these data to educators, public, and parents/ families? | • N/A | • Examine OTL data from student and teacher data.<br>• Jointly interpret OTL data with HIDOE to understand relationships to the assessment results | • To what degree do the OTL results relate to assessment scores?<br>• How to we use the results to support schools in 2021-2022?<br>• How to we communicate OTL results to stakeholders in a constructive and productive manner? | • Teachers and students both indicated that the past year impacted their learning content and Hawaiian language skills.<br>• UH worked with HIDOE to interpret and disseminate the survey results. |

| Evaluation category | Key questions | Standard Context | Context changes for 2021 | Decisions | Summary |
|---|---|---|---|---|---|
| Communicating /Reporting | • Taken in total, how do the analyses outlined above support our decisions on how to use data from the 2021 assessment cycle?<br>• What should be considered when deciding what data to report to stakeholders? | • Typical reporting includes:<br>○ State summary data by demographic group<br>○ School reports<br>○ Family reports | • Examine data and analytics including participation rates, test and item functionality, and OTL results to make decisions about the use and interpretability of the assessment results. | • What criteria do we use to make final determinations about the use of results from the assessment?<br>• At what adjustments or disclaimers need to be made when communicating assessment results to stakeholders? | • Data will be provided to HIDOE for reporting purposes.<br>• School reports included participation rates and how those should be considered by educators.<br>• Family reports included high level information from OTL survey.<br>• Schools received OTL infographics to aid in the interpretation of results. |

## 14.2. Administration Conditions

In order to best accommodate schools while maintaining the security of our item bank, limited options were offered. The framework in Figure 14.2 provides an overview of the considerations.

**Figure 14.2: Administration and Planning**




In 2021, several options were considered for adjusting the administration given the challenges of Covid-19. The goal of any changes in the administration was to make testing more accessible to families and schools and to reduce the burden of testing. The KĀ'EO team worked closely with HIDOE to plan for 2021 test administration in response to the letter from the USED. The main considerations are as follows:

- Extending the testing window and moving assessments to the summer or fall: The KĀ'EO assessment provided limited flexibility to schools on an individual basis to extend their testing window following HIDOE guidance. While limited, this allowed for maintaining the timing of the assessment scoring meeting and a timely reporting of results.

- Giving the assessment remotely, where feasible: The Kaiapuni schools had some flexibility in administration location, however, students were not be allowed to take the assessments remotely at home due to the potential of security or administration issues. Requirements for alternative site administration include administration of the assessment with a certified Test Administrator and followed all test security guidelines, in alignment with HIDOE guidance for other assessments. The goal was to maintain a standardized administration and security of the item bank, while providing schools with additional options to administer assessments safely and follow Department of Health guidelines.

- Shortening the state assessment, to make testing more feasible to implement and prioritize in-person learning time. The HIDOE and KĀ'EO teams discussed the possibility of shortening the assessment by applying a modified blueprint. Due to the low reliability seen in previous administrations of some assessments (particularly in middle school grades), it was deemed infeasible to shorten the operational

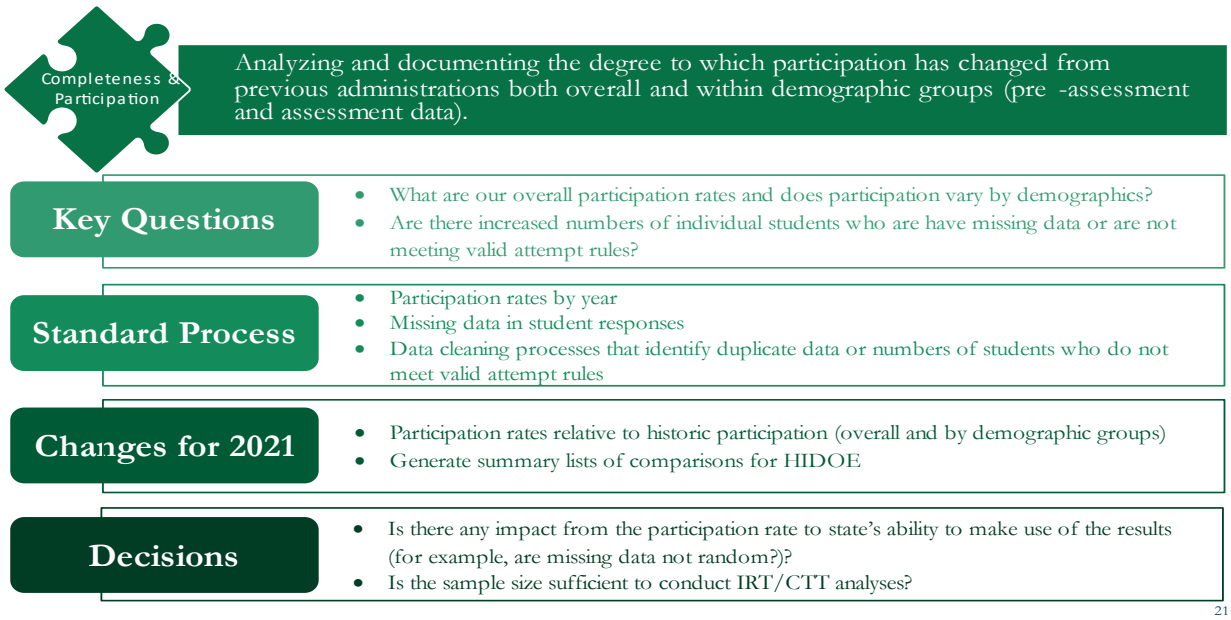
assessment. However, all embedded field test items were removed which reduced the length of each assessment by approximately 10%.

In addition, the KĀ'EO Assessment Team monitored the return to in-person learning across the immersion schools. While a portion of Kaiapuni schools returned to in-person learning, on specific islands (e.g., Kaua'i) other schools have remained hybrid or remote. This has resulted in about 8% of Kaiapuni students remaining on line, 67% hybrid and 20% in-person (Source: KĀ'EO educator spring 2021 survey).

## 14.3. Population Comparison

Next, the team considered the degree to which the population of students changed as well as the sample of students who participated in the assessment. This was informed by the framework in Figure 14.3.

**Figure 14.3: Completeness and Participation**




To address this issue, we considered both overall population rates, participation rates, as well as demographic differences. Our first step was to examine population with past test results. Table 14.2 was developed and shows that minor differences in the populations (greater than 10%) were noted. It was noted that there were two changes in the population. The first was a slight increase in English speaking students in 7$^{th}$ grade and the second was a slight increase in the number of Hispanic students in 8$^{th}$ grade. It is difficult to know the root cause for the change in 7$^{th}$ grade however, the increase in Hispanic students in 8$^{th}$ grade was investigated by comparing the Federal Ethnicity categories with a State ethnicity collection that uses different aggregation rules than the federal ethnicity aggregations rules. The comparison of the changes in the state ethnicity categories, indicated that there were no demographic differences in that data. Thus, the increase seen in the federal ethnicity categories is most likely related to the two-part ethnicity question that was implemented shortly after the 2019 8$^{th}$ graders entered kindergarten. This issue is being investigated further by the Office of Hawaiian Education (OHE).

## Table 14.2: Comparison of 2019 to 2021 Population of Kaiapuni Students

| Groups | Grade 3 | | | | Grade 4 | | | | Grade 5 | | | | Grade 6 | | | | Grade 7 | | | | Grade 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | |
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Language Background | | | | | | | | | | | | | | | | | | | | | | | | |
| English | 313 | 88.9 | 321 | 88.9 | 201 | 87.0 | 295 | 89.7 | 266 | 91.7 | 286 | 88.5 | 237 | 88.4 | 183 | 87.6 | 172 | 80.4 | 205 | 91.1 | 141 | 83.4 | 168 | 84.8 |
| French | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Hawaiian | 34 | 9.7 | 37 | 10.2 | 29 | 12.6 | 33 | 10.0 | 23 | 7.9 | 33 | 10.2 | 30 | 11.2 | 25 | 12.0 | 42 | 19.6 | 19 | 8.4 | 28 | 16.6 | 30 | 15.2 |
| Japanese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Portuguese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Spanish | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Tagalog | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Pohnpeian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| IEP | | | | | | | | | | | | | | | | | | | | | | | | |
| N | 342 | 97.2 | 346 | 95.8 | 213 | 92.2 | 315 | 95.7 | 280 | 96.6 | 310 | 96.0 | 253 | 94.4 | 191 | 91.4 | 201 | 93.9 | 210 | 93.3 | 155 | 91.7 | 188 | 94.9 |
| Y | 10 | 2.8 | 15 | 4.2 | 18 | 7.8 | 14 | 4.3 | 10 | 3.4 | 13 | 4.0 | 15 | 5.6 | 18 | 8.6 | 13 | 6.1 | 15 | 6.7 | 14 | 8.3 | 10 | 5.1 |
| 504 Plan | | | | | | | | | | | | | | | | | | | | | | | | |
| N | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 313 | 96.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 10 | 3.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Migrant | | | | | | | | | | | | | | | | | | | | | | | | |
| N | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Gender | | | | | | | | | | | | | | | | | | | | | | | | |
| F | 197 | 56.0 | 203 | 56.2 | 131 | 56.7 | 167 | 50.8 | 141 | 48.6 | 182 | 56.3 | 143 | 53.4 | 118 | 56.5 | 110 | 51.4 | 108 | 48.0 | 98 | 58.0 | 107 | 54.0 |
| M | 155 | 44.0 | 158 | 43.8 | 100 | 43.3 | 162 | 49.2 | 149 | 51.4 | 141 | 43.7 | 125 | 46.6 | 91 | 43.5 | 104 | 48.6 | 117 | 52.0 | 71 | 42.0 | 91 | 46.0 |
| Federal Ethnicity | | | | | | | | | | | | | | | | | | | | | | | | |
| American Indian or Alaska Native | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Black | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Hispanic | 75 | 21.3 | 78 | 21.6 | 46 | 19.9 | 61 | 18.5 | 58 | 20.0 | 68 | 21.1 | 54 | 20.1 | 42 | 20.1 | 35 | 16.4 | 47 | 20.9 | -- | -- | 33 | 16.7 |
| Multiple | 42 | 11.9 | 40 | 11.1 | 23 | 10.0 | 34 | 10.3 | 24 | 8.3 | 41 | 12.7 | 28 | 10.4 | 21 | 10.0 | 17 | 7.9 | 13 | 5.8 | -- | -- | 18 | 9.1 |
| Pacific Islander | 225 | 63.9 | 232 | 64.3 | 157 | 68.0 | 222 | 67.5 | 198 | 68.3 | 207 | 64.1 | 176 | 65.7 | 141 | 67.5 | 155 | 72.4 | 160 | 71.1 | -- | -- | 139 | 70.2 |
| White | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Free/Reduced Lunch | | | | | | | | | | | | | | | | | | | | | | | | |
| N | 161 | 45.7 | 171 | 47.4 | 94 | 40.7 | 152 | 46.2 | 136 | 46.9 | 157 | 48.6 | 119 | 44.4 | 100 | 47.8 | 89 | 41.6 | 110 | 48.9 | 81 | 47.9 | 100 | 50.5 |
| Y | 191 | 54.3 | 190 | 52.6 | 137 | 59.3 | 177 | 53.8 | 154 | 53.1 | 166 | 51.4 | 149 | 55.6 | 109 | 52.2 | 125 | 58.4 | 115 | 51.1 | 88 | 52.1 | 98 | 49.5 |
| State Ethnicity | | | | | | | | | | | | | | | | | | | | | | | | |
| American Indian or Alaska Native | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Black | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Groups | Grade 3 | | | | Grade 4 | | | | Grade 5 | | | | Grade 6 | | | | Grade 7 | | | | Grade 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | |
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Hispanic | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Japanese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Multiple | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Portuguese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| White | 23 | 6.5 | 19 | 5.3 | 13 | 5.6 | 21 | 6.4 | 19 | 6.6 | 16 | 5.0 | 13 | 4.9 | 13 | 6.2 | 11 | 5.1 | 9 | 4.0 | 9 | 5.3 | 12 | 6.1 |
| Chinese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Filipino | 13 | 3.7 | 12 | 3.3 | -- | -- | -- | -- | 11 | 3.8 | 13 | 4.0 | 13 | 4.9 | -- | -- | -- | -- | -- | -- | -- | -- | 10 | 5.1 |
| Native Hawaiian | 276 | 78.4 | 294 | 81.4 | 193 | 83.5 | 267 | 81.2 | 245 | 84.5 | 255 | 78.9 | 214 | 79.9 | 177 | 84.7 | 176 | 82.2 | 195 | 86.7 | 153 | 90.5 | 163 | 82.3 |
| Part-Hawaiian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Korean | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Micronesian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Tongan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Guamanian/Chamorro | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Other Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Other Pacific Islander | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Pacific Islander two or more | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Indo-Chinese | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| ALL | | | | | | | | | | | | | | | | | | | | | | | | |
| ALL | 352 | 100.0 | 361 | 100.0 | 231 | 100.0 | 329 | 100.0 | 290 | 100.0 | 323 | 100.0 | 268 | 100.0 | 209 | 100.0 | 214 | 100.0 | 225 | 100.0 | 169 | 100.0 | 198 | 100.0 |

## 14.4. Sample Comparison

Next the 2021 sample was compared relative to 2019. These data show that for most groups, there was little year to year or within year variation in the participation rate by demographic group (plus or minus 10%). There were several exceptions where differences in the tested population were different in 2021 relative to 2019. The first was the difference in percentages of Hispanic students in 8th grade (noted in the population table above). The second was that there were percentages of students eligible to receive free or reduced-price lunch in 7th grade. In addition, when groups were very small (n<5), the proportions could also fluctuate from year to year.

### Table 14.3: Demographic Participation

| | | Grade 3 | | | | Grade 4 | | | | Grade 5 | | | | Grade 6 | | | | Grade 7 | | | | Grade 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | |
| | | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| Hawaiian Language Arts | All students | 343 | 97.4 | 283 | 76.7 | 227 | 98.3 | 258 | 77.5 | 280 | 96.6 | 260 | 78.3 | 239 | 89.2 | 171 | 79.2 | 189 | 88.3 | 168 | 72.1 | 135 | 79.9 | 143 | 70.4 |
| | F | 191 | 97.0 | 161 | 77.4 | 130 | 99.2 | 132 | 78.6 | 135 | 95.7 | 145 | 78.0 | 129 | 90.2 | 95 | 77.2 | 97 | 88.2 | 86 | 76.1 | 75 | 76.5 | 78 | 70.9 |
| | M | 152 | 98.1 | 122 | 75.8 | 97 | 97.0 | 126 | 76.4 | 145 | 97.3 | 115 | 78.8 | 110 | 88.0 | 76 | 81.7 | 92 | 88.5 | 82 | 68.3 | 60 | 84.5 | 65 | 69.9 |
| | Two or More | 42 | 100.0 | 35 | 87.5 | 22 | 95.7 | 28 | 82.4 | 24 | 100.0 | 36 | 87.8 | 23 | 82.1 | 17 | 81.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| | American Indian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Black or African American | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Hispanic | 75 | 100.0 | 59 | 72.8 | 46 | 100.0 | 48 | 78.7 | 57 | 98.3 | 58 | 81.7 | 46 | 85.2 | 33 | 78.6 | 33 | 94.3 | 33 | 67.3 | 6 | 66.7 | 21 | 63.6 |
| | Native Hawaiian or Pacific Islander | 216 | 96.0 | 183 | 77.5 | 154 | 98.1 | 171 | 75.7 | 191 | 96.5 | 160 | 75.1 | 163 | 92.6 | 117 | 79.1 | 142 | 91.6 | 120 | 73.2 | 122 | 81.3 | 99 | 69.2 |
| | White | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | IEP - N | 334 | 97.7 | 274 | 77.4 | 210 | 98.6 | 244 | 76.5 | 271 | 96.8 | 248 | 78.0 | 229 | 90.5 | 156 | 79.2 | 177 | 88.1 | 155 | 71.1 | 125 | 80.6 | 135 | 69.9 |
| | IEP - Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 504 - N | 336 | 97.4 | 275 | 76.6 | 224 | 98.2 | 254 | 77.9 | 273 | 96.5 | 252 | 78.3 | 235 | 89.4 | 166 | 79.0 | 182 | 88.3 | 160 | 71.1 | 134 | 80.2 | 137 | 69.5 |
| | 504 - Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FRL - N | 156 | 96.9 | 122 | 79.2 | 91 | 96.8 | 108 | 76.6 | 133 | 97.8 | 114 | 80.9 | 107 | 89.9 | 76 | 80.9 | 79 | 88.8 | 64 | 64.6 | 67 | 82.7 | 61 | 73.5 |
| | FRL - Y | 187 | 97.9 | 161 | 74.9 | 136 | 99.3 | 150 | 78.1 | 147 | 95.5 | 146 | 76.4 | 132 | 88.6 | 95 | 77.9 | 110 | 88.0 | 104 | 77.6 | 68 | 77.3 | 82 | 68.3 |
| | Migrant - N | 341 | 97.4 | 280 | 76.5 | 223 | 98.2 | 253 | 77.1 | 273 | 96.5 | 256 | 78.0 | 234 | 89.0 | 167 | 78.8 | 186 | 88.2 | 164 | 71.6 | 133 | 79.6 | 140 | 70.4 |
| | Migrant - Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Native Hawaiian or Part-Hawaiian | 269 | 97.1 | 230 | 76.4 | 192 | 98.5 | 207 | 76.1 | 237 | 96.7 | 202 | 76.5 | 199 | 92.6 | 145 | 78.4 | 164 | 92.7 | 146 | 72.3 | 126 | 81.8 | 115 | 68.5 |
| | Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | White | 23 | 100.0 | 12 | 60.0 | 13 | 100.0 | 17 | 81.0 | 17 | 89.5 | 13 | 81.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Filipino | 13 | 100.0 | 11 | 91.7 | -- | -- | -- | -- | 11 | 100.0 | 12 | 92.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Other | 34 | 100.0 | 24 | 80.0 | 13 | 92.9 | 23 | 85.2 | 14 | 100.0 | 29 | 85.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Mathematics | All students | 345 | 98.0 | 281 | 76.2 | 227 | 98.3 | 256 | 76.9 | 278 | 95.9 | 257 | 77.4 | 238 | 88.8 | 168 | 77.8 | 189 | 88.3 | 168 | 72.1 | 135 | 79.9 | 140 | 69.0 |
| | F | 193 | 98.0 | 160 | 76.9 | 130 | 99.2 | 134 | 79.8 | 135 | 95.7 | 143 | 76.9 | 129 | 90.2 | 94 | 76.4 | 96 | 87.3 | 83 | 73.5 | 75 | 76.5 | 76 | 69.1 |
| | M | 152 | 98.1 | 121 | 75.2 | 97 | 97.0 | 122 | 73.9 | 143 | 96.0 | 114 | 78.1 | 109 | 87.2 | 74 | 79.6 | 93 | 89.4 | 85 | 70.8 | 60 | 84.5 | 64 | 68.8 |
| | Two or More | 42 | 100.0 | 35 | 87.5 | 22 | 95.7 | 29 | 85.3 | 23 | 95.8 | 36 | 87.8 | 23 | 82.1 | 16 | 76.2 | 13 | 76.5 | 8 | 61.5 | -- | -- | -- | -- |
| | American Indian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Asian | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| | | Grade 3 | | | | Grade 4 | | | | Grade 5 | | | | Grade 6 | | | | Grade 7 | | | | Grade 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | | 2019 | | 2021 | |
| | | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| | Black or African American | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Hispanic | 75 | 100.0 | 58 | 71.6 | 46 | 100.0 | 48 | 78.7 | 56 | 96.6 | 57 | 80.3 | 46 | 85.2 | 33 | 78.6 | 33 | 94.3 | 35 | 71.4 | -- | -- | -- | -- |
| | Native Hawaiian or Pacific Islander | 218 | 96.9 | 182 | 77.1 | 154 | 98.1 | 168 | 74.3 | 191 | 96.5 | 158 | 74.2 | 163 | 92.6 | 115 | 77.7 | 142 | 91.6 | 118 | 72.0 | 122 | 81.3 | 97 | 67.8 |
| | White | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | IEP - N | 336 | 98.2 | 272 | 76.8 | 210 | 98.6 | 242 | 75.9 | 269 | 96.1 | 245 | 77.0 | 228 | 90.1 | 153 | 77.7 | 178 | 88.6 | 155 | 71.1 | 125 | 80.6 | 132 | 68.4 |
| | IEP - Y | -- | -- | -- | -- | 17 | 94.4 | 14 | 100.0 | -- | -- | -- | -- | 10 | 66.7 | 15 | 78.9 | -- | -- | -- | -- | -- | -- | -- | -- |
| | 504 - N | 338 | 98.0 | 273 | 76.0 | 224 | 98.2 | 251 | 77.0 | 271 | 95.8 | 249 | 77.3 | 234 | 89.0 | 163 | 77.6 | 182 | 88.3 | 160 | 71.1 | 134 | 80.2 | 134 | 68.0 |
| | 504 - Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | FRL - N | 156 | 96.9 | 121 | 78.6 | 91 | 96.8 | 109 | 77.3 | 133 | 97.8 | 113 | 80.1 | 106 | 89.1 | 75 | 79.8 | 80 | 89.9 | 64 | 64.6 | 67 | 82.7 | 60 | 72.3 |
| | FRL - Y | 189 | 99.0 | 160 | 74.4 | 136 | 99.3 | 147 | 76.6 | 145 | 94.2 | 144 | 75.4 | 132 | 88.6 | 93 | 76.2 | 109 | 87.2 | 104 | 77.6 | 68 | 77.3 | 80 | 66.7 |
| | Migrant - N | 343 | 98.0 | 278 | 76.0 | 223 | 98.2 | 251 | 76.5 | 271 | 95.8 | 253 | 77.1 | 233 | 88.6 | 164 | 77.4 | 186 | 88.2 | 164 | 71.6 | 133 | 79.6 | 137 | 68.8 |
| | Migrant - Y | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Native Hawaiian or Part-Hawaiian | 271 | 97.8 | 228 | 75.7 | 192 | 98.5 | 204 | 75.0 | 236 | 96.3 | 199 | 75.4 | 199 | 92.6 | 143 | 77.3 | 164 | 92.7 | 146 | 72.3 | 126 | 81.8 | 113 | 67.3 |
| | Samoan | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | White | 23 | 100.0 | 12 | 60.0 | 13 | 100.0 | 18 | 85.7 | 17 | 89.5 | 13 | 81.3 | 10 | 76.9 | 11 | 84.6 | 7 | 63.6 | 6 | 60.0 | 6 | 66.7 | 8 | 66.7 |
| | Filipino | 13 | 100.0 | 11 | 91.7 | -- | -- | -- | -- | 10 | 90.9 | 12 | 92.3 | 11 | 84.6 | 5 | 100.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Other | 34 | 100.0 | 24 | 80.0 | 13 | 92.9 | 23 | 85.2 | 14 | 100.0 | 29 | 85.3 | 16 | 64.0 | -- | -- | 11 | 68.8 | -- | -- | -- | -- | -- | -- |
| Science | All students | | | | | | | | | | | | | | | | | | | | | 133 | 78.7 | 138 | 69.7 |
| | F | | | | | | | | | | | | | | | | | | | | | 73 | 74.5 | 75 | 70.1 |
| | M | | | | | | | | | | | | | | | | | | | | | 60 | 84.5 | 63 | 69.2 |
| | Two or More | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | American Indian | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | Asian | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | Hispanic | | | | | | | | | | | | | | | | | | | | | -- | -- | 21 | 63.6 |
| | Native Hawaiian or Pacific Islander | | | | | | | | | | | | | | | | | | | | | 120 | 80.0 | 95 | 68.3 |
| | White | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | IEP - N | | | | | | | | | | | | | | | | | | | | | 124 | 80.0 | 130 | 69.1 |
| | IEP - Y | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | 504 - N | | | | | | | | | | | | | | | | | | | | | 132 | 79.0 | 132 | 68.8 |
| | 504 - Y | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | FRL - N | | | | | | | | | | | | | | | | | | | | | 67 | 82.7 | 61 | 73.5 |
| | FRL - Y | | | | | | | | | | | | | | | | | | | | | 66 | 75.0 | 77 | 67.0 |
| | Migrant - N | | | | | | | | | | | | | | | | | | | | | 131 | 78.4 | 135 | 69.6 |
| | Migrant - Y | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | Native Hawaiian or Part-Hawaiian | | | | | | | | | | | | | | | | | | | | | 124 | 80.5 | 111 | 67.7 |
| | Samoan | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | White | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | Filipino | | | | | | | | | | | | | | | | | | | | | -- | -- | -- | -- |
| | Other | | | | | | | | | | | | | | | | | | | | | --- | -- | -- | -- |

Next, the team looked at participation rates by grade and by school. In general, percent participation rates were in the low to mid 70s. Seventh and eighth grade had the lowest participation rate at 72.0% and 68.2% respectively (Figure 14.4). This might be due to the fact that the state of Hawaii prioritized bringing younger students back for in-person learning first while many of the middle schools were still participating in remote learning. There were also notable variations in the degree to which individual schools participated in KĀ'EO this year (Figure 14.5). There were three schools with less than 10% participation and one of those schools (school number 563) is relatively large. When that school is removed from participation rates, the overall percent participation increases from 75% to 90% (Figure 14.6).

**Figure 14.4: Participation in KĀ'EO by grade**

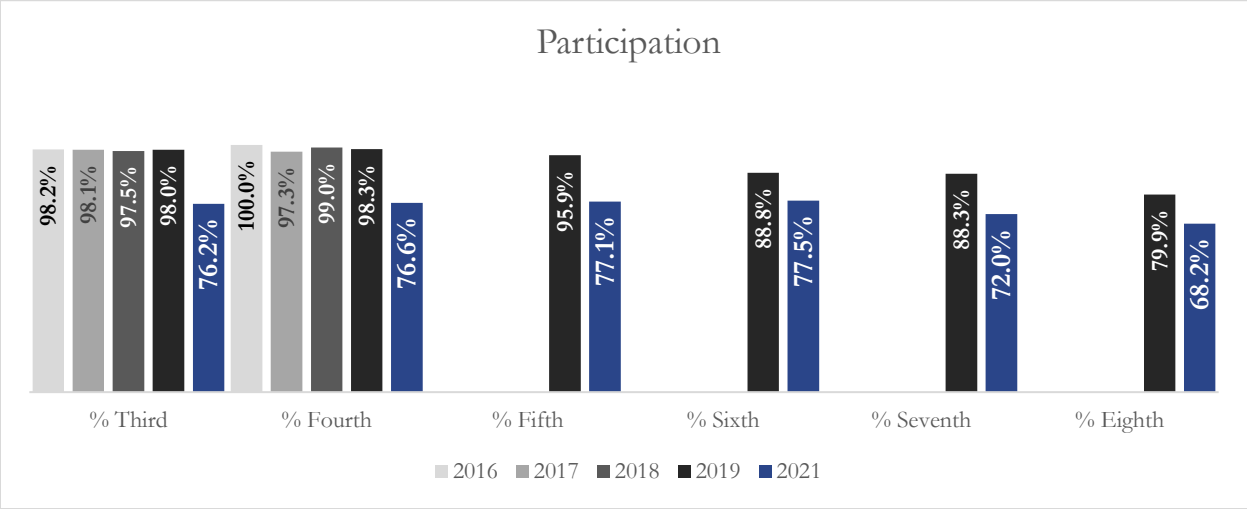



**Figure 14.5: Participation by school**

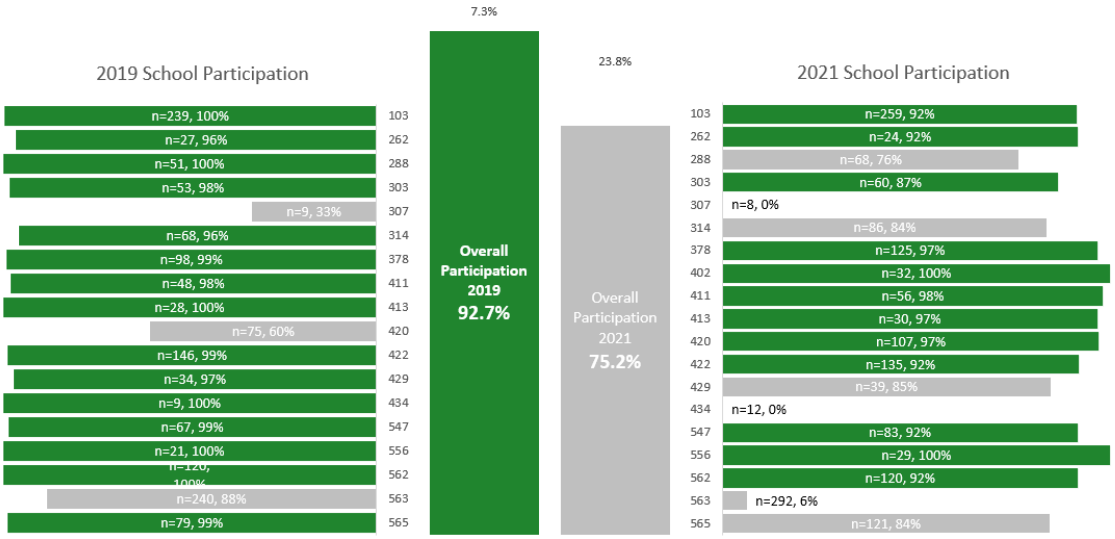
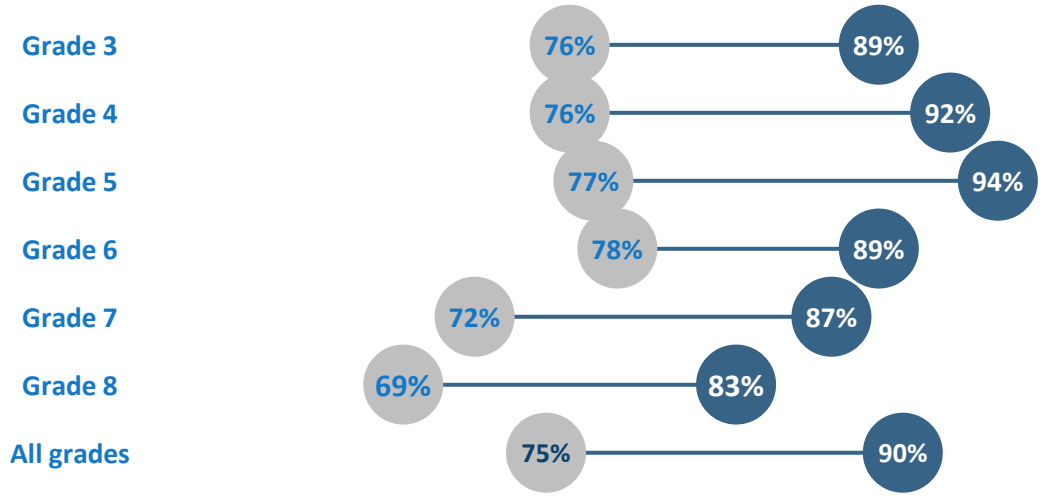


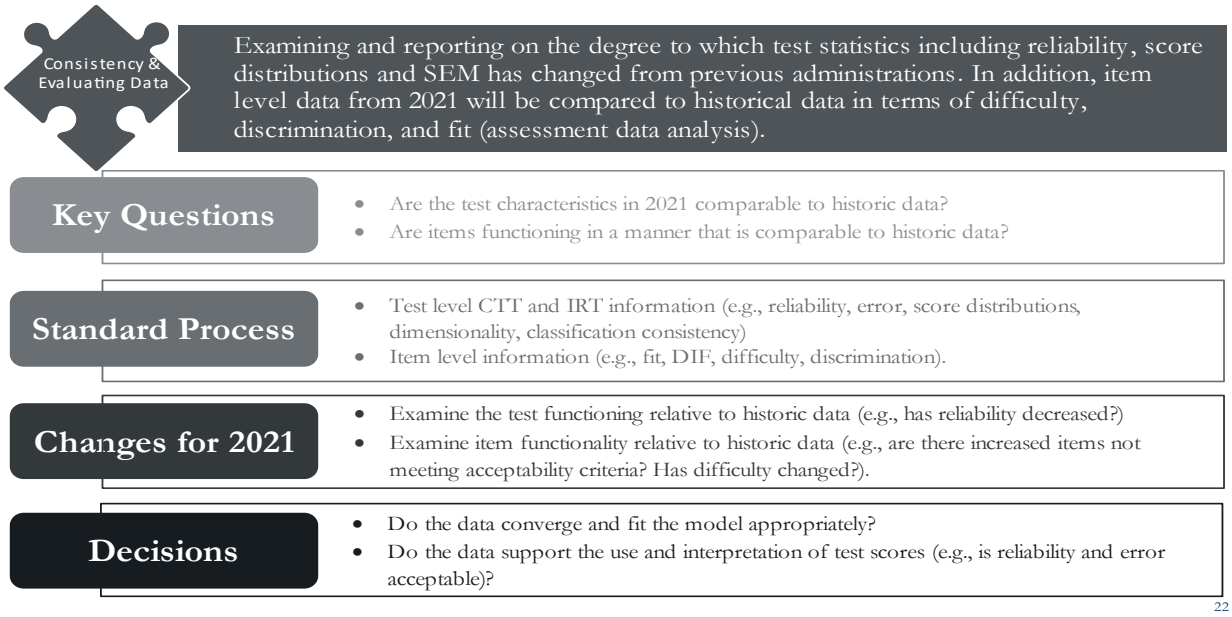
**Figure 14.6: Participation Rate Differences With and Without School 563**




## 14.5. Consistency and Evaluating Data

Next the team analyzed the test and item data. The process of post-equating the tests was used to examine the difficulty and drift of the 2021 assessments. In addition to post-equating, we will plan to examine additional test level statistics against historic averages or 2019 test scores. We will also examine test score distributions between historic and 2021 data using a data analysis tool represented in Figure 14.7.

**Figure 14.7: Consistency and Evaluating Data Framework**




### 14.5.1. *Test analysis*

These data show that the assessments varied in terms of difficulty. Most of the tests got more difficult from 2019 to 2021. Namely the HLA assessments which might be expected given that the majority of teachers surveyed (71%)

reported that the pandemic impacted their students' language proficiency. However, while some of the assessments became easier; other assessments were slightly more difficult (Table 14.4). For example, Grade 6 HLA was more difficult in 2021 but Grade 8 science was easier in 2021. In table 15.5, scale scores highlighted in blue show assessments where the scores were lower in 2021 and great show assessments where the scores were higher.

**Table 14.4: A History of Cronbach's Alpha and Logit Measure**

| grade | subject | Cronbach's Alpha | | | | Average Scale Score | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | 2021 | 2016 | 2017 | 2018 | 2019 | 2021 |
| 3 | HLA | 0.89 | 0.89 | 0.90 | 0.91 | 500.0 | 498.2 | 501.1 | 498.0 | 477.4 |
| 4 | HLA | 0.89 | 0.90 | 0.90 | 0.88 | 500.0 | 517.1 | 515.1 | 515.5 | 495.7 |
| 5 | HLA | -- | -- | 0.90 | 0.90 | -- | -- | -- | 500.1 | 490.5 |
| 6 | HLA | -- | -- | 0.89 | 0.91 | -- | -- | -- | 500.0 | 477.6 |
| 7 | HLA | -- | -- | 0.86 | 0.89 | -- | -- | -- | 500.1 | 505.5 |
| 8 | HLA | -- | -- | 0.88 | 0.91 | -- | -- | -- | 500.2 | 500.9 |
| 3 | MA | 0.85 | 0.83 | 0.86 | 0.85 | 500.1 | 498.7 | 496.1 | 496.6 | 486.7 |
| 4 | MA | 0.85 | 0.87 | 0.84 | 0.82 | 500.0 | 511.5 | 503.7 | 507.2 | 491.3 |
| 5 | MA | -- | -- | 0.83 | 0.82 | -- | -- | -- | 500.1 | 501.5 |
| 6 | MA | -- | -- | 0.84 | 0.88 | -- | -- | -- | 500.0 | 487.6 |
| 7 | MA | -- | -- | 0.71 | 0.69 | -- | -- | -- | 499.9 | 503.2 |
| 8 | MA | -- | -- | 0.79 | 0.73 | -- | -- | -- | 500.1 | 505.5 |
| 8 | SC | -- | -- | 0.80 | 0.80 | -- | -- | -- | 500.0 | 513.7 |

### 14.5.2. *Item analysis*

As part of the standard analyses, all items for an assessment were examined. During these analyses, items that are flagged for not meeting performance criteria (e.g., poor discrimination) are marked for further review. For 2021, we furthered these analyses for items on the assessments that were flagged as different from historic administration. For these additional item level analyses, the KĀ'EO Assessment Team also examined the overall reliability and difficulty against historic averages or 2019 scores. Thirteen more items were flagged for difficulty of less than .2 in 2021 relative to 2019 across all the tests. These items were reviewed by UH staff and there was no definitive pattern seen to the content of the items or the type of items. The team concluded that item difficulty was not an impediment to reporting data from the 2021 assessment.

**Table 14.5: Item Difficulty**

| Grade | Difficulty less than 0.20 | | | Difficulty greater than 0.95 | | | Grand Total |
|---|---|---|---|---|---|---|---|
| | 2019 Not 2021 | 2021 Not 2019 | 2019 & 2021 | 2019 Not 2021 | 2021 Not 2019 | 2019 & 2021 | |
| 3 | -- | 3 | 5 | -- | -- | 1 | 9 |
| 4 | -- | 4 | -- | 1 | -- | 1 | 6 |
| 5 | 2 | 3 | 3 | 2 | -- | 1 | 11 |
| 6 | -- | 1 | 11 | 3 | -- | 3 | 18 |
| 7 | 1 | 1 | 15 | -- | -- | 4 | 21 |
| 8 | 2 | 1 | 6 | -- | 1 | 1 | 11 |
| Grand Total | 5 | 13 | 40 | 6 | 1 | 11 | 76 |

The technical team monitored item displacements as part of our ongoing monitoring of the equating. Items were flagged if they exceeded an absolute value of 1.5. These items were reviewed for content, exposure, test fatigue, or language issues (Table 14.6).

**Table 14.6: Displacements**

| Grade | Test | Item | Displacement | 2021 Notes (negative displacements indicated that the item was easier in 2021 relative to 2019) |
|---|---|---|---|---|
| 5 | HLA | 1222 | -2.83 | This item was reviewed for exposure issues, if fatigue was a factor, content, or guess. There was no specific reason identified for the change in difficulty. But because of the high displacement, it was decided that it would be removed from anchoring. |
| 7 | MA | 525 | -1.79 | Item reviewed with UH staff and there was no issue with exposure, content, etc. This item was retained in the anchoring. |
| | | 555 | 1.6 | Item reviewed with UH staff because it got a bit harder. If their language proficiency went down, it makes sense that this item is harder. |
| 8 | MA | 603 | -2.37 | In 2019 8% of kids got right, in 2021, 48% of kids got right, UH staff reviewed and there was no content or exposure issue, or fatigue issue |
| | | 1140 | -1.64 | In 2019 1% of kids got right, in 2021, 4% of kids got right. Item was reviewed with UH staff but there were no issues of exposure. Might be content related and teachers teaching roman numerals |
| | SC | 1205 | -2.98 | 2% of kids got this correct in 2019 and 26% got it correct this year (reviewed this year but only flagged green). Because of the high displacement, it was decided that it would be removed from anchoring. |
| | | 932 | -1.68 | 10% of kids got this correct in 2019 and 39% got it correct this year. There were no identified issues with this item. |
| | | 972 | -2.55 | 5% of kids got this correct last year, 40% got it correct this year (not reviewed this year) Reviewed with UH staff and retain as anchor. This somewhat balances out the items that got easier versus harder. |
| | | 1110 | 2.96 | 32% got this correct in 2019 but only 3% of kids got it correct this year (reviewed for difficulty and DIF this year). Because of the high displacement, it was decided that it would be removed from anchoring. |

### 14.5.3. *Examining OTL (Impact/Context)*

Looking at the data collected through the Opportunity to Learn (OTL) surveys, the KĀʻEO Assessment Team aimed to understand how students have been impacted by remote learning. In particular, the KĀʻEO Assessment Team was interested in how the pandemic affected learning and language proficiency in this unique context and population of students.

OTL has traditionally referred to the degree to which students have been equally exposed to a concept they see on an assessment, but the term has evolved to include whether schools have access to the resources required to provide quality instruction and whether the learning environment accounts for the diversity of students (Floden, 2002; Gee, 2008; Marion, 2020). OTL is not a new issue for Kaiapuni schools, but it requires a more purposeful approach because of the unique nature of Hawaiian language immersion. Traditional considerations exist, such as access to academic content, but there is also the consideration of opportunity to learn the Hawaiian language that demands equal study. For this reason, OTL surveys have been embedded in the KĀʻEO for the past several years.

*During a pre–COVID-19 school year, it was common to witness [teachers'] and [students'] exchanges during instructional time. Feedback regarding students' [thoughts] on a topic or [lesson] produced was immediate, and both [teachers] and [students] could possibly explore other venues to expand in their learning. There was intentional time for movement, and there was intentional time to pause and reflect. The importance of being together as we learn together, [face to face], was in place. THIS WAS NONEXISTENT DUE TO THE IMPACT OF COVID-19. —Educator*

In 2021, the goal of the surveys took on new importance because of the need to understand the impact of the pandemic in our schools. The COVID-19 pandemic has had an impact on many aspects of life both nationally and within Hawai'i. This impact is apparent in educational systems due to rapid and ongoing changes in learning environments, such as the shift to remote learning. During spring 2021, educators and students in Kaiapuni schools were surveyed separately about how their school experiences were impacted by the pandemic. The surveys focused on the impact of the pandemic on Hawaiian language proficiency, instruction and learning, and engagement. Sixty-six percent of educators from 5 islands and 17 of the 19 Kaiapuni schools that administer KĀ'EO responded; seventy-six percent of grade 3–8 students responded to the surveys.

**71%** of educators reported their students' Hawaiian language proficiency was impacted to a moderate or great extent.

**26%** of students reported a decrease in their Hawaiian language proficiency

Both educators and students indicated a loss of Hawaiian language proficiency during the pandemic. Around the same percentage of educators reported their students' ability to communicate in Hawaiian with peers (71%) and teachers (69%) had been affected by the pandemic to at least a moderate to great extent. More students in grades 7 and 8 (39%) reported a decrease in their Hawaiian language proficiency than students in grades 3 and 4 (20%) and grades 5 and 6 (23%) did.

## 14.6. Impact on Instruction and Learning

**29%** of educators reported covering at least three-quarters of their standard curriculum during spring 2021.

**52%** of students reported being in school less than half a day during the 2020/21 school year.

Educators responded to a range of questions about instruction and curriculum. Regarding mode of instruction, 58% of educators reported their students were learning online during spring 2020. This changed substantially by spring 2021, with educators reporting only 8% of students were learning online. There were also changes in curriculum coverage. Forty-eight percent of educators reported they were able to cover only half or less of the standard curriculum in spring 2020. By spring 2021, however, only 26% of educators reported so. These results correspond to changes in instructional time from spring 2020 to spring 2021, as 89% of educators reported engaging their students in 0–2 hours of daily instruction in spring 2020 while 42% reported providing 6–7 hours of daily instruction in spring 2021.

Finally, respondents answered an additional open-ended question about the impact of the pandemic on students' learning and language proficiency. Half of the teachers who responded to this question indicated that language proficiency impacts learning as well. For example, one educator stated that "language loss profoundly impacted [students'] ability to do schoolwork in immersion. Most of our students do not come from households that communicate using Hawaiian language. When kids came back to school, many were struggling to express themselves in Hawaiian." Educators saw the connection between language proficiency loss and its impacts to students' learning during the pandemic.

**61%** of educators reported students received less instructional time during the 2020/21 compared to years past.

**38%** of students reported they never or only sometimes learned as much as in previous years.

## 14.7. Impact on Engagement

Both educators and students responded to questions about the impact of the pandemic on student engagement. The first set of questions focused on student access to the internet and digital devices because these are fundamental to participating and engaging in online learning. For the second set of questions, educators reflected on instructional time and student engagement, and students reflected on learning and engagement in online school.

### 14.7.1. *Access to the Internet and Digital Devices*

Access to both the internet and digital devices at home is important for students to be able to participate in online learning. Eight percent of students reported they never had reliable access to the internet to participate in online learning during the 2020/21 school year, and 25% indicated they never had access to a digital device at home. Similarly, 13% of educators reported their students had access to the internet less than half of the time, and 29% reported less than half of their students had access to a digital device at home. As one educator put it, "*The focus wasn't the same. Couldn't rely on the internet working smoothly*."

### 14.7.2. *Student Engagement*

A large proportion (61%) of educators indicated their students received less instructional time during the 2020/21 school year compared to years past. This corresponded to student survey results that showed students felt they were learning less in 2020/21 relative to past school years. Additionally, both educators and students reported lower student engagement than in previous years: 70% of educators stated their students were less engaged, and 18% of students stated they were never as interested in online learning as in in-person learning.

**70%** of educators reported students were less engaged during the 2020/21 school year, compared to previous years.

**18%** of students reported they were never interested in learning online as opposed to in-person learning.

In addition, educators responded to an open-ended question about student engagement in their classrooms. Many educators stated that participation and engagement varied widely. For example, one teacher noted, "I had students who did better online, [with fewer] classroom distractions. I had students who did poorer online; they needed in-person teaching. Some . . . were disengaged because they were at home watching themselves, no parental supervision, or taking care of their younger siblings, so there was no attention on their learning on the home front." Educators also mentioned that engagement impacted students' language and academic abilities and restricted opportunities for formal and informal use of Hawaiian. A smaller number of educators cited the impact of technology on engagement. As one educator pointed out, "Not all students live in places where the internet connection is good even with extra modems, so their level of participation and engagement is affected by just the mere fact that they can't hear me or they get knocked off. Even at the school, we have days [when] we all have problems with our internet connection . . . which also affects what we are able to teach."

## 14.8. Reporting (Reporting/Communication)

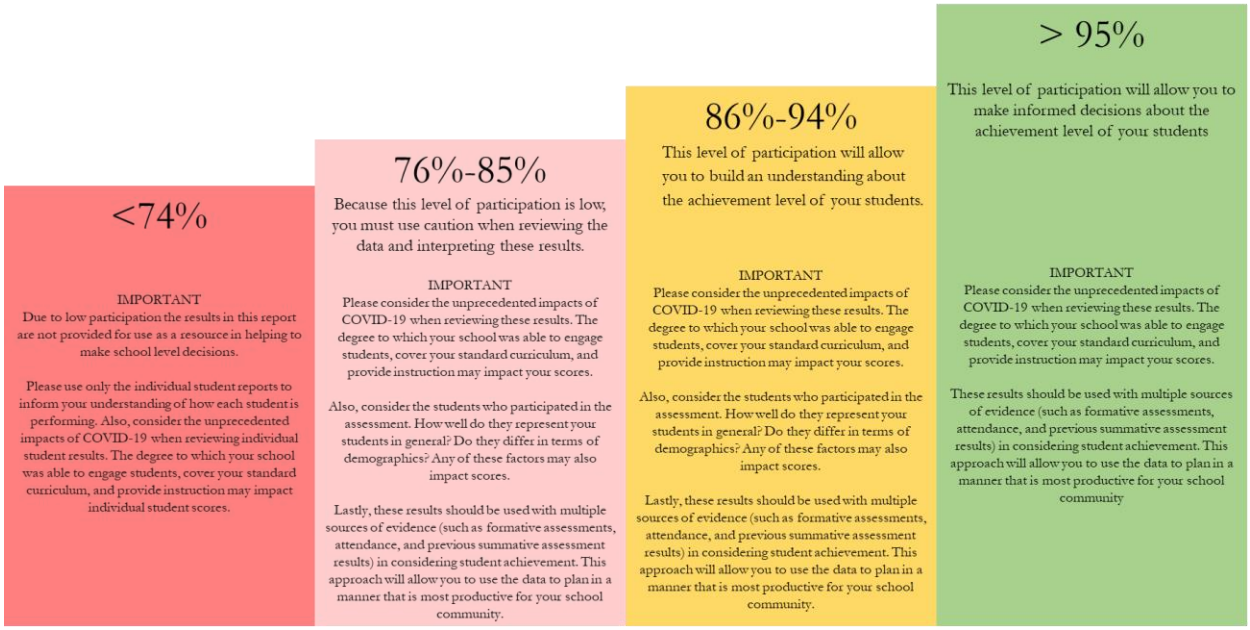
*"There no greater threat to the public trust than reporting statistics like this is business as usual"* (p. 8, Ho, 2021).

The KĀ'EO team values the perspective that Andrew Ho discussed in his 2021 memo because it resonates with the priorities we place on transparency. The team co-interpreted the results discussed above and made decisions about what data to report and guidance on interpretation. This allowed us to provide guidance to schools about inferences that can be made from the data and how to best present participation and OTL data to parents and school staff. The KĀ'EO team also worked with HIDOE to interpret the data to understand the degree to which the data impact the assessment purpose statements.

## Modified student and school reports

Reports were modified to highlight information that would be important to stakeholders use and for the interpretation of the results. For the school reports, participation rates were key to providing appropriate guidance to schools about how to interpret the results. As such the following text was added to the school reports (Figure 14.8). Chapter 12: Reporting provides an example of the student report.

**Figure 14.8: Participation Rate information**




## Discussion guide

The team also provided schools with a discussion guide that they could use to better understand the assessment results in the larger context of the pandemic. This guide included information on understanding the OTL survey results, the assessment data, and participation rates. There were also reflection questions included to help educators consider how the OTL findings might relate to the context in their own school building (Figure 14.9). See Appendix M for Discussion Guide.

**Figure 14.9: Discussion Guide Introduction and Reflection Questions**

KĀʻEO
Kalapuni Assessment of Educational Outcomes

2021
Educator & Student Surveys

## Introduction

**As you unpack your school's KĀ'EO results, you may find it helpful to have additional information available to facilitate conversations at your school.**

Opportunity To Learn (OTL) survey results are included in this document to provide some additional context for those conversations.

The results have been categorized according to **four major themes:**

1. Impacts on **instruction and learning**
2. Impacts on **student engagement**
3. Impacts to **Hawaiian language proficiency**
4. Impacts on **student readiness**

**On the next page, you will see questions provided as a starting point to facilitate discussion in your school and community, followed by the results of the OTL survey.**

## Questions To Consider

**As you review the OTL results, consider the following questions and how they might apply across all four major themes:**

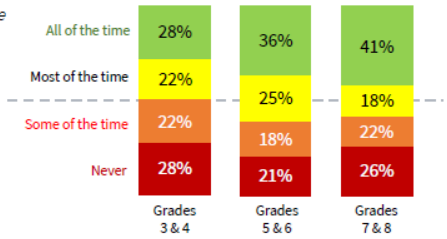
- ✓ What does (or does not) resonate in the OTL data in how it applies to your school's specific context? Were there grade levels or content areas that were particularly impacted?
- ✓ What additional information would you want to know from families, teachers and students this year?
- ✓ Are there results that were NOT expected?
- ✓ If you have seen impacts to Hawaiian language proficiency similar to what is reflected in this data, how do you think this has impacted students' learning and the ability to demonstrate what they know? What are some strategies that you can use to mitigate these impacts in your specific school context?
- ✓ Your school probably has a wealth of data from other sources – formative assessment data, performance assessment data, anecdotal data, school-specific measures, lived experiences, etc. How can these rich, additional sources of information be used along with KĀʻEO and OTL results to make informed decisions about next steps? What are your next steps?

KĀʻEO
Kaiapuni Assessment of Educational Outcomes

2021
Educator & Student Surveys

## . . . and computer access was an issue for many students .

**Q:** *"I have a computer at home so I can participate in online school. . .*




## Many students also reported internet access issues.

**Q:** *"I have reliable internet access at home. . .*

Some of the time or Never **37%**

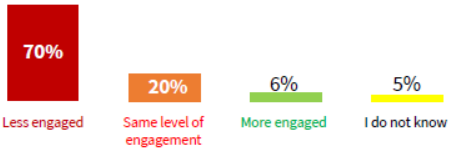
All of the time[1] or Most of the time **63%**

[1] Across all grades, only 20% reported having access "All of the Time."

## Overall, educators reported that students were less engaged .

**Q:** *"Compared to previous school years, how engaged are your students in school?"*

[2] Based on Educator Survey data.

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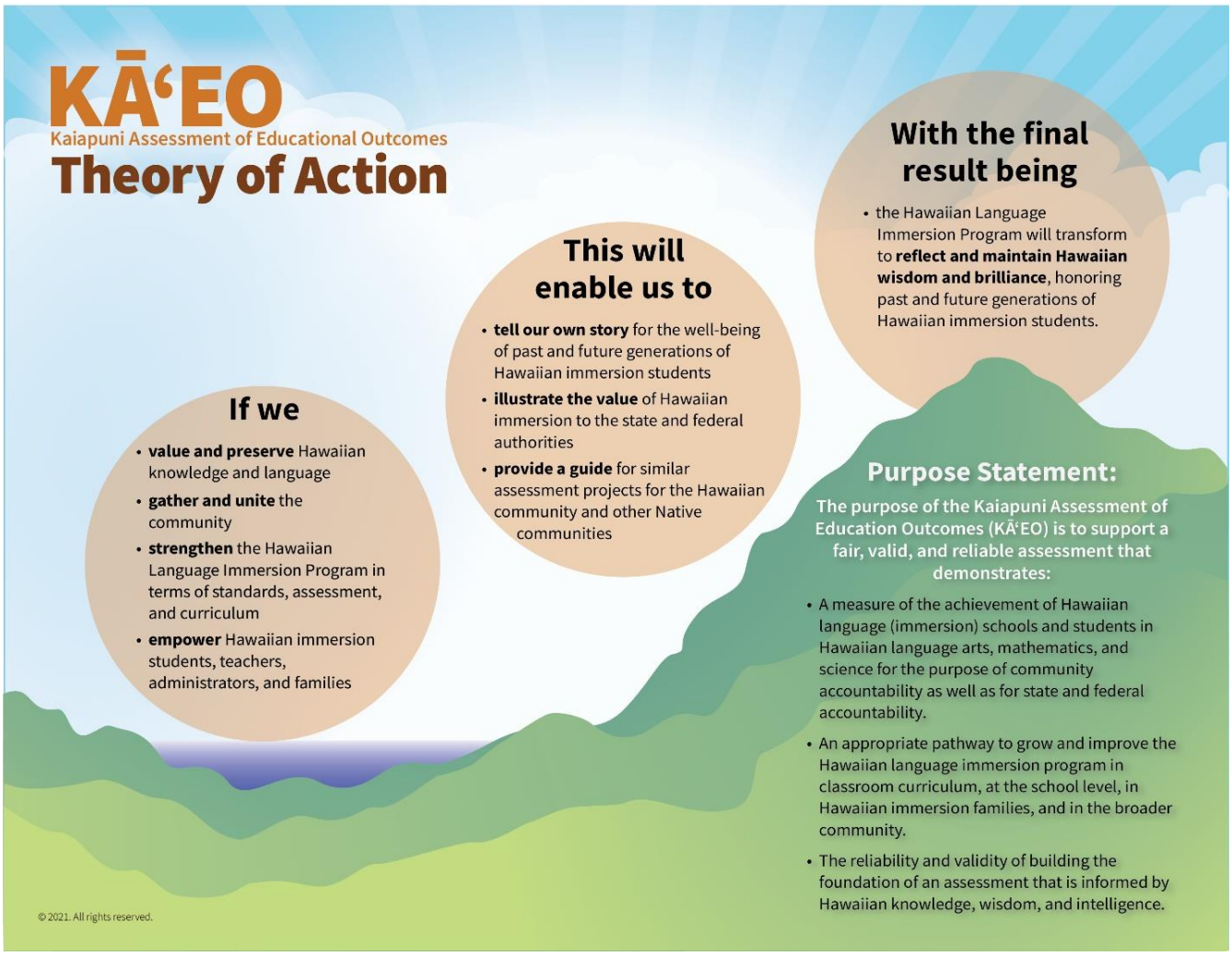
# Appendix A: Theory of Action

**Ka Manaʻo Hoʻoulu:**

Mālama i ka ʻike a me ka ʻōlelo Hawaiʻi ➔ Hui pū ke kaiāulu ➔ Hoʻoikaika i ka papahana kaiapuni (ana, hōʻike, haʻawina) ➔ ʻĀmana nā haumāna, kumu, poʻokula, mākua ➔ Haʻi i ko kākou moʻolelo ponoʻī: 1) no ka pono o nā hanauna i hala a me nā hanauna hou, 2) e hōʻike ai i ka ikaika o ke kaiapuni i ke aupuni, 3) e alakaʻi ai i ke ala kūpono no nā kaiāulu Hawaiʻi a me nā kaiāulu ʻōiwi ➔ E kū ana ka papahana kaiapuni i ka naʻauao Hawaiʻi no nā hanauna i hala a me nā hanauna hou.

**Theory of Action:**

**Appendix Figure A.1: Theory of Action (translated)**



# Appendix B: : Purpose Statements

**Ka mākia o ka hōʻike:**

ʻO ka mākia ʻo KĀʻEO ka paepae ʻana i ka loiloi kaiapuni pono e hōʻike ai i:

- ka lei o ka lanakila o nā kula a me nā haumāna ʻōlelo Hawaiʻi i ke kaiāulu a me ke aupuni ma o ka mākau ʻōlelo Hawaiʻi, ka pili helu a me ke akeakamai.
- ke ala kūpono e hoʻomōhala ai i ka papahana kaiapuni ma ka hana ma ka papa, nā kula, nā ʻohana kaiapuni, a me ke kaiāulu.
- ka pono o ke kūkulu ʻana i ke kahua o ka loiloi ma o ka naʻauao Hawaiʻi.

**Purpose Statement:**

The purpose of the Kaiapuni Assessment of Education Outcomes (KĀʻEO) is to support a fair, valid, and reliable assessment that demonstrates:

- To measure the achievement of Hawaiian language (immersion) schools and students in Hawaiian language arts, mathematics, and science for the purpose of community accountability as well as for state and federal accountability.
- An appropriate pathway to grow and improve the Hawaiian language immersion program in classroom curriculum, at the school level, in Hawaiian immersion families, and in the broader community.
- The reliability and validity of building the foundation of an assessment that is informed by Hawaiian knowledge, wisdom, and intelligence.

# Appendix C: : Classical Test Theory Statistics

This appendix contains the details of the Classical Test Theory (CTT) item analysis.

### Appendix Table C.1: 2021 HLA CTT Statistics

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 3 | 84 | 0.51 | 0.50 | 21.85 | 127.47 | 0.53 | . | 0.90 | 271 |
| HLA | 3 | 87 | 0.18 | 0.39 | 22.18 | 129.27 | 0.49 | . | 0.90 | 271 |
| HLA | 3 | 88 | 0.30 | 0.46 | 22.07 | 128.51 | 0.48 | . | 0.90 | 271 |
| HLA | 3 | 89 | 0.45 | 0.50 | 21.91 | 130.23 | 0.29 | . | 0.90 | 271 |
| HLA | 3 | 90 | 0.75 | 0.43 | 21.61 | 129.54 | 0.41 | . | 0.90 | 271 |
| HLA | 3 | 91 | 0.69 | 0.46 | 21.68 | 128.48 | 0.48 | . | 0.90 | 271 |
| HLA | 3 | 92 | 0.31 | 0.46 | 22.06 | 127.93 | 0.54 | . | 0.90 | 271 |
| HLA | 3 | 93 | 0.73 | 0.44 | 21.63 | 130.06 | 0.34 | . | 0.90 | 271 |
| HLA | 3 | 94 | 0.71 | 0.46 | 21.66 | 129.19 | 0.42 | . | 0.90 | 271 |
| HLA | 3 | 95 | 0.29 | 0.46 | 22.07 | 128.89 | 0.45 | . | 0.90 | 271 |
| HLA | 3 | 96 | 0.18 | 0.39 | 22.18 | 129.22 | 0.50 | . | 0.90 | 271 |
| HLA | 3 | 97 | 0.30 | 0.46 | 22.07 | 128.43 | 0.49 | . | 0.90 | 271 |
| HLA | 3 | 99 | 0.41 | 0.49 | 21.95 | 129.11 | 0.39 | . | 0.90 | 271 |
| HLA | 3 | 101 | 0.29 | 0.46 | 22.07 | 128.74 | 0.46 | . | 0.90 | 271 |
| HLA | 3 | 104 | 0.12 | 0.33 | 22.24 | 129.57 | 0.54 | . | 0.90 | 271 |
| HLA | 3 | 107 | 0.53 | 0.50 | 21.84 | 130.87 | 0.23 | . | 0.91 | 271 |
| HLA | 3 | 108 | 0.32 | 0.47 | 22.04 | 127.32 | 0.59 | . | 0.90 | 271 |
| HLA | 3 | 110 | 0.34 | 0.47 | 22.03 | 130.14 | 0.31 | . | 0.90 | 271 |
| HLA | 3 | 112 | 0.08 | 0.28 | 22.28 | 131.13 | 0.40 | . | 0.90 | 271 |
| HLA | 3 | 113 | 0.06 | 0.24 | 22.31 | 132.32 | 0.25 | . | 0.91 | 271 |
| HLA | 3 | 114 | 0.42 | 0.50 | 21.94 | 130.99 | 0.22 | . | 0.91 | 271 |
| HLA | 3 | 117 | 0.57 | 0.50 | 21.79 | 128.20 | 0.47 | . | 0.90 | 271 |
| HLA | 3 | 119 | 0.35 | 0.48 | 22.02 | 131.93 | 0.14 | . | 0.91 | 271 |
| HLA | 3 | 123 | 0.42 | 0.50 | 21.94 | 132.99 | 0.04 | . | 0.91 | 271 |
| HLA | 3 | 125 | 0.44 | 0.50 | 21.92 | 129.00 | 0.40 | . | 0.90 | 271 |
| HLA | 3 | 127 | 0.03 | 0.16 | 22.34 | 132.52 | 0.33 | . | 0.91 | 271 |
| HLA | 3 | 130 | 0.37 | 0.48 | 22.00 | 131.84 | 0.15 | . | 0.91 | 271 |
| HLA | 3 | 137 | 0.35 | 0.48 | 22.01 | 130.01 | 0.32 | . | 0.90 | 271 |
| HLA | 3 | 138 | 0.29 | 0.55 | 22.07 | 126.97 | 0.52 | . | 0.90 | 271 |
| HLA | 3 | 143 | 0.24 | 0.43 | 22.13 | 131.04 | 0.26 | . | 0.90 | 271 |
| HLA | 3 | 145 | 0.58 | 0.50 | 21.79 | 127.62 | 0.53 | . | 0.90 | 271 |
| HLA | 3 | 150 | 0.66 | 0.48 | 21.71 | 129.22 | 0.40 | . | 0.90 | 271 |
| HLA | 3 | 156 | 0.28 | 0.45 | 22.08 | 131.06 | 0.24 | . | 0.91 | 271 |
| HLA | 3 | 158 | 0.37 | 0.48 | 22.00 | 129.97 | 0.32 | . | 0.90 | 271 |
| HLA | 3 | 161 | 0.41 | 0.49 | 21.95 | 129.19 | 0.38 | . | 0.90 | 271 |
| HLA | 3 | 162 | 0.53 | 0.50 | 21.84 | 128.70 | 0.42 | . | 0.90 | 271 |
| HLA | 3 | 379 | 0.17 | 0.42 | 22.19 | 128.65 | 0.52 | . | 0.90 | 271 |
| HLA | 3 | 381 | 0.30 | 0.46 | 22.07 | 128.18 | 0.52 | . | 0.90 | 271 |
| HLA | 3 | 383 | 0.67 | 0.47 | 21.70 | 131.72 | 0.17 | . | 0.91 | 271 |
| HLA | 3 | 384 | 0.61 | 0.49 | 21.75 | 131.02 | 0.22 | . | 0.91 | 271 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 3 | 394 | 1.84 | 1.63 | 20.53 | 109.27 | 0.64 | . | 0.91 | 271 |
| HLA | 3 | 1020 | 0.25 | 0.57 | 22.12 | 126.02 | 0.58 | . | 0.90 | 271 |
| HLA | 3 | 1021 | 0.52 | 0.50 | 21.85 | 131.32 | 0.19 | . | 0.91 | 271 |
| HLA | 3 | 1022 | 0.37 | 0.48 | 21.99 | 133.85 | -0.03 | . | 0.91 | 271 |
| HLA | 3 | 1023 | 0.19 | 0.40 | 22.17 | 129.43 | 0.46 | . | 0.90 | 271 |
| HLA | 3 | 1024 | 0.50 | 0.85 | 21.86 | 119.31 | 0.74 | . | 0.90 | 271 |
| HLA | 3 | 1025 | 0.12 | 0.32 | 22.25 | 132.15 | 0.20 | . | 0.91 | 271 |
| HLA | 3 | 1026 | 0.23 | 0.42 | 22.14 | 128.60 | 0.52 | . | 0.90 | 271 |
| HLA | 3 | 1277 | 0.24 | 0.43 | 22.12 | 133.61 | -0.01 | . | 0.91 | 271 |
| HLA | 3 | 1280 | 0.26 | 0.44 | 22.10 | 132.72 | 0.08 | . | 0.91 | 271 |
| HLA | 3 | 1281 | 0.42 | 0.50 | 21.94 | 130.20 | 0.29 | . | 0.90 | 271 |
| HLA | 3 | 1282 | 0.39 | 0.49 | 21.98 | 130.21 | 0.30 | . | 0.90 | 271 |
| HLA | 3 | 1283 | 0.52 | 0.50 | 21.85 | 128.88 | 0.41 | . | 0.90 | 271 |
| HLA | 3 | 1284 | 0.39 | 0.67 | 21.97 | 123.69 | 0.65 | . | 0.90 | 271 |
| HLA | 3 | 1285 | 0.05 | 0.21 | 22.32 | 132.14 | 0.31 | . | 0.90 | 271 |
| HLA | 3 | 1286 | 0.10 | 0.30 | 22.27 | 131.53 | 0.31 | . | 0.90 | 271 |
| HLA | 3 | 1478 | 0.35 | 0.48 | 22.01 | 130.19 | 0.30 | . | 0.90 | 271 |
| HLA | 4 | 7 | 0.78 | 0.41 | 26.29 | 110.40 | 0.40 | . | 0.88 | 250 |
| HLA | 4 | 8 | 0.58 | 0.50 | 26.50 | 108.86 | 0.48 | . | 0.88 | 250 |
| HLA | 4 | 9 | 0.36 | 0.48 | 26.71 | 109.56 | 0.42 | . | 0.88 | 250 |
| HLA | 4 | 11 | 0.12 | 0.33 | 26.95 | 111.47 | 0.35 | . | 0.88 | 250 |
| HLA | 4 | 12 | 0.70 | 0.46 | 26.38 | 110.39 | 0.35 | . | 0.88 | 250 |
| HLA | 4 | 13 | 0.83 | 0.38 | 26.24 | 111.48 | 0.30 | . | 0.88 | 250 |
| HLA | 4 | 14 | 0.68 | 0.47 | 26.39 | 111.01 | 0.28 | . | 0.88 | 250 |
| HLA | 4 | 15 | 0.52 | 0.50 | 26.56 | 109.20 | 0.44 | . | 0.88 | 250 |
| HLA | 4 | 16 | 0.65 | 0.48 | 26.42 | 109.22 | 0.46 | . | 0.88 | 250 |
| HLA | 4 | 17 | 0.45 | 0.50 | 26.62 | 108.92 | 0.47 | . | 0.88 | 250 |
| HLA | 4 | 18 | 0.59 | 0.49 | 26.48 | 111.05 | 0.26 | . | 0.88 | 250 |
| HLA | 4 | 20 | 0.71 | 0.46 | 26.36 | 108.63 | 0.55 | . | 0.88 | 250 |
| HLA | 4 | 21 | 0.42 | 0.50 | 26.65 | 111.30 | 0.24 | . | 0.88 | 250 |
| HLA | 4 | 22 | 0.36 | 0.48 | 26.71 | 111.44 | 0.23 | . | 0.88 | 250 |
| HLA | 4 | 23 | 0.41 | 0.49 | 26.66 | 112.68 | 0.10 | . | 0.88 | 250 |
| HLA | 4 | 24 | 0.29 | 0.46 | 26.78 | 109.41 | 0.46 | . | 0.88 | 250 |
| HLA | 4 | 25 | 0.27 | 0.44 | 26.80 | 113.79 | 0.00 | . | 0.88 | 250 |
| HLA | 4 | 26 | 0.42 | 0.50 | 26.65 | 110.77 | 0.29 | . | 0.88 | 250 |
| HLA | 4 | 27 | 0.58 | 0.50 | 26.50 | 111.67 | 0.20 | . | 0.88 | 250 |
| HLA | 4 | 30 | 0.46 | 0.50 | 26.61 | 111.43 | 0.22 | . | 0.88 | 250 |
| HLA | 4 | 31 | 0.44 | 0.50 | 26.63 | 110.75 | 0.29 | . | 0.88 | 250 |
| HLA | 4 | 34 | 0.53 | 0.50 | 26.54 | 110.78 | 0.28 | . | 0.88 | 250 |
| HLA | 4 | 35 | 0.22 | 0.51 | 26.85 | 108.17 | 0.53 | . | 0.88 | 250 |
| HLA | 4 | 36 | 0.40 | 0.49 | 26.67 | 113.33 | 0.04 | . | 0.88 | 250 |
| HLA | 4 | 37 | 0.38 | 0.49 | 26.69 | 112.16 | 0.16 | . | 0.88 | 250 |
| HLA | 4 | 38 | 0.67 | 0.47 | 26.40 | 111.52 | 0.23 | . | 0.88 | 250 |
| HLA | 4 | 40 | 0.38 | 0.49 | 26.69 | 110.24 | 0.35 | . | 0.88 | 250 |
| HLA | 4 | 41 | 0.24 | 0.43 | 26.83 | 112.49 | 0.15 | . | 0.88 | 250 |
| HLA | 4 | 42 | 0.69 | 0.83 | 26.38 | 102.35 | 0.66 | . | 0.87 | 250 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 4 | 46 | 0.37 | 0.48 | 26.70 | 111.09 | 0.26 | . | 0.88 | 250 |
| HLA | 4 | 47 | 0.47 | 0.50 | 26.60 | 109.74 | 0.38 | . | 0.88 | 250 |
| HLA | 4 | 48 | 0.67 | 0.47 | 26.40 | 109.30 | 0.46 | . | 0.88 | 250 |
| HLA | 4 | 49 | 0.65 | 0.48 | 26.42 | 108.96 | 0.48 | . | 0.88 | 250 |
| HLA | 4 | 50 | 0.45 | 0.50 | 26.62 | 108.61 | 0.50 | . | 0.88 | 250 |
| HLA | 4 | 51 | 0.41 | 0.49 | 26.66 | 112.26 | 0.15 | . | 0.88 | 250 |
| HLA | 4 | 54 | 0.48 | 0.50 | 26.59 | 109.81 | 0.38 | . | 0.88 | 250 |
| HLA | 4 | 55 | 0.36 | 0.48 | 26.71 | 112.70 | 0.11 | . | 0.88 | 250 |
| HLA | 4 | 56 | 0.23 | 0.42 | 26.84 | 113.00 | 0.09 | . | 0.88 | 250 |
| HLA | 4 | 57 | 0.23 | 0.42 | 26.84 | 113.65 | 0.02 | . | 0.88 | 250 |
| HLA | 4 | 60 | 0.63 | 0.48 | 26.44 | 109.08 | 0.47 | . | 0.88 | 250 |
| HLA | 4 | 61 | 0.39 | 0.49 | 26.68 | 111.12 | 0.26 | . | 0.88 | 250 |
| HLA | 4 | 62 | 0.42 | 0.50 | 26.65 | 111.47 | 0.22 | . | 0.88 | 250 |
| HLA | 4 | 63 | 0.16 | 0.37 | 26.91 | 114.05 | -0.02 | . | 0.88 | 250 |
| HLA | 4 | 64 | 0.68 | 0.47 | 26.39 | 109.61 | 0.43 | . | 0.88 | 250 |
| HLA | 4 | 65 | 0.76 | 0.43 | 26.32 | 110.27 | 0.39 | . | 0.88 | 250 |
| HLA | 4 | 387 | 0.42 | 0.50 | 26.65 | 110.38 | 0.33 | . | 0.88 | 250 |
| HLA | 4 | 389 | 0.76 | 0.43 | 26.32 | 109.65 | 0.46 | . | 0.88 | 250 |
| HLA | 4 | 395 | 1.61 | 1.38 | 25.46 | 97.82 | 0.52 | . | 0.88 | 250 |
| HLA | 4 | 1011 | 0.31 | 0.46 | 26.76 | 110.56 | 0.33 | . | 0.88 | 250 |
| HLA | 4 | 1012 | 0.25 | 0.43 | 26.82 | 109.11 | 0.52 | . | 0.88 | 250 |
| HLA | 4 | 1013 | 0.80 | 0.99 | 26.27 | 100.86 | 0.62 | . | 0.88 | 250 |
| HLA | 4 | 1014 | 0.11 | 0.31 | 26.96 | 111.93 | 0.30 | . | 0.88 | 250 |
| HLA | 4 | 1015 | 0.44 | 0.50 | 26.63 | 110.98 | 0.27 | . | 0.88 | 250 |
| HLA | 4 | 1016 | 0.29 | 0.46 | 26.78 | 111.70 | 0.22 | . | 0.88 | 250 |
| HLA | 4 | 1017 | 0.02 | 0.14 | 27.05 | 113.24 | 0.25 | . | 0.88 | 250 |
| HLA | 4 | 1019 | 0.30 | 0.46 | 26.77 | 110.11 | 0.38 | . | 0.88 | 250 |
| HLA | 4 | 1291 | 0.26 | 0.44 | 26.82 | 110.27 | 0.39 | . | 0.88 | 250 |
| HLA | 5 | 625 | 0.55 | 0.50 | 25.60 | 140.62 | 0.18 | . | 0.90 | 252 |
| HLA | 5 | 626 | 0.66 | 0.48 | 25.48 | 137.98 | 0.43 | . | 0.90 | 252 |
| HLA | 5 | 627 | 0.47 | 0.50 | 25.67 | 141.00 | 0.15 | . | 0.90 | 252 |
| HLA | 5 | 629 | 0.34 | 0.47 | 25.81 | 137.72 | 0.45 | . | 0.90 | 252 |
| HLA | 5 | 630 | 0.35 | 0.48 | 25.80 | 139.85 | 0.26 | . | 0.90 | 252 |
| HLA | 5 | 631 | 0.41 | 0.49 | 25.73 | 137.53 | 0.45 | . | 0.90 | 252 |
| HLA | 5 | 633 | 0.37 | 0.48 | 25.78 | 139.44 | 0.29 | . | 0.90 | 252 |
| HLA | 5 | 634 | 0.62 | 0.49 | 25.52 | 139.02 | 0.33 | . | 0.90 | 252 |
| HLA | 5 | 636 | 0.47 | 0.50 | 25.67 | 137.52 | 0.44 | . | 0.90 | 252 |
| HLA | 5 | 637 | 0.20 | 0.40 | 25.94 | 138.17 | 0.49 | . | 0.90 | 252 |
| HLA | 5 | 640 | 0.15 | 0.36 | 25.99 | 140.14 | 0.31 | . | 0.90 | 252 |
| HLA | 5 | 642 | 0.28 | 0.45 | 25.86 | 138.26 | 0.43 | . | 0.90 | 252 |
| HLA | 5 | 644 | 0.84 | 0.37 | 25.31 | 139.02 | 0.44 | . | 0.90 | 252 |
| HLA | 5 | 646 | 0.51 | 0.50 | 25.63 | 138.62 | 0.35 | . | 0.90 | 252 |
| HLA | 5 | 648 | 0.49 | 0.50 | 25.65 | 139.12 | 0.30 | . | 0.90 | 252 |
| HLA | 5 | 672 | 0.56 | 0.50 | 25.58 | 141.30 | 0.12 | . | 0.90 | 252 |
| HLA | 5 | 673 | 0.12 | 0.33 | 26.02 | 141.54 | 0.17 | . | 0.90 | 252 |
| HLA | 5 | 677 | 0.10 | 0.30 | 26.04 | 139.53 | 0.47 | . | 0.90 | 252 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 5 | 681 | 0.16 | 0.37 | 25.98 | 140.22 | 0.30 | . | 0.90 | 252 |
| HLA | 5 | 684 | 0.44 | 0.50 | 25.70 | 136.41 | 0.54 | . | 0.89 | 252 |
| HLA | 5 | 689 | 0.61 | 0.49 | 25.54 | 137.16 | 0.49 | . | 0.90 | 252 |
| HLA | 5 | 690 | 0.43 | 0.50 | 25.71 | 136.73 | 0.52 | . | 0.90 | 252 |
| HLA | 5 | 693 | 0.26 | 0.44 | 25.88 | 139.81 | 0.29 | . | 0.90 | 252 |
| HLA | 5 | 696 | 0.49 | 0.50 | 25.65 | 136.28 | 0.55 | . | 0.89 | 252 |
| HLA | 5 | 699 | 0.62 | 0.49 | 25.52 | 138.77 | 0.35 | . | 0.90 | 252 |
| HLA | 5 | 702 | 0.34 | 0.48 | 25.80 | 137.59 | 0.46 | . | 0.90 | 252 |
| HLA | 5 | 706 | 0.08 | 0.30 | 26.06 | 140.02 | 0.40 | . | 0.90 | 252 |
| HLA | 5 | 707 | 0.10 | 0.31 | 26.04 | 141.29 | 0.22 | . | 0.90 | 252 |
| HLA | 5 | 708 | 0.22 | 0.42 | 25.92 | 138.74 | 0.41 | . | 0.90 | 252 |
| HLA | 5 | 709 | 0.56 | 0.50 | 25.58 | 137.93 | 0.41 | . | 0.90 | 252 |
| HLA | 5 | 711 | 0.28 | 0.45 | 25.86 | 140.78 | 0.19 | . | 0.90 | 252 |
| HLA | 5 | 712 | 0.78 | 1.10 | 25.36 | 125.37 | 0.67 | . | 0.89 | 252 |
| HLA | 5 | 713 | 0.29 | 0.46 | 25.85 | 137.09 | 0.53 | . | 0.90 | 252 |
| HLA | 5 | 714 | 0.36 | 0.48 | 25.79 | 137.34 | 0.48 | . | 0.90 | 252 |
| HLA | 5 | 716 | 0.35 | 0.48 | 25.80 | 141.51 | 0.11 | . | 0.90 | 252 |
| HLA | 5 | 718 | 0.17 | 0.38 | 25.97 | 142.23 | 0.07 | . | 0.90 | 252 |
| HLA | 5 | 719 | 0.33 | 0.47 | 25.82 | 136.42 | 0.58 | . | 0.89 | 252 |
| HLA | 5 | 720 | 0.39 | 0.49 | 25.75 | 137.39 | 0.47 | . | 0.90 | 252 |
| HLA | 5 | 721 | 0.63 | 0.49 | 25.52 | 137.11 | 0.50 | . | 0.90 | 252 |
| HLA | 5 | 722 | 0.81 | 0.85 | 25.33 | 131.20 | 0.57 | . | 0.89 | 252 |
| HLA | 5 | 723 | 0.20 | 0.40 | 25.94 | 137.77 | 0.54 | . | 0.90 | 252 |
| HLA | 5 | 724 | 0.46 | 0.50 | 25.69 | 140.47 | 0.19 | . | 0.90 | 252 |
| HLA | 5 | 725 | 0.41 | 0.49 | 25.73 | 138.21 | 0.39 | . | 0.90 | 252 |
| HLA | 5 | 726 | 0.38 | 0.49 | 25.77 | 138.88 | 0.34 | . | 0.90 | 252 |
| HLA | 5 | 727 | 0.29 | 0.46 | 25.85 | 137.00 | 0.54 | . | 0.90 | 252 |
| HLA | 5 | 728 | 0.50 | 0.50 | 25.64 | 137.94 | 0.41 | . | 0.90 | 252 |
| HLA | 5 | 729 | 0.69 | 0.46 | 25.45 | 141.02 | 0.16 | . | 0.90 | 252 |
| HLA | 5 | 730 | 0.30 | 0.46 | 25.84 | 140.33 | 0.22 | . | 0.90 | 252 |
| HLA | 5 | 1030 | 3.19 | 1.92 | 22.96 | 114.24 | 0.61 | . | 0.90 | 252 |
| HLA | 5 | 1072 | 0.26 | 0.44 | 25.88 | 139.83 | 0.28 | . | 0.90 | 252 |
| HLA | 5 | 1074 | 0.83 | 0.37 | 25.31 | 140.34 | 0.28 | . | 0.90 | 252 |
| HLA | 5 | 1183 | 0.35 | 0.48 | 25.79 | 140.01 | 0.24 | . | 0.90 | 252 |
| HLA | 5 | 1186 | 0.46 | 0.50 | 25.68 | 139.82 | 0.25 | . | 0.90 | 252 |
| HLA | 5 | 1193 | 0.35 | 0.48 | 25.79 | 139.15 | 0.32 | . | 0.90 | 252 |
| HLA | 5 | 1208 | 0.28 | 0.45 | 25.87 | 141.56 | 0.11 | . | 0.90 | 252 |
| HLA | 5 | 1215 | 0.27 | 0.45 | 25.87 | 142.63 | 0.01 | . | 0.90 | 252 |
| HLA | 5 | 1222 | 0.73 | 0.45 | 25.41 | 137.06 | 0.55 | . | 0.90 | 252 |
| HLA | 6 | 624 | 0.65 | 0.48 | 24.92 | 170.31 | 0.40 | . | 0.91 | 164 |
| HLA | 6 | 628 | 0.65 | 0.48 | 24.93 | 169.25 | 0.48 | . | 0.91 | 164 |
| HLA | 6 | 632 | 0.38 | 0.49 | 25.20 | 171.07 | 0.33 | . | 0.91 | 164 |
| HLA | 6 | 635 | 0.82 | 0.39 | 24.76 | 172.20 | 0.31 | . | 0.91 | 164 |
| HLA | 6 | 638 | 0.76 | 0.43 | 24.81 | 174.09 | 0.11 | . | 0.91 | 164 |
| HLA | 6 | 639 | 0.36 | 0.48 | 25.21 | 170.21 | 0.40 | . | 0.91 | 164 |
| HLA | 6 | 641 | 0.27 | 0.44 | 25.30 | 169.32 | 0.52 | . | 0.91 | 164 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 6 | 643 | 1.30 | 1.21 | 24.27 | 155.43 | 0.62 | . | 0.91 | 164 |
| HLA | 6 | 645 | 0.37 | 0.49 | 25.20 | 169.08 | 0.49 | . | 0.91 | 164 |
| HLA | 6 | 647 | 0.16 | 0.37 | 25.41 | 172.45 | 0.30 | . | 0.91 | 164 |
| HLA | 6 | 649 | 0.33 | 0.47 | 25.24 | 172.74 | 0.21 | . | 0.91 | 164 |
| HLA | 6 | 650 | 0.26 | 0.44 | 25.32 | 170.37 | 0.43 | . | 0.91 | 164 |
| HLA | 6 | 651 | 0.13 | 0.34 | 25.44 | 171.56 | 0.43 | . | 0.91 | 164 |
| HLA | 6 | 652 | 0.52 | 0.50 | 25.05 | 169.43 | 0.45 | . | 0.91 | 164 |
| HLA | 6 | 653 | 0.63 | 0.48 | 24.94 | 168.70 | 0.52 | . | 0.91 | 164 |
| HLA | 6 | 655 | 0.59 | 0.49 | 24.98 | 169.86 | 0.42 | . | 0.91 | 164 |
| HLA | 6 | 656 | 0.34 | 0.48 | 25.23 | 170.88 | 0.35 | . | 0.91 | 164 |
| HLA | 6 | 657 | 0.44 | 0.50 | 25.13 | 168.46 | 0.53 | . | 0.91 | 164 |
| HLA | 6 | 659 | 0.41 | 0.49 | 25.16 | 173.60 | 0.13 | . | 0.91 | 164 |
| HLA | 6 | 660 | 0.03 | 0.17 | 25.54 | 174.73 | 0.16 | . | 0.91 | 164 |
| HLA | 6 | 661 | 0.35 | 0.48 | 25.23 | 172.00 | 0.26 | . | 0.91 | 164 |
| HLA | 6 | 662 | 0.52 | 0.50 | 25.05 | 170.19 | 0.39 | . | 0.91 | 164 |
| HLA | 6 | 663 | 0.04 | 0.19 | 25.54 | 174.88 | 0.12 | . | 0.91 | 164 |
| HLA | 6 | 664 | 0.57 | 0.89 | 25.01 | 159.92 | 0.65 | . | 0.91 | 164 |
| HLA | 6 | 665 | 0.32 | 0.47 | 25.26 | 167.81 | 0.62 | . | 0.91 | 164 |
| HLA | 6 | 666 | 0.77 | 0.97 | 24.80 | 161.12 | 0.55 | . | 0.91 | 164 |
| HLA | 6 | 667 | 0.51 | 0.50 | 25.06 | 170.21 | 0.39 | . | 0.91 | 164 |
| HLA | 6 | 668 | 0.14 | 0.35 | 25.43 | 171.08 | 0.47 | . | 0.91 | 164 |
| HLA | 6 | 669 | 0.37 | 0.48 | 25.21 | 170.30 | 0.39 | . | 0.91 | 164 |
| HLA | 6 | 674 | 0.04 | 0.19 | 25.54 | 174.16 | 0.26 | . | 0.91 | 164 |
| HLA | 6 | 675 | 0.27 | 0.44 | 25.30 | 170.21 | 0.44 | . | 0.91 | 164 |
| HLA | 6 | 676 | 0.03 | 0.17 | 25.54 | 175.15 | 0.07 | . | 0.91 | 164 |
| HLA | 6 | 678 | 0.46 | 0.50 | 25.11 | 167.33 | 0.61 | . | 0.91 | 164 |
| HLA | 6 | 679 | 0.26 | 0.44 | 25.32 | 171.96 | 0.29 | . | 0.91 | 164 |
| HLA | 6 | 680 | 1.71 | 1.32 | 23.86 | 149.55 | 0.75 | . | 0.91 | 164 |
| HLA | 6 | 682 | 0.37 | 0.48 | 25.21 | 174.33 | 0.07 | . | 0.91 | 164 |
| HLA | 6 | 683 | 0.66 | 0.47 | 24.91 | 169.92 | 0.43 | . | 0.91 | 164 |
| HLA | 6 | 687 | 0.11 | 0.31 | 25.46 | 172.48 | 0.35 | . | 0.91 | 164 |
| HLA | 6 | 688 | 0.32 | 0.47 | 25.26 | 167.97 | 0.60 | . | 0.91 | 164 |
| HLA | 6 | 691 | 0.06 | 0.24 | 25.51 | 174.20 | 0.20 | . | 0.91 | 164 |
| HLA | 6 | 692 | 0.20 | 0.40 | 25.37 | 174.31 | 0.10 | . | 0.91 | 164 |
| HLA | 6 | 694 | 0.27 | 0.47 | 25.30 | 167.27 | 0.65 | . | 0.91 | 164 |
| HLA | 6 | 697 | 0.38 | 0.49 | 25.20 | 171.08 | 0.33 | . | 0.91 | 164 |
| HLA | 6 | 698 | 0.08 | 0.27 | 25.49 | 173.97 | 0.20 | . | 0.91 | 164 |
| HLA | 6 | 700 | 0.56 | 0.50 | 25.01 | 169.02 | 0.48 | . | 0.91 | 164 |
| HLA | 6 | 701 | 0.04 | 0.19 | 25.54 | 173.85 | 0.33 | . | 0.91 | 164 |
| HLA | 6 | 703 | 0.53 | 0.50 | 25.04 | 172.57 | 0.20 | . | 0.91 | 164 |
| HLA | 6 | 704 | 0.57 | 0.50 | 25.01 | 169.29 | 0.46 | . | 0.91 | 164 |
| HLA | 6 | 1031 | 2.73 | 1.70 | 22.85 | 148.33 | 0.59 | . | 0.91 | 164 |
| HLA | 6 | 1075 | 0.35 | 0.48 | 25.23 | 172.73 | 0.20 | . | 0.91 | 164 |
| HLA | 6 | 1083 | 0.38 | 0.49 | 25.20 | 169.74 | 0.44 | . | 0.91 | 164 |
| HLA | 6 | 1169 | 0.26 | 0.44 | 25.32 | 172.07 | 0.28 | . | 0.91 | 164 |
| HLA | 6 | 1170 | 0.05 | 0.22 | 25.52 | 174.29 | 0.20 | . | 0.91 | 164 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 6 | 1171 | 0.34 | 0.47 | 25.24 | 171.32 | 0.32 | . | 0.91 | 164 |
| HLA | 6 | 1172 | 0.64 | 0.48 | 24.93 | 171.60 | 0.29 | . | 0.91 | 164 |
| HLA | 6 | 1173 | 0.74 | 0.93 | 24.83 | 160.51 | 0.60 | . | 0.91 | 164 |
| HLA | 6 | 1309 | 0.21 | 0.41 | 25.37 | 170.16 | 0.49 | . | 0.91 | 164 |
| HLA | 7 | 762 | 0.48 | 0.50 | 25.42 | 137.09 | 0.38 | . | 0.88 | 160 |
| HLA | 7 | 763 | 0.67 | 0.47 | 25.23 | 140.23 | 0.12 | . | 0.89 | 160 |
| HLA | 7 | 769 | 0.70 | 0.46 | 25.20 | 138.94 | 0.25 | . | 0.88 | 160 |
| HLA | 7 | 770 | 0.28 | 0.57 | 25.62 | 134.48 | 0.53 | . | 0.88 | 160 |
| HLA | 7 | 774 | 0.15 | 0.36 | 25.75 | 138.21 | 0.42 | . | 0.88 | 160 |
| HLA | 7 | 777 | 0.37 | 0.48 | 25.53 | 140.18 | 0.13 | . | 0.89 | 160 |
| HLA | 7 | 784 | 0.66 | 0.48 | 25.24 | 138.60 | 0.27 | . | 0.88 | 160 |
| HLA | 7 | 790 | 0.69 | 0.46 | 25.21 | 136.67 | 0.46 | . | 0.88 | 160 |
| HLA | 7 | 803 | 0.29 | 0.45 | 25.61 | 138.69 | 0.28 | . | 0.88 | 160 |
| HLA | 7 | 806 | 0.30 | 0.46 | 25.60 | 138.15 | 0.32 | . | 0.88 | 160 |
| HLA | 7 | 808 | 1.48 | 1.37 | 24.42 | 121.47 | 0.61 | . | 0.88 | 160 |
| HLA | 7 | 811 | 0.31 | 0.47 | 25.59 | 137.84 | 0.35 | . | 0.88 | 160 |
| HLA | 7 | 822 | 0.06 | 0.24 | 25.84 | 141.02 | 0.13 | . | 0.89 | 160 |
| HLA | 7 | 829 | 0.49 | 0.50 | 25.41 | 140.28 | 0.11 | . | 0.89 | 160 |
| HLA | 7 | 834 | 0.44 | 0.50 | 25.46 | 136.21 | 0.46 | . | 0.88 | 160 |
| HLA | 7 | 839 | 0.26 | 0.44 | 25.64 | 136.89 | 0.47 | . | 0.88 | 160 |
| HLA | 7 | 843 | 0.08 | 0.26 | 25.83 | 140.06 | 0.27 | . | 0.88 | 160 |
| HLA | 7 | 869 | 0.07 | 0.25 | 25.83 | 139.09 | 0.45 | . | 0.88 | 160 |
| HLA | 7 | 870 | 0.07 | 0.25 | 25.83 | 139.73 | 0.34 | . | 0.88 | 160 |
| HLA | 7 | 871 | 0.72 | 0.45 | 25.18 | 138.39 | 0.31 | . | 0.88 | 160 |
| HLA | 7 | 872 | 0.51 | 0.97 | 25.39 | 130.64 | 0.46 | . | 0.88 | 160 |
| HLA | 7 | 874 | 0.10 | 0.30 | 25.80 | 139.32 | 0.34 | . | 0.88 | 160 |
| HLA | 7 | 875 | 0.50 | 0.50 | 25.40 | 136.76 | 0.41 | . | 0.88 | 160 |
| HLA | 7 | 876 | 0.17 | 0.38 | 25.73 | 142.37 | -0.08 | . | 0.89 | 160 |
| HLA | 7 | 877 | 0.51 | 0.50 | 25.39 | 139.64 | 0.17 | . | 0.89 | 160 |
| HLA | 7 | 878 | 0.59 | 0.89 | 25.31 | 129.70 | 0.56 | . | 0.88 | 160 |
| HLA | 7 | 879 | 0.33 | 0.47 | 25.58 | 141.73 | -0.01 | . | 0.89 | 160 |
| HLA | 7 | 880 | 0.17 | 0.38 | 25.73 | 139.03 | 0.30 | . | 0.88 | 160 |
| HLA | 7 | 882 | 0.69 | 0.46 | 25.21 | 137.96 | 0.34 | . | 0.88 | 160 |
| HLA | 7 | 883 | 0.15 | 0.36 | 25.75 | 139.76 | 0.23 | . | 0.88 | 160 |
| HLA | 7 | 884 | 0.12 | 0.33 | 25.78 | 139.37 | 0.31 | . | 0.88 | 160 |
| HLA | 7 | 885 | 0.74 | 0.44 | 25.16 | 137.59 | 0.40 | . | 0.88 | 160 |
| HLA | 7 | 886 | 0.06 | 0.24 | 25.84 | 141.75 | 0.01 | . | 0.89 | 160 |
| HLA | 7 | 887 | 0.67 | 0.47 | 25.23 | 135.89 | 0.52 | . | 0.88 | 160 |
| HLA | 7 | 888 | 0.76 | 0.43 | 25.14 | 140.44 | 0.12 | . | 0.89 | 160 |
| HLA | 7 | 889 | 0.56 | 0.93 | 25.34 | 130.24 | 0.51 | . | 0.88 | 160 |
| HLA | 7 | 891 | 0.26 | 0.44 | 25.64 | 137.54 | 0.40 | . | 0.88 | 160 |
| HLA | 7 | 892 | 0.29 | 0.45 | 25.61 | 138.65 | 0.28 | . | 0.88 | 160 |
| HLA | 7 | 897 | 0.48 | 0.50 | 25.42 | 138.40 | 0.27 | . | 0.88 | 160 |
| HLA | 7 | 899 | 0.45 | 0.50 | 25.45 | 135.87 | 0.49 | . | 0.88 | 160 |
| HLA | 7 | 902 | 0.31 | 0.47 | 25.59 | 136.57 | 0.47 | . | 0.88 | 160 |
| HLA | 7 | 903 | 0.03 | 0.16 | 25.88 | 141.41 | 0.11 | . | 0.89 | 160 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 7 | 930 | 0.43 | 0.50 | 25.48 | 139.65 | 0.17 | . | 0.89 | 160 |
| HLA | 7 | 1032 | 3.06 | 1.66 | 22.84 | 116.44 | 0.63 | . | 0.88 | 160 |
| HLA | 7 | 1088 | 0.21 | 0.41 | 25.69 | 137.74 | 0.41 | . | 0.88 | 160 |
| HLA | 7 | 1089 | 0.10 | 0.30 | 25.80 | 140.61 | 0.16 | . | 0.89 | 160 |
| HLA | 7 | 1096 | 1.02 | 1.08 | 24.88 | 127.82 | 0.53 | . | 0.88 | 160 |
| HLA | 7 | 1097 | 1.31 | 1.01 | 24.59 | 126.48 | 0.63 | . | 0.88 | 160 |
| HLA | 7 | 1098 | 0.22 | 0.42 | 25.68 | 140.04 | 0.17 | . | 0.89 | 160 |
| HLA | 7 | 1099 | 0.48 | 0.50 | 25.42 | 137.06 | 0.39 | . | 0.88 | 160 |
| HLA | 7 | 1104 | 0.24 | 0.43 | 25.66 | 140.50 | 0.11 | . | 0.89 | 160 |
| HLA | 7 | 1118 | 0.73 | 0.45 | 25.17 | 141.00 | 0.06 | . | 0.89 | 160 |
| HLA | 7 | 1175 | 0.41 | 0.49 | 25.49 | 135.43 | 0.54 | . | 0.88 | 160 |
| HLA | 7 | 1178 | 0.18 | 0.39 | 25.72 | 138.22 | 0.38 | . | 0.88 | 160 |
| HLA | 7 | 1179 | 0.14 | 0.35 | 25.76 | 138.06 | 0.44 | . | 0.88 | 160 |
| HLA | 7 | 1182 | 0.25 | 0.43 | 25.65 | 136.43 | 0.51 | . | 0.88 | 160 |
| HLA | 7 | 1185 | 0.13 | 0.34 | 25.77 | 141.35 | 0.05 | . | 0.89 | 160 |
| HLA | 8 | 761 | 0.27 | 0.45 | 27.11 | 168.08 | 0.58 | | 0.91 | 127 |
| HLA | 8 | 764 | 0.20 | 0.41 | 27.17 | 172.18 | 0.25 | | 0.91 | 127 |
| HLA | 8 | 766 | 0.07 | 0.26 | 27.31 | 172.83 | 0.30 | | 0.91 | 127 |
| HLA | 8 | 767 | 0.82 | 0.90 | 26.56 | 159.71 | 0.64 | | 0.91 | 127 |
| HLA | 8 | 771 | 0.31 | 0.46 | 27.07 | 168.13 | 0.55 | | 0.91 | 127 |
| HLA | 8 | 772 | 0.14 | 0.35 | 27.24 | 170.61 | 0.46 | | 0.91 | 127 |
| HLA | 8 | 778 | 0.31 | 0.46 | 27.07 | 170.30 | 0.37 | | 0.91 | 127 |
| HLA | 8 | 780 | 0.94 | 1.05 | 26.44 | 155.96 | 0.69 | | 0.90 | 127 |
| HLA | 8 | 785 | 0.47 | 0.50 | 26.91 | 169.53 | 0.40 | | 0.91 | 127 |
| HLA | 8 | 793 | 0.02 | 0.13 | 27.36 | 174.27 | 0.20 | | 0.91 | 127 |
| HLA | 8 | 796 | 0.33 | 0.47 | 27.05 | 173.89 | 0.07 | | 0.91 | 127 |
| HLA | 8 | 802 | 0.03 | 0.18 | 27.35 | 174.18 | 0.16 | | 0.91 | 127 |
| HLA | 8 | 805 | 0.46 | 0.50 | 26.91 | 172.65 | 0.16 | | 0.91 | 127 |
| HLA | 8 | 810 | 0.04 | 0.20 | 27.34 | 173.78 | 0.22 | | 0.91 | 127 |
| HLA | 8 | 820 | 0.91 | 1.09 | 26.46 | 154.19 | 0.72 | | 0.90 | 127 |
| HLA | 8 | 826 | 0.39 | 0.49 | 26.99 | 172.47 | 0.18 | | 0.91 | 127 |
| HLA | 8 | 833 | 0.60 | 0.49 | 26.78 | 167.86 | 0.54 | | 0.91 | 127 |
| HLA | 8 | 848 | 0.80 | 0.41 | 26.58 | 170.69 | 0.39 | | 0.91 | 127 |
| HLA | 8 | 855 | 0.56 | 0.50 | 26.82 | 170.12 | 0.35 | | 0.91 | 127 |
| HLA | 8 | 867 | 0.23 | 0.42 | 27.15 | 173.07 | 0.15 | | 0.91 | 127 |
| HLA | 8 | 893 | 0.31 | 0.46 | 27.07 | 174.16 | 0.05 | | 0.91 | 127 |
| HLA | 8 | 894 | 0.24 | 0.43 | 27.14 | 169.69 | 0.46 | | 0.91 | 127 |
| HLA | 8 | 901 | 0.21 | 0.41 | 27.17 | 168.44 | 0.60 | | 0.91 | 127 |
| HLA | 8 | 904 | 0.73 | 0.45 | 26.65 | 170.91 | 0.33 | | 0.91 | 127 |
| HLA | 8 | 905 | 0.33 | 0.47 | 27.05 | 171.79 | 0.24 | | 0.91 | 127 |
| HLA | 8 | 906 | 0.44 | 0.50 | 26.94 | 169.79 | 0.38 | | 0.91 | 127 |
| HLA | 8 | 909 | 0.82 | 0.39 | 26.56 | 171.17 | 0.36 | | 0.91 | 127 |
| HLA | 8 | 910 | 0.60 | 0.49 | 26.78 | 169.51 | 0.41 | | 0.91 | 127 |
| HLA | 8 | 911 | 0.81 | 0.75 | 26.57 | 162.98 | 0.59 | | 0.91 | 127 |
| HLA | 8 | 912 | 0.39 | 0.49 | 26.99 | 169.82 | 0.38 | | 0.91 | 127 |
| HLA | 8 | 913 | 0.17 | 0.37 | 27.21 | 172.66 | 0.22 | | 0.91 | 127 |

| subject | grade | Item Number | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 8 | 914 | 0.30 | 0.46 | 27.08 | 172.84 | 0.16 | | 0.91 | 127 |
| HLA | 8 | 916 | 0.23 | 0.42 | 27.15 | 173.65 | 0.10 | | 0.91 | 127 |
| HLA | 8 | 917 | 0.90 | 0.30 | 26.48 | 171.73 | 0.39 | | 0.91 | 127 |
| HLA | 8 | 920 | 0.38 | 0.49 | 27.00 | 169.76 | 0.39 | | 0.91 | 127 |
| HLA | 8 | 921 | 0.55 | 0.50 | 26.83 | 168.53 | 0.48 | | 0.91 | 127 |
| HLA | 8 | 922 | 0.47 | 0.50 | 26.91 | 168.05 | 0.51 | | 0.91 | 127 |
| HLA | 8 | 924 | 0.21 | 0.41 | 27.17 | 171.01 | 0.35 | | 0.91 | 127 |
| HLA | 8 | 925 | 0.54 | 0.50 | 26.84 | 168.01 | 0.52 | | 0.91 | 127 |
| HLA | 8 | 926 | 0.36 | 0.48 | 27.02 | 173.17 | 0.12 | | 0.91 | 127 |
| HLA | 8 | 927 | 0.69 | 0.47 | 26.69 | 169.63 | 0.42 | | 0.91 | 127 |
| HLA | 8 | 929 | 0.75 | 0.44 | 26.63 | 168.76 | 0.53 | | 0.91 | 127 |
| HLA | 8 | 1034 | 2.89 | 1.83 | 24.49 | 140.06 | 0.73 | | 0.91 | 127 |
| HLA | 8 | 1078 | 0.31 | 0.47 | 27.06 | 174.36 | 0.03 | | 0.91 | 127 |
| HLA | 8 | 1079 | 0.46 | 0.50 | 26.91 | 169.43 | 0.40 | | 0.91 | 127 |
| HLA | 8 | 1092 | 0.13 | 0.33 | 27.25 | 175.76 | -0.10 | | 0.91 | 127 |
| HLA | 8 | 1105 | 0.32 | 0.47 | 27.06 | 172.99 | 0.14 | | 0.91 | 127 |
| HLA | 8 | 1126 | 0.82 | 0.39 | 26.56 | 169.79 | 0.50 | | 0.91 | 127 |
| HLA | 8 | 1127 | 0.20 | 0.40 | 27.18 | 170.90 | 0.37 | | 0.91 | 127 |
| HLA | 8 | 1190 | 0.50 | 0.50 | 26.87 | 168.11 | 0.51 | | 0.91 | 127 |
| HLA | 8 | 1192 | 0.68 | 0.47 | 26.70 | 169.64 | 0.42 | | 0.91 | 127 |
| HLA | 8 | 1199 | 0.45 | 0.50 | 26.93 | 166.94 | 0.60 | | 0.91 | 127 |
| HLA | 8 | 1201 | 0.35 | 0.48 | 27.03 | 167.51 | 0.58 | | 0.91 | 127 |
| HLA | 8 | 1210 | 0.38 | 0.49 | 27.00 | 170.35 | 0.34 | | 0.91 | 127 |
| HLA | 8 | 1212 | 0.51 | 0.50 | 26.87 | 169.91 | 0.37 | | 0.91 | 127 |
| HLA | 8 | 1214 | 1.08 | 1.37 | 26.30 | 149.64 | 0.70 | | 0.91 | 127 |

## Appendix Table C.2: 2021 MA: CTT Statistics

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 169 | 0.38 | 0.49 | 18.80 | 57.99 | 0.44 | . | 0.85 | 272 |
| 3 | 172 | 0.26 | 0.44 | 18.92 | 57.52 | 0.57 | . | 0.84 | 272 |
| 3 | 173 | 0.39 | 0.49 | 18.78 | 59.07 | 0.29 | . | 0.85 | 272 |
| 3 | 174 | 0.41 | 0.49 | 18.76 | 57.28 | 0.53 | . | 0.84 | 272 |
| 3 | 178 | 0.93 | 0.26 | 18.25 | 60.79 | 0.16 | . | 0.85 | 272 |
| 3 | 180 | 0.40 | 0.49 | 18.77 | 58.65 | 0.35 | . | 0.85 | 272 |
| 3 | 182 | 0.32 | 0.47 | 18.86 | 59.26 | 0.28 | . | 0.85 | 272 |
| 3 | 184 | 0.78 | 0.42 | 18.40 | 59.58 | 0.27 | . | 0.85 | 272 |
| 3 | 185 | 0.10 | 0.30 | 19.08 | 60.75 | 0.14 | . | 0.85 | 272 |
| 3 | 186 | 0.37 | 0.48 | 18.81 | 59.62 | 0.22 | . | 0.85 | 272 |
| 3 | 187 | 0.63 | 0.48 | 18.54 | 58.68 | 0.35 | . | 0.85 | 272 |
| 3 | 188 | 0.48 | 0.50 | 18.70 | 58.07 | 0.42 | . | 0.85 | 272 |
| 3 | 189 | 0.71 | 0.46 | 18.47 | 59.96 | 0.19 | . | 0.85 | 272 |
| 3 | 190 | 0.58 | 0.49 | 18.59 | 59.21 | 0.27 | . | 0.85 | 272 |
| 3 | 191 | 0.21 | 0.41 | 18.96 | 58.96 | 0.38 | . | 0.85 | 272 |
| 3 | 193 | 0.56 | 0.50 | 18.61 | 59.75 | 0.19 | . | 0.85 | 272 |
| 3 | 198 | 0.75 | 0.43 | 18.42 | 59.77 | 0.23 | . | 0.85 | 272 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 201 | 0.63 | 0.48 | 18.55 | 58.80 | 0.33 | . | 0.85 | 272 |
| 3 | 202 | 0.78 | 0.41 | 18.39 | 59.34 | 0.31 | . | 0.85 | 272 |
| 3 | 204 | 0.38 | 0.49 | 18.79 | 57.74 | 0.48 | . | 0.85 | 272 |
| 3 | 205 | 0.33 | 0.47 | 18.84 | 59.81 | 0.20 | . | 0.85 | 272 |
| 3 | 206 | 0.60 | 0.49 | 18.57 | 58.86 | 0.32 | . | 0.85 | 272 |
| 3 | 207 | 0.52 | 0.50 | 18.65 | 58.55 | 0.35 | . | 0.85 | 272 |
| 3 | 208 | 0.32 | 0.47 | 18.85 | 58.06 | 0.45 | . | 0.85 | 272 |
| 3 | 209 | 0.26 | 0.44 | 18.91 | 59.84 | 0.21 | . | 0.85 | 272 |
| 3 | 210 | 0.23 | 0.42 | 18.95 | 59.85 | 0.23 | . | 0.85 | 272 |
| 3 | 211 | 0.21 | 0.41 | 18.97 | 60.81 | 0.08 | . | 0.85 | 272 |
| 3 | 212 | 0.31 | 0.46 | 18.87 | 57.68 | 0.51 | . | 0.84 | 272 |
| 3 | 213 | 0.22 | 0.42 | 18.95 | 58.81 | 0.39 | . | 0.85 | 272 |
| 3 | 214 | 0.33 | 0.47 | 18.85 | 57.95 | 0.46 | . | 0.85 | 272 |
| 3 | 215 | 0.76 | 0.43 | 18.41 | 59.56 | 0.27 | . | 0.85 | 272 |
| 3 | 216 | 0.43 | 0.50 | 18.75 | 59.30 | 0.25 | . | 0.85 | 272 |
| 3 | 217 | 0.20 | 0.40 | 18.97 | 60.04 | 0.21 | . | 0.85 | 272 |
| 3 | 218 | 0.20 | 0.40 | 18.97 | 60.26 | 0.17 | . | 0.85 | 272 |
| 3 | 219 | 0.14 | 0.35 | 19.04 | 61.11 | 0.05 | . | 0.85 | 272 |
| 3 | 221 | 0.28 | 0.45 | 18.90 | 57.88 | 0.50 | . | 0.85 | 272 |
| 3 | 223 | 0.37 | 0.48 | 18.81 | 60.04 | 0.16 | . | 0.85 | 272 |
| 3 | 224 | 0.32 | 0.47 | 18.85 | 59.57 | 0.24 | . | 0.85 | 272 |
| 3 | 225 | 0.29 | 0.45 | 18.89 | 60.67 | 0.09 | . | 0.85 | 272 |
| 3 | 226 | 0.22 | 0.42 | 18.96 | 60.13 | 0.18 | . | 0.85 | 272 |
| 3 | 229 | 0.43 | 0.50 | 18.75 | 59.13 | 0.28 | . | 0.85 | 272 |
| 3 | 230 | 0.25 | 0.43 | 18.93 | 59.96 | 0.20 | . | 0.85 | 272 |
| 3 | 231 | 0.35 | 0.48 | 18.83 | 59.81 | 0.20 | . | 0.85 | 272 |
| 3 | 233 | 0.03 | 0.20 | 19.15 | 60.74 | 0.23 | . | 0.85 | 272 |
| 3 | 234 | 0.07 | 0.33 | 19.11 | 59.49 | 0.38 | . | 0.85 | 272 |
| 3 | 235 | 0.09 | 0.32 | 19.09 | 59.21 | 0.44 | . | 0.85 | 272 |
| 3 | 368 | 0.19 | 0.39 | 18.99 | 58.28 | 0.51 | . | 0.85 | 272 |
| 3 | 371 | 0.19 | 0.39 | 18.99 | 59.52 | 0.30 | . | 0.85 | 272 |
| 3 | 374 | 0.29 | 0.45 | 18.89 | 60.79 | 0.07 | . | 0.85 | 272 |
| 3 | 992 | 0.02 | 0.15 | 19.15 | 60.72 | 0.33 | . | 0.85 | 272 |
| 3 | 995 | 0.20 | 0.40 | 18.98 | 60.28 | 0.17 | . | 0.85 | 272 |
| 3 | 1035 | 0.25 | 0.43 | 18.93 | 59.64 | 0.25 | . | 0.85 | 272 |
| 3 | 1036 | 0.07 | 0.25 | 19.11 | 60.50 | 0.24 | . | 0.85 | 272 |
| 3 | 1303 | 0.11 | 0.31 | 19.07 | 60.79 | 0.12 | . | 0.85 | 272 |
| 3 | 1305 | 0.05 | 0.22 | 19.13 | 60.59 | 0.25 | . | 0.85 | 272 |
| 4 | 103 | 0.30 | 0.46 | 19.94 | 56.87 | 0.35 | . | 0.81 | 252 |
| 4 | 109 | 0.52 | 0.50 | 19.73 | 56.21 | 0.41 | . | 0.81 | 252 |
| 4 | 135 | 0.56 | 0.50 | 19.68 | 56.11 | 0.42 | . | 0.81 | 252 |
| 4 | 140 | 0.62 | 0.49 | 19.63 | 56.81 | 0.33 | . | 0.81 | 252 |
| 4 | 154 | 0.49 | 0.50 | 19.75 | 55.97 | 0.44 | . | 0.81 | 252 |
| 4 | 157 | 0.35 | 0.48 | 19.89 | 56.79 | 0.34 | . | 0.81 | 252 |
| 4 | 163 | 0.63 | 0.49 | 19.62 | 57.58 | 0.23 | . | 0.81 | 252 |
| 4 | 164 | 0.32 | 0.47 | 19.92 | 58.58 | 0.10 | . | 0.82 | 252 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 165 | 0.42 | 0.50 | 19.82 | 57.10 | 0.29 | . | 0.81 | 252 |
| 4 | 166 | 0.25 | 0.43 | 20.00 | 57.06 | 0.35 | . | 0.81 | 252 |
| 4 | 167 | 0.49 | 0.50 | 19.75 | 58.30 | 0.12 | . | 0.82 | 252 |
| 4 | 168 | 0.32 | 0.47 | 19.92 | 56.17 | 0.45 | . | 0.81 | 252 |
| 4 | 170 | 0.46 | 0.50 | 19.78 | 58.83 | 0.06 | . | 0.82 | 252 |
| 4 | 171 | 0.38 | 0.49 | 19.87 | 56.76 | 0.34 | . | 0.81 | 252 |
| 4 | 236 | 0.34 | 0.48 | 19.90 | 56.73 | 0.36 | . | 0.81 | 252 |
| 4 | 238 | 0.38 | 0.49 | 19.86 | 57.24 | 0.27 | . | 0.81 | 252 |
| 4 | 239 | 0.07 | 0.25 | 20.17 | 57.85 | 0.42 | . | 0.81 | 252 |
| 4 | 240 | 0.04 | 0.21 | 20.20 | 58.83 | 0.20 | . | 0.82 | 252 |
| 4 | 241 | 0.25 | 0.44 | 19.99 | 59.12 | 0.03 | . | 0.82 | 252 |
| 4 | 242 | 0.86 | 0.35 | 19.38 | 58.18 | 0.22 | . | 0.81 | 252 |
| 4 | 243 | 0.30 | 0.46 | 19.94 | 58.06 | 0.18 | . | 0.82 | 252 |
| 4 | 244 | 0.02 | 0.13 | 20.23 | 59.51 | -0.02 | . | 0.82 | 252 |
| 4 | 245 | 0.36 | 0.48 | 19.88 | 57.23 | 0.28 | . | 0.81 | 252 |
| 4 | 246 | 0.24 | 0.43 | 20.00 | 57.39 | 0.30 | . | 0.81 | 252 |
| 4 | 247 | 0.33 | 0.47 | 19.92 | 57.60 | 0.24 | . | 0.81 | 252 |
| 4 | 249 | 0.35 | 0.48 | 19.89 | 57.64 | 0.23 | . | 0.81 | 252 |
| 4 | 250 | 0.36 | 0.48 | 19.88 | 56.47 | 0.39 | . | 0.81 | 252 |
| 4 | 252 | 0.03 | 0.17 | 20.21 | 58.60 | 0.35 | . | 0.81 | 252 |
| 4 | 253 | 0.22 | 0.42 | 20.02 | 58.42 | 0.14 | . | 0.82 | 252 |
| 4 | 254 | 0.31 | 0.46 | 19.93 | 58.33 | 0.14 | . | 0.82 | 252 |
| 4 | 256 | 0.31 | 0.47 | 19.93 | 57.38 | 0.27 | . | 0.81 | 252 |
| 4 | 257 | 0.26 | 0.44 | 19.98 | 58.30 | 0.15 | . | 0.82 | 252 |
| 4 | 258 | 0.42 | 0.49 | 19.83 | 57.95 | 0.17 | . | 0.82 | 252 |
| 4 | 259 | 0.27 | 0.44 | 19.98 | 58.23 | 0.16 | . | 0.82 | 252 |
| 4 | 261 | 0.25 | 0.43 | 20.00 | 57.57 | 0.27 | . | 0.81 | 252 |
| 4 | 262 | 1.06 | 0.80 | 19.18 | 54.76 | 0.35 | . | 0.81 | 252 |
| 4 | 263 | 0.42 | 0.50 | 19.82 | 57.57 | 0.22 | . | 0.81 | 252 |
| 4 | 264 | 0.32 | 0.47 | 19.92 | 59.67 | -0.05 | . | 0.82 | 252 |
| 4 | 265 | 0.54 | 0.50 | 19.70 | 59.05 | 0.03 | . | 0.82 | 252 |
| 4 | 267 | 0.57 | 0.50 | 19.67 | 55.79 | 0.47 | . | 0.81 | 252 |
| 4 | 268 | 0.60 | 0.49 | 19.64 | 58.81 | 0.06 | . | 0.82 | 252 |
| 4 | 271 | 0.46 | 0.50 | 19.78 | 56.67 | 0.34 | . | 0.81 | 252 |
| 4 | 274 | 0.39 | 0.49 | 19.85 | 57.39 | 0.25 | . | 0.81 | 252 |
| 4 | 276 | 0.27 | 0.45 | 19.97 | 57.87 | 0.21 | . | 0.81 | 252 |
| 4 | 277 | 0.36 | 0.48 | 19.88 | 56.60 | 0.37 | . | 0.81 | 252 |
| 4 | 278 | 0.25 | 0.43 | 20.00 | 58.19 | 0.17 | . | 0.82 | 252 |
| 4 | 373 | 0.29 | 0.46 | 19.95 | 58.63 | 0.10 | . | 0.82 | 252 |
| 4 | 375 | 0.58 | 0.65 | 19.66 | 55.37 | 0.39 | . | 0.81 | 252 |
| 4 | 377 | 0.34 | 0.47 | 19.90 | 56.43 | 0.40 | . | 0.81 | 252 |
| 4 | 378 | 0.39 | 0.49 | 19.85 | 55.69 | 0.49 | . | 0.81 | 252 |
| 4 | 1005 | 0.52 | 0.50 | 19.73 | 56.14 | 0.42 | . | 0.81 | 252 |
| 4 | 1006 | 0.27 | 0.45 | 19.97 | 58.69 | 0.09 | . | 0.82 | 252 |
| 4 | 1007 | 0.27 | 0.45 | 19.97 | 59.82 | -0.08 | . | 0.82 | 252 |
| 4 | 1009 | 0.27 | 0.44 | 19.98 | 57.27 | 0.30 | . | 0.81 | 252 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 1010 | 0.02 | 0.14 | 20.22 | 59.10 | 0.18 | . | 0.82 | 252 |
| 5 | 412 | 0.24 | 0.43 | 20.14 | 68.06 | 0.51 | . | 0.81 | 246 |
| 5 | 413 | 0.58 | 0.49 | 19.79 | 68.65 | 0.36 | . | 0.82 | 246 |
| 5 | 414 | 0.87 | 1.27 | 19.51 | 64.24 | 0.29 | . | 0.83 | 246 |
| 5 | 415 | 0.43 | 0.50 | 19.94 | 69.60 | 0.24 | . | 0.82 | 246 |
| 5 | 416 | 0.42 | 0.50 | 19.95 | 67.88 | 0.46 | . | 0.81 | 246 |
| 5 | 417 | 0.09 | 0.29 | 20.28 | 70.18 | 0.33 | . | 0.82 | 246 |
| 5 | 419 | 0.22 | 0.41 | 20.16 | 71.37 | 0.05 | . | 0.82 | 246 |
| 5 | 420 | 0.03 | 0.17 | 20.35 | 71.30 | 0.19 | . | 0.82 | 246 |
| 5 | 421 | 0.61 | 0.49 | 19.76 | 69.59 | 0.25 | . | 0.82 | 246 |
| 5 | 422 | 0.42 | 0.50 | 19.95 | 68.97 | 0.32 | . | 0.82 | 246 |
| 5 | 424 | 0.43 | 0.50 | 19.94 | 70.45 | 0.14 | . | 0.82 | 246 |
| 5 | 425 | 0.36 | 0.48 | 20.01 | 70.99 | 0.08 | . | 0.82 | 246 |
| 5 | 426 | 0.31 | 0.47 | 20.06 | 69.85 | 0.23 | . | 0.82 | 246 |
| 5 | 428 | 0.26 | 0.44 | 20.11 | 70.95 | 0.10 | . | 0.82 | 246 |
| 5 | 429 | 0.24 | 0.43 | 20.14 | 70.60 | 0.15 | . | 0.82 | 246 |
| 5 | 431 | 0.43 | 0.50 | 19.94 | 67.83 | 0.46 | . | 0.81 | 246 |
| 5 | 432 | 0.23 | 0.42 | 20.14 | 71.05 | 0.09 | . | 0.82 | 246 |
| 5 | 433 | 0.72 | 0.45 | 19.65 | 69.02 | 0.35 | . | 0.82 | 246 |
| 5 | 434 | 0.40 | 0.49 | 19.98 | 69.55 | 0.25 | . | 0.82 | 246 |
| 5 | 435 | 0.65 | 0.95 | 19.73 | 64.25 | 0.44 | . | 0.81 | 246 |
| 5 | 436 | 0.28 | 0.45 | 20.09 | 69.66 | 0.26 | . | 0.82 | 246 |
| 5 | 437 | 0.32 | 0.47 | 20.05 | 70.65 | 0.12 | . | 0.82 | 246 |
| 5 | 439 | 0.30 | 0.46 | 20.08 | 69.21 | 0.32 | . | 0.82 | 246 |
| 5 | 440 | 0.12 | 0.32 | 20.26 | 71.60 | 0.03 | . | 0.82 | 246 |
| 5 | 441 | 0.61 | 0.49 | 19.76 | 68.95 | 0.33 | . | 0.82 | 246 |
| 5 | 442 | 0.27 | 0.44 | 20.11 | 70.55 | 0.15 | . | 0.82 | 246 |
| 5 | 443 | 0.23 | 0.42 | 20.15 | 70.32 | 0.19 | . | 0.82 | 246 |
| 5 | 444 | 0.52 | 0.50 | 19.86 | 70.47 | 0.14 | . | 0.82 | 246 |
| 5 | 445 | 0.23 | 0.42 | 20.15 | 69.13 | 0.36 | . | 0.82 | 246 |
| 5 | 446 | 0.49 | 0.50 | 19.89 | 70.15 | 0.17 | . | 0.82 | 246 |
| 5 | 448 | 0.40 | 0.49 | 19.98 | 69.30 | 0.28 | . | 0.82 | 246 |
| 5 | 449 | 0.19 | 0.39 | 20.18 | 70.51 | 0.18 | . | 0.82 | 246 |
| 5 | 450 | 0.33 | 0.47 | 20.05 | 69.39 | 0.29 | . | 0.82 | 246 |
| 5 | 451 | 0.37 | 0.49 | 20.00 | 68.60 | 0.38 | . | 0.82 | 246 |
| 5 | 452 | 0.40 | 0.49 | 19.97 | 71.05 | 0.07 | . | 0.82 | 246 |
| 5 | 453 | 0.18 | 0.38 | 20.20 | 69.34 | 0.37 | . | 0.82 | 246 |
| 5 | 454 | 0.31 | 0.46 | 20.07 | 68.89 | 0.36 | . | 0.82 | 246 |
| 5 | 455 | 0.38 | 0.49 | 19.99 | 70.01 | 0.20 | . | 0.82 | 246 |
| 5 | 456 | 0.39 | 0.49 | 19.98 | 68.57 | 0.38 | . | 0.82 | 246 |
| 5 | 457 | 0.46 | 0.50 | 19.92 | 70.12 | 0.18 | . | 0.82 | 246 |
| 5 | 458 | 0.77 | 0.42 | 19.60 | 71.43 | 0.03 | . | 0.82 | 246 |
| 5 | 459 | 0.18 | 0.38 | 20.20 | 70.18 | 0.24 | . | 0.82 | 246 |
| 5 | 460 | 0.66 | 0.48 | 19.72 | 69.14 | 0.32 | . | 0.82 | 246 |
| 5 | 462 | 0.24 | 0.43 | 20.13 | 70.71 | 0.13 | . | 0.82 | 246 |
| 5 | 463 | 0.23 | 0.55 | 20.14 | 67.10 | 0.50 | . | 0.81 | 246 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 464 | 0.29 | 0.52 | 20.09 | 67.59 | 0.47 | . | 0.81 | 246 |
| 5 | 1058 | 0.32 | 0.47 | 20.06 | 70.21 | 0.18 | . | 0.82 | 246 |
| 5 | 1093 | 0.07 | 0.33 | 20.30 | 70.40 | 0.24 | . | 0.82 | 246 |
| 5 | 1121 | 0.36 | 0.48 | 20.02 | 70.44 | 0.15 | . | 0.82 | 246 |
| 5 | 1128 | 0.60 | 0.49 | 19.77 | 70.24 | 0.17 | . | 0.82 | 246 |
| 5 | 1130 | 0.43 | 0.50 | 19.94 | 67.86 | 0.46 | . | 0.81 | 246 |
| 5 | 1136 | 0.32 | 0.47 | 20.05 | 71.69 | -0.01 | . | 0.83 | 246 |
| 5 | 1187 | 0.38 | 0.49 | 20.00 | 68.68 | 0.36 | . | 0.82 | 246 |
| 5 | 1202 | 0.24 | 0.43 | 20.13 | 69.19 | 0.35 | . | 0.82 | 246 |
| 5 | 1217 | 0.11 | 0.32 | 20.26 | 71.69 | 0.01 | . | 0.82 | 246 |
| 5 | 1223 | 0.15 | 0.36 | 20.22 | 70.81 | 0.15 | . | 0.82 | 246 |
| 5 | 1229 | 0.13 | 0.33 | 20.25 | 69.40 | 0.42 | . | 0.82 | 246 |
| 5 | 1232 | 0.15 | 0.36 | 20.22 | 69.92 | 0.30 | . | 0.82 | 246 |
| 6 | 466 | 0.11 | 0.32 | 17.01 | 95.83 | 0.03 | . | 0.88 | 162 |
| 6 | 468 | 0.38 | 0.49 | 16.74 | 90.99 | 0.53 | . | 0.87 | 162 |
| 6 | 469 | 0.90 | 1.15 | 16.22 | 81.74 | 0.63 | . | 0.87 | 162 |
| 6 | 470 | 0.14 | 0.35 | 16.98 | 94.28 | 0.26 | . | 0.87 | 162 |
| 6 | 476 | 0.11 | 0.32 | 17.01 | 96.27 | -0.04 | . | 0.88 | 162 |
| 6 | 478 | 0.36 | 0.48 | 16.77 | 92.73 | 0.34 | . | 0.87 | 162 |
| 6 | 480 | 0.27 | 0.44 | 16.86 | 93.69 | 0.26 | . | 0.87 | 162 |
| 6 | 482 | 0.02 | 0.16 | 17.10 | 95.32 | 0.26 | . | 0.88 | 162 |
| 6 | 484 | 0.15 | 0.36 | 16.97 | 93.73 | 0.32 | . | 0.87 | 162 |
| 6 | 487 | 0.22 | 0.42 | 16.90 | 96.55 | -0.07 | . | 0.88 | 162 |
| 6 | 490 | 0.30 | 0.46 | 16.82 | 93.54 | 0.27 | . | 0.87 | 162 |
| 6 | 491 | 0.61 | 0.80 | 16.51 | 86.80 | 0.59 | . | 0.87 | 162 |
| 6 | 495 | 0.38 | 0.49 | 16.74 | 93.88 | 0.21 | . | 0.88 | 162 |
| 6 | 499 | 0.21 | 0.41 | 16.91 | 94.68 | 0.16 | . | 0.88 | 162 |
| 6 | 502 | 0.38 | 0.56 | 16.74 | 89.75 | 0.57 | . | 0.87 | 162 |
| 6 | 509 | 0.42 | 0.50 | 16.70 | 92.71 | 0.33 | . | 0.87 | 162 |
| 6 | 512 | 0.17 | 0.38 | 16.95 | 95.33 | 0.09 | . | 0.88 | 162 |
| 6 | 514 | 0.43 | 0.50 | 16.70 | 93.95 | 0.20 | . | 0.88 | 162 |
| 6 | 515 | 0.37 | 0.48 | 16.75 | 93.43 | 0.26 | . | 0.87 | 162 |
| 6 | 517 | 0.28 | 0.45 | 16.85 | 92.55 | 0.39 | . | 0.87 | 162 |
| 6 | 520 | 0.23 | 0.42 | 16.90 | 95.16 | 0.10 | . | 0.88 | 162 |
| 6 | 521 | 0.20 | 0.40 | 16.92 | 96.52 | -0.07 | . | 0.88 | 162 |
| 6 | 524 | 0.06 | 0.24 | 17.06 | 95.25 | 0.18 | . | 0.88 | 162 |
| 6 | 526 | 0.37 | 0.48 | 16.75 | 93.98 | 0.21 | . | 0.88 | 162 |
| 6 | 534 | 0.18 | 0.39 | 16.94 | 93.80 | 0.29 | . | 0.87 | 162 |
| 6 | 535 | 0.46 | 0.50 | 16.67 | 92.36 | 0.37 | . | 0.87 | 162 |
| 6 | 537 | 0.44 | 0.50 | 16.68 | 92.63 | 0.34 | . | 0.87 | 162 |
| 6 | 545 | 0.25 | 0.43 | 16.88 | 93.31 | 0.32 | . | 0.87 | 162 |
| 6 | 550 | 0.38 | 0.49 | 16.74 | 91.75 | 0.44 | . | 0.87 | 162 |
| 6 | 551 | 0.30 | 0.46 | 16.83 | 93.80 | 0.24 | . | 0.87 | 162 |
| 6 | 553 | 0.27 | 0.44 | 16.86 | 93.51 | 0.28 | . | 0.87 | 162 |
| 6 | 563 | 0.35 | 0.48 | 16.77 | 92.89 | 0.33 | . | 0.87 | 162 |
| 6 | 567 | 0.35 | 0.48 | 16.77 | 93.35 | 0.28 | . | 0.87 | 162 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 568 | 0.46 | 0.50 | 16.67 | 92.67 | 0.33 | . | 0.87 | 162 |
| 6 | 570 | 0.06 | 0.23 | 17.07 | 94.03 | 0.46 | . | 0.87 | 162 |
| 6 | 571 | 0.64 | 0.48 | 16.48 | 92.31 | 0.39 | . | 0.87 | 162 |
| 6 | 572 | 0.28 | 0.45 | 16.84 | 93.89 | 0.23 | . | 0.88 | 162 |
| 6 | 574 | 0.32 | 0.47 | 16.80 | 92.09 | 0.43 | . | 0.87 | 162 |
| 6 | 575 | 0.06 | 0.24 | 17.06 | 94.33 | 0.37 | . | 0.87 | 162 |
| 6 | 577 | 0.12 | 0.32 | 17.01 | 96.49 | -0.07 | . | 0.88 | 162 |
| 6 | 578 | 0.31 | 0.46 | 16.81 | 93.25 | 0.30 | . | 0.87 | 162 |
| 6 | 579 | 0.31 | 0.47 | 16.81 | 93.36 | 0.28 | . | 0.87 | 162 |
| 6 | 580 | 0.23 | 0.42 | 16.90 | 95.60 | 0.04 | . | 0.88 | 162 |
| 6 | 581 | 0.22 | 0.42 | 16.90 | 92.14 | 0.48 | . | 0.87 | 162 |
| 6 | 585 | 0.03 | 0.17 | 17.09 | 95.56 | 0.16 | . | 0.88 | 162 |
| 6 | 1062 | 0.32 | 0.69 | 16.80 | 86.01 | 0.75 | . | 0.87 | 162 |
| 6 | 1063 | 0.41 | 0.49 | 16.72 | 92.83 | 0.32 | . | 0.87 | 162 |
| 6 | 1101 | 0.41 | 0.49 | 16.72 | 93.25 | 0.28 | . | 0.87 | 162 |
| 6 | 1131 | 0.72 | 1.14 | 16.41 | 79.88 | 0.73 | . | 0.86 | 162 |
| 6 | 1142 | 0.43 | 0.50 | 16.70 | 92.29 | 0.38 | . | 0.87 | 162 |
| 6 | 1200 | 0.31 | 0.47 | 16.81 | 93.92 | 0.22 | . | 0.88 | 162 |
| 6 | 1203 | 0.44 | 0.50 | 16.68 | 92.67 | 0.34 | . | 0.87 | 162 |
| 6 | 1225 | 0.06 | 0.23 | 17.07 | 95.06 | 0.23 | . | 0.88 | 162 |
| 6 | 1251 | 0.08 | 0.27 | 17.04 | 93.22 | 0.54 | . | 0.87 | 162 |
| 6 | 1253 | 0.20 | 0.40 | 16.93 | 92.37 | 0.47 | . | 0.87 | 162 |
| 6 | 1254 | 0.44 | 0.50 | 16.69 | 92.98 | 0.30 | . | 0.87 | 162 |
| 6 | 1256 | 0.20 | 0.40 | 16.92 | 94.60 | 0.18 | . | 0.88 | 162 |
| 7 | 467 | 0.12 | 0.32 | 13.37 | 30.37 | 0.04 | . | 0.69 | 161 |
| 7 | 471 | 0.06 | 0.24 | 13.43 | 30.16 | 0.15 | . | 0.69 | 161 |
| 7 | 474 | 0.14 | 0.35 | 13.35 | 30.23 | 0.07 | . | 0.69 | 161 |
| 7 | 475 | 0.14 | 0.35 | 13.35 | 29.53 | 0.26 | . | 0.68 | 161 |
| 7 | 477 | 0.13 | 0.34 | 13.36 | 30.56 | -0.02 | . | 0.69 | 161 |
| 7 | 479 | 0.16 | 0.37 | 13.33 | 29.61 | 0.22 | . | 0.68 | 161 |
| 7 | 481 | 0.45 | 0.72 | 13.04 | 27.24 | 0.38 | . | 0.67 | 161 |
| 7 | 483 | 0.17 | 0.38 | 13.32 | 30.77 | -0.07 | . | 0.70 | 161 |
| 7 | 485 | 0.22 | 0.41 | 13.27 | 30.00 | 0.10 | . | 0.69 | 161 |
| 7 | 486 | 0.27 | 0.44 | 13.22 | 30.50 | -0.02 | . | 0.69 | 161 |
| 7 | 488 | 0.22 | 0.41 | 13.27 | 30.10 | 0.08 | . | 0.69 | 161 |
| 7 | 489 | 0.33 | 0.47 | 13.16 | 29.02 | 0.27 | . | 0.68 | 161 |
| 7 | 492 | 0.20 | 0.40 | 13.29 | 29.00 | 0.34 | . | 0.68 | 161 |
| 7 | 493 | 0.24 | 0.43 | 13.25 | 30.06 | 0.08 | . | 0.69 | 161 |
| 7 | 494 | 0.30 | 0.46 | 13.19 | 29.27 | 0.23 | . | 0.68 | 161 |
| 7 | 496 | 0.34 | 0.47 | 13.16 | 29.34 | 0.20 | . | 0.68 | 161 |
| 7 | 498 | 0.35 | 0.48 | 13.14 | 28.49 | 0.37 | . | 0.67 | 161 |
| 7 | 501 | 0.02 | 0.16 | 13.47 | 30.38 | 0.12 | . | 0.69 | 161 |
| 7 | 503 | 0.30 | 0.46 | 13.19 | 30.04 | 0.07 | . | 0.69 | 161 |
| 7 | 505 | 0.32 | 0.47 | 13.17 | 30.89 | -0.10 | . | 0.70 | 161 |
| 7 | 506 | 0.24 | 0.43 | 13.25 | 30.73 | -0.06 | . | 0.70 | 161 |
| 7 | 508 | 0.52 | 0.50 | 12.97 | 29.52 | 0.16 | . | 0.69 | 161 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 511 | 0.22 | 0.41 | 13.27 | 30.26 | 0.04 | . | 0.69 | 161 |
| 7 | 513 | 0.02 | 0.14 | 13.47 | 30.25 | 0.23 | . | 0.69 | 161 |
| 7 | 516 | 0.10 | 0.30 | 13.39 | 29.32 | 0.37 | . | 0.68 | 161 |
| 7 | 522 | 0.14 | 0.35 | 13.35 | 29.07 | 0.38 | . | 0.68 | 161 |
| 7 | 523 | 0.43 | 0.50 | 13.06 | 28.43 | 0.37 | . | 0.67 | 161 |
| 7 | 525 | 0.34 | 0.47 | 13.16 | 29.34 | 0.20 | . | 0.68 | 161 |
| 7 | 527 | 0.22 | 0.41 | 13.27 | 28.44 | 0.45 | . | 0.67 | 161 |
| 7 | 533 | 0.27 | 0.45 | 13.22 | 29.07 | 0.28 | . | 0.68 | 161 |
| 7 | 536 | 0.47 | 0.50 | 13.02 | 28.62 | 0.33 | . | 0.67 | 161 |
| 7 | 540 | 0.26 | 0.44 | 13.23 | 29.10 | 0.28 | . | 0.68 | 161 |
| 7 | 541 | 0.44 | 0.50 | 13.05 | 28.69 | 0.32 | . | 0.68 | 161 |
| 7 | 543 | 0.14 | 0.35 | 13.35 | 30.41 | 0.02 | . | 0.69 | 161 |
| 7 | 547 | 0.42 | 0.73 | 13.07 | 27.01 | 0.40 | . | 0.67 | 161 |
| 7 | 549 | 0.20 | 0.41 | 13.29 | 30.08 | 0.08 | . | 0.69 | 161 |
| 7 | 552 | 0.09 | 0.28 | 13.40 | 29.96 | 0.19 | . | 0.68 | 161 |
| 7 | 555 | 0.01 | 0.08 | 13.48 | 30.49 | 0.14 | . | 0.69 | 161 |
| 7 | 557 | 0.42 | 0.49 | 13.07 | 29.73 | 0.12 | . | 0.69 | 161 |
| 7 | 559 | 0.25 | 0.43 | 13.24 | 30.14 | 0.06 | . | 0.69 | 161 |
| 7 | 561 | 0.22 | 0.42 | 13.27 | 29.35 | 0.24 | . | 0.68 | 161 |
| 7 | 562 | 0.65 | 0.70 | 12.84 | 28.23 | 0.25 | . | 0.68 | 161 |
| 7 | 564 | 0.21 | 0.41 | 13.28 | 29.74 | 0.16 | . | 0.69 | 161 |
| 7 | 565 | 0.31 | 0.46 | 13.18 | 29.81 | 0.12 | . | 0.69 | 161 |
| 7 | 616 | 0.47 | 0.50 | 13.02 | 29.81 | 0.10 | . | 0.69 | 161 |
| 7 | 1065 | 0.39 | 0.49 | 13.10 | 29.05 | 0.25 | . | 0.68 | 161 |
| 7 | 1066 | 0.03 | 0.17 | 13.46 | 30.36 | 0.12 | . | 0.69 | 161 |
| 7 | 1134 | 0.43 | 0.50 | 13.06 | 30.57 | -0.04 | . | 0.70 | 161 |
| 7 | 1234 | 0.26 | 0.44 | 13.23 | 30.94 | -0.11 | . | 0.70 | 161 |
| 7 | 1237 | 0.12 | 0.32 | 13.37 | 29.47 | 0.30 | . | 0.68 | 161 |
| 7 | 1241 | 0.34 | 0.48 | 13.15 | 29.44 | 0.18 | . | 0.68 | 161 |
| 7 | 1244 | 0.11 | 0.32 | 13.38 | 30.37 | 0.04 | . | 0.69 | 161 |
| 7 | 1247 | 0.03 | 0.17 | 13.46 | 30.66 | -0.04 | . | 0.69 | 161 |
| 7 | 1252 | 0.01 | 0.11 | 13.48 | 30.54 | 0.05 | . | 0.69 | 161 |
| 7 | 1259 | 0.20 | 0.41 | 13.29 | 29.86 | 0.13 | . | 0.69 | 161 |
| 7 | 1264 | 0.03 | 0.17 | 13.46 | 30.66 | -0.04 | . | 0.69 | 161 |
| 8 | 529 | 0.18 | 0.38 | 13.73 | 33.06 | 0.27 | . | 0.72 | 135 |
| 8 | 530 | 0.34 | 0.48 | 13.57 | 34.53 | -0.07 | . | 0.74 | 135 |
| 8 | 531 | 0.17 | 0.38 | 13.74 | 33.49 | 0.17 | . | 0.72 | 135 |
| 8 | 532 | 0.26 | 0.44 | 13.65 | 33.81 | 0.08 | . | 0.73 | 135 |
| 8 | 542 | 0.04 | 0.21 | 13.87 | 34.58 | -0.09 | . | 0.73 | 135 |
| 8 | 544 | 0.22 | 0.42 | 13.69 | 34.56 | -0.07 | . | 0.73 | 135 |
| 8 | 548 | 0.04 | 0.19 | 13.87 | 33.96 | 0.18 | . | 0.73 | 135 |
| 8 | 556 | 0.13 | 0.34 | 13.78 | 33.29 | 0.25 | . | 0.72 | 135 |
| 8 | 566 | 0.24 | 0.43 | 13.67 | 32.58 | 0.34 | . | 0.72 | 135 |
| 8 | 569 | 0.20 | 0.40 | 13.71 | 32.80 | 0.31 | . | 0.72 | 135 |
| 8 | 573 | 0.23 | 0.42 | 13.68 | 33.52 | 0.14 | . | 0.73 | 135 |
| 8 | 576 | 0.08 | 0.28 | 13.83 | 34.38 | -0.02 | . | 0.73 | 135 |

| Grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 582 | 0.22 | 0.44 | 13.69 | 33.29 | 0.18 | . | 0.72 | 135 |
| 8 | 583 | 0.41 | 0.54 | 13.50 | 31.07 | 0.51 | . | 0.71 | 135 |
| 8 | 584 | 0.27 | 0.45 | 13.64 | 32.80 | 0.27 | . | 0.72 | 135 |
| 8 | 586 | 0.29 | 0.46 | 13.62 | 34.37 | -0.03 | . | 0.73 | 135 |
| 8 | 588 | 0.04 | 0.21 | 13.87 | 34.12 | 0.10 | . | 0.73 | 135 |
| 8 | 589 | 0.38 | 0.49 | 13.53 | 33.59 | 0.10 | . | 0.73 | 135 |
| 8 | 590 | 0.10 | 0.31 | 13.81 | 32.58 | 0.49 | . | 0.71 | 135 |
| 8 | 591 | 0.07 | 0.25 | 13.84 | 33.67 | 0.23 | . | 0.72 | 135 |
| 8 | 592 | 0.27 | 0.45 | 13.64 | 33.47 | 0.14 | . | 0.73 | 135 |
| 8 | 593 | 0.28 | 0.45 | 13.63 | 34.61 | -0.08 | . | 0.74 | 135 |
| 8 | 594 | 0.36 | 0.48 | 13.56 | 33.77 | 0.07 | . | 0.73 | 135 |
| 8 | 596 | 0.39 | 0.49 | 13.52 | 33.31 | 0.15 | . | 0.73 | 135 |
| 8 | 597 | 0.37 | 0.49 | 13.54 | 31.94 | 0.41 | . | 0.71 | 135 |
| 8 | 598 | 0.34 | 0.48 | 13.57 | 34.90 | -0.13 | . | 0.74 | 135 |
| 8 | 599 | 0.22 | 0.42 | 13.69 | 33.22 | 0.21 | . | 0.72 | 135 |
| 8 | 600 | 0.47 | 0.50 | 13.44 | 32.77 | 0.24 | . | 0.72 | 135 |
| 8 | 601 | 0.18 | 0.38 | 13.73 | 33.29 | 0.22 | . | 0.72 | 135 |
| 8 | 602 | 0.19 | 0.39 | 13.73 | 33.50 | 0.17 | . | 0.73 | 135 |
| 8 | 603 | 0.47 | 0.50 | 13.44 | 32.99 | 0.20 | . | 0.72 | 135 |
| 8 | 604 | 0.30 | 0.46 | 13.61 | 33.88 | 0.06 | . | 0.73 | 135 |
| 8 | 607 | 0.27 | 0.45 | 13.64 | 33.99 | 0.04 | . | 0.73 | 135 |
| 8 | 608 | 0.40 | 0.49 | 13.51 | 33.49 | 0.12 | . | 0.73 | 135 |
| 8 | 611 | 0.53 | 0.50 | 13.39 | 33.02 | 0.20 | . | 0.72 | 135 |
| 8 | 612 | 0.21 | 0.41 | 13.70 | 32.15 | 0.45 | . | 0.71 | 135 |
| 8 | 613 | 0.44 | 0.67 | 13.47 | 30.94 | 0.41 | . | 0.71 | 135 |
| 8 | 614 | 0.39 | 0.49 | 13.53 | 32.34 | 0.33 | . | 0.72 | 135 |
| 8 | 615 | 0.13 | 0.34 | 13.78 | 33.83 | 0.11 | . | 0.73 | 135 |
| 8 | 617 | 0.21 | 0.41 | 13.70 | 33.52 | 0.15 | . | 0.73 | 135 |
| 8 | 618 | 0.63 | 0.49 | 13.28 | 32.85 | 0.24 | . | 0.72 | 135 |
| 8 | 620 | 0.01 | 0.12 | 13.90 | 34.39 | -0.01 | . | 0.73 | 135 |
| 8 | 621 | 0.50 | 0.50 | 13.41 | 33.54 | 0.10 | . | 0.73 | 135 |
| 8 | 1135 | 0.19 | 0.55 | 13.72 | 32.00 | 0.34 | . | 0.72 | 135 |
| 8 | 1138 | 0.04 | 0.23 | 13.87 | 33.86 | 0.19 | . | 0.73 | 135 |
| 8 | 1140 | 0.04 | 0.19 | 13.87 | 33.92 | 0.20 | . | 0.73 | 135 |
| 8 | 1141 | 0.39 | 0.49 | 13.53 | 32.03 | 0.39 | . | 0.71 | 135 |
| 8 | 1218 | 0.03 | 0.17 | 13.88 | 34.12 | 0.12 | . | 0.73 | 135 |
| 8 | 1228 | 0.28 | 0.45 | 13.63 | 33.19 | 0.19 | . | 0.72 | 135 |
| 8 | 1230 | 0.25 | 0.44 | 13.66 | 33.57 | 0.13 | . | 0.73 | 135 |
| 8 | 1236 | 0.21 | 0.41 | 13.70 | 34.36 | -0.03 | . | 0.73 | 135 |
| 8 | 1268 | 0.04 | 0.19 | 13.87 | 33.90 | 0.21 | . | 0.73 | 135 |
| 8 | 1269 | 0.34 | 0.48 | 13.57 | 32.26 | 0.35 | . | 0.72 | 135 |
| 8 | 1270 | 0.21 | 0.41 | 13.70 | 32.88 | 0.29 | . | 0.72 | 135 |
| 8 | 1273 | 0.18 | 0.38 | 13.73 | 33.50 | 0.17 | . | 0.72 | 135 |
| 8 | 1274 | 0.23 | 0.42 | 13.68 | 31.80 | 0.51 | . | 0.71 | 135 |

## Appendix Table C.3: 2021 HLA CTT Statistics

| grade | Item | Mean | Std. Deviation | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Correlation | Squared Multiple Correlation | Cronbach's Alpha if Deleted | N |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1331 | 0.71 | 0.88 | 18.24 | 62.53 | 0.58 | . | 0.81 | 251 |
| 5 | 1348 | 0.14 | 0.35 | 18.81 | 72.42 | -0.21 | . | 0.83 | 251 |
| 5 | 1326 | 0.31 | 0.46 | 18.65 | 70.49 | 0.08 | . | 0.82 | 251 |
| 5 | 1325 | 0.43 | 0.50 | 18.53 | 68.39 | 0.33 | . | 0.82 | 251 |
| 5 | 1332 | 0.43 | 0.50 | 18.52 | 68.32 | 0.34 | . | 0.82 | 251 |
| 5 | 1353 | 0.07 | 0.25 | 18.88 | 70.93 | 0.08 | . | 0.82 | 251 |
| 5 | 1368 | 0.12 | 0.33 | 18.83 | 69.80 | 0.26 | . | 0.82 | 251 |
| 5 | 1347 | 0.56 | 0.50 | 18.39 | 70.93 | 0.02 | . | 0.83 | 251 |
| 5 | 1340 | 0.14 | 0.35 | 18.81 | 70.97 | 0.04 | . | 0.82 | 251 |
| 5 | 1362 | 0.49 | 0.50 | 18.46 | 67.99 | 0.37 | . | 0.82 | 251 |
| 5 | 1319 | 0.25 | 0.44 | 18.70 | 72.04 | -0.12 | . | 0.83 | 251 |
| 5 | 1318 | 0.19 | 0.39 | 18.76 | 67.65 | 0.54 | . | 0.82 | 251 |
| 5 | 1354 | 0.23 | 0.42 | 18.73 | 68.91 | 0.32 | . | 0.82 | 251 |
| 5 | 1341 | 1.00 | 1.05 | 17.96 | 60.63 | 0.59 | . | 0.81 | 251 |
| 5 | 1321 | 0.67 | 0.47 | 18.28 | 69.64 | 0.19 | . | 0.82 | 251 |
| 5 | 1330 | 0.35 | 0.48 | 18.61 | 69.37 | 0.22 | . | 0.82 | 251 |
| 5 | 1356 | 1.19 | 0.75 | 17.76 | 64.73 | 0.50 | . | 0.81 | 251 |
| 5 | 1371 | 0.45 | 0.50 | 18.51 | 68.19 | 0.35 | . | 0.82 | 251 |
| 5 | 1374 | 0.26 | 0.44 | 18.69 | 72.17 | -0.14 | . | 0.83 | 251 |
| 5 | 1329 | 0.39 | 0.49 | 18.56 | 68.10 | 0.37 | . | 0.82 | 251 |
| 5 | 1350 | 0.49 | 0.89 | 18.46 | 62.84 | 0.55 | . | 0.81 | 251 |
| 5 | 1322 | 0.69 | 0.47 | 18.27 | 67.76 | 0.44 | . | 0.82 | 251 |
| 5 | 1363 | 0.10 | 0.31 | 18.85 | 70.92 | 0.06 | . | 0.82 | 251 |
| 5 | 1367 | 0.42 | 0.49 | 18.53 | 69.57 | 0.18 | . | 0.82 | 251 |
| 5 | 1336 | 0.39 | 0.49 | 18.56 | 69.48 | 0.20 | . | 0.82 | 251 |
| 5 | 1323 | 0.53 | 0.50 | 18.43 | 68.05 | 0.37 | . | 0.82 | 251 |
| 5 | 1364 | 0.17 | 0.38 | 18.78 | 69.67 | 0.24 | . | 0.82 | 251 |
| 5 | 1357 | 0.09 | 0.28 | 18.86 | 70.32 | 0.20 | . | 0.82 | 251 |
| 5 | 1360 | 0.05 | 0.21 | 18.90 | 70.10 | 0.33 | . | 0.82 | 251 |
| 5 | 1346 | 0.12 | 0.33 | 18.83 | 71.40 | -0.03 | . | 0.83 | 251 |
| 5 | 1315 | 0.53 | 0.88 | 18.42 | 63.25 | 0.52 | . | 0.81 | 251 |
| 5 | 1317 | 0.52 | 0.50 | 18.43 | 69.26 | 0.22 | . | 0.82 | 251 |
| 5 | 1333 | 0.31 | 0.47 | 18.64 | 70.74 | 0.05 | . | 0.83 | 251 |
| 5 | 1351 | 0.31 | 0.47 | 18.64 | 68.95 | 0.28 | . | 0.82 | 251 |
| 5 | 1337 | 0.29 | 0.45 | 18.67 | 71.37 | -0.03 | . | 0.83 | 251 |
| 5 | 1338 | 0.27 | 0.45 | 18.68 | 69.79 | 0.18 | . | 0.82 | 251 |
| 5 | 1339 | 0.25 | 0.44 | 18.70 | 70.15 | 0.14 | . | 0.82 | 251 |
| 5 | 1369 | 0.12 | 0.33 | 18.83 | 70.19 | 0.19 | . | 0.82 | 251 |
| 5 | 1327 | 0.30 | 0.46 | 18.65 | 69.82 | 0.17 | . | 0.82 | 251 |
| 5 | 1365 | 0.19 | 0.39 | 18.76 | 69.76 | 0.21 | . | 0.82 | 251 |
| 5 | 1320 | 0.10 | 0.30 | 18.86 | 71.11 | 0.03 | . | 0.82 | 251 |
| 5 | 1372 | 0.42 | 0.85 | 18.53 | 63.27 | 0.54 | . | 0.81 | 251 |
| 5 | 1344 | 0.38 | 0.49 | 18.57 | 70.99 | 0.01 | . | 0.83 | 251 |
| 5 | 1373 | 0.43 | 0.50 | 18.52 | 68.22 | 0.35 | . | 0.82 | 251 |
| 5 | 1324 | 0.20 | 0.40 | 18.75 | 69.84 | 0.20 | . | 0.82 | 251 |
| 5 | 1334 | 0.39 | 0.62 | 18.56 | 67.02 | 0.39 | . | 0.82 | 251 |
| 5 | 1366 | 0.24 | 0.43 | 18.71 | 69.62 | 0.21 | . | 0.82 | 251 |
| 5 | 1358 | 0.42 | 0.49 | 18.53 | 69.07 | 0.25 | . | 0.82 | 251 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 1349 | 0.18 | 0.38 | 18.78 | 69.44 | 0.27 | . | 0.82 | 251 |
| 5 | 1359 | 0.30 | 0.46 | 18.65 | 68.73 | 0.31 | . | 0.82 | 251 |
| 5 | 1328 | 0.65 | 0.48 | 18.30 | 68.10 | 0.38 | . | 0.82 | 251 |
| 5 | 1370 | 0.37 | 0.48 | 18.59 | 68.40 | 0.34 | . | 0.82 | 251 |
| 5 | 1361 | 0.35 | 0.48 | 18.60 | 70.01 | 0.14 | . | 0.82 | 251 |
| 8 | 983 | 0.04 | 0.19 | 16.20 | 58.26 | 0.20 | . | 0.80 | 137 |
| 8 | 962 | 0.64 | 0.48 | 15.60 | 55.57 | 0.42 | . | 0.79 | 137 |
| 8 | 952 | 0.42 | 0.50 | 15.82 | 57.58 | 0.14 | . | 0.80 | 137 |
| 8 | 951 | 0.06 | 0.24 | 16.18 | 58.34 | 0.13 | . | 0.80 | 137 |
| 8 | 977 | 0.31 | 0.47 | 15.92 | 56.66 | 0.28 | . | 0.80 | 137 |
| 8 | 1109 | 0.43 | 0.50 | 15.80 | 58.32 | 0.04 | . | 0.80 | 137 |
| 8 | 956 | 0.40 | 0.49 | 15.83 | 56.27 | 0.32 | . | 0.80 | 137 |
| 8 | 959 | 0.01 | 0.12 | 16.22 | 58.53 | 0.17 | . | 0.80 | 137 |
| 8 | 955 | 0.15 | 0.35 | 16.09 | 57.42 | 0.24 | . | 0.80 | 137 |
| 8 | 1238 | 0.14 | 0.35 | 16.09 | 58.56 | 0.03 | . | 0.80 | 137 |
| 8 | 1205 | 0.26 | 0.44 | 15.97 | 57.87 | 0.12 | . | 0.80 | 137 |
| 8 | 1257 | 0.53 | 0.50 | 15.71 | 57.47 | 0.15 | . | 0.80 | 137 |
| 8 | 932 | 0.40 | 0.49 | 15.83 | 56.17 | 0.33 | . | 0.80 | 137 |
| 8 | 1111 | 0.16 | 0.37 | 16.07 | 57.97 | 0.14 | . | 0.80 | 137 |
| 8 | 1260 | 0.15 | 0.36 | 16.08 | 56.97 | 0.32 | . | 0.80 | 137 |
| 8 | 1265 | 0.28 | 0.45 | 15.95 | 57.33 | 0.19 | . | 0.80 | 137 |
| 8 | 953 | 0.34 | 0.47 | 15.90 | 58.09 | 0.08 | . | 0.80 | 137 |
| 8 | 954 | 0.28 | 0.45 | 15.96 | 56.41 | 0.33 | . | 0.80 | 137 |
| 8 | 942 | 0.48 | 0.50 | 15.75 | 57.22 | 0.18 | . | 0.80 | 137 |
| 8 | 936 | 0.34 | 0.48 | 15.89 | 55.32 | 0.47 | . | 0.79 | 137 |
| 8 | 964 | 0.20 | 0.41 | 16.03 | 56.73 | 0.32 | . | 0.80 | 137 |
| 8 | 937 | 1.26 | 1.34 | 14.97 | 46.44 | 0.58 | . | 0.78 | 137 |
| 8 | 971 | 0.01 | 0.12 | 16.22 | 59.00 | -0.08 | . | 0.80 | 137 |
| 8 | 972 | 0.42 | 0.50 | 15.81 | 56.57 | 0.27 | . | 0.80 | 137 |
| 8 | 1258 | 0.09 | 0.29 | 16.14 | 57.68 | 0.24 | . | 0.80 | 137 |
| 8 | 947 | 0.07 | 0.26 | 16.16 | 58.87 | -0.02 | . | 0.80 | 137 |
| 8 | 1114 | 1.06 | 1.06 | 15.18 | 48.91 | 0.60 | . | 0.78 | 137 |
| 8 | 984 | 0.05 | 0.22 | 16.18 | 59.17 | -0.11 | . | 0.80 | 137 |
| 8 | 948 | 0.31 | 0.46 | 15.93 | 58.05 | 0.08 | . | 0.80 | 137 |
| 8 | 950 | 0.34 | 0.48 | 15.89 | 56.76 | 0.26 | . | 0.80 | 137 |
| 8 | 961 | 0.01 | 0.12 | 16.22 | 59.00 | -0.08 | . | 0.80 | 137 |
| 8 | 987 | 0.12 | 0.32 | 16.12 | 57.32 | 0.29 | . | 0.80 | 137 |
| 8 | 970 | 0.21 | 0.41 | 16.02 | 59.54 | -0.13 | . | 0.81 | 137 |
| 8 | 985 | 0.57 | 0.50 | 15.66 | 56.53 | 0.28 | . | 0.80 | 137 |
| 8 | 949 | 0.30 | 0.46 | 15.93 | 58.47 | 0.02 | . | 0.80 | 137 |
| 8 | 981 | 0.27 | 0.45 | 15.96 | 57.52 | 0.17 | . | 0.80 | 137 |
| 8 | 946 | 0.54 | 0.50 | 15.69 | 55.07 | 0.48 | . | 0.79 | 137 |
| 8 | 944 | 0.16 | 0.37 | 16.07 | 56.97 | 0.32 | . | 0.80 | 137 |
| 8 | 978 | 0.07 | 0.26 | 16.16 | 57.68 | 0.28 | . | 0.80 | 137 |
| 8 | 945 | 0.61 | 0.97 | 15.63 | 51.59 | 0.45 | . | 0.79 | 137 |
| 8 | 1266 | 0.30 | 0.46 | 15.93 | 57.94 | 0.10 | . | 0.80 | 137 |
| 8 | 986 | 0.11 | 0.31 | 16.12 | 58.42 | 0.07 | . | 0.80 | 137 |
| 8 | 967 | 0.12 | 0.32 | 16.12 | 58.52 | 0.05 | . | 0.80 | 137 |
| 8 | 969 | 0.33 | 0.47 | 15.91 | 56.00 | 0.37 | . | 0.79 | 137 |
| 8 | 980 | 0.05 | 0.22 | 16.18 | 59.02 | -0.06 | . | 0.80 | 137 |
| 8 | 1267 | 0.38 | 0.49 | 15.85 | 56.48 | 0.29 | . | 0.80 | 137 |
| 8 | 965 | 0.39 | 0.49 | 15.85 | 54.84 | 0.52 | . | 0.79 | 137 |
| 8 | 960 | 0.32 | 0.47 | 15.91 | 57.55 | 0.15 | . | 0.80 | 137 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 958 | 0.04 | 0.19 | 16.20 | 58.22 | 0.21 | . | 0.80 | 137 |
| 8 | 938 | 0.28 | 0.45 | 15.96 | 56.51 | 0.32 | . | 0.80 | 137 |
| 8 | 979 | 0.08 | 0.27 | 16.15 | 57.87 | 0.22 | . | 0.80 | 137 |
| 8 | 939 | 0.40 | 0.49 | 15.83 | 54.79 | 0.53 | . | 0.79 | 137 |
| 8 | 974 | 0.09 | 0.29 | 16.14 | 57.53 | 0.28 | . | 0.80 | 137 |
| 8 | 1056 | 0.10 | 0.30 | 16.13 | 59.12 | -0.08 | . | 0.80 | 137 |
| 8 | 1110 | 0.04 | 0.19 | 16.20 | 58.29 | 0.18 | . | 0.80 | 137 |
| 8 | 1263 | 0.26 | 0.44 | 15.97 | 57.53 | 0.17 | . | 0.80 | 137 |
| 8 | 975 | 0.04 | 0.19 | 16.20 | 58.44 | 0.13 | . | 0.80 | 137 |
| 8 | 1054 | 0.40 | 0.49 | 15.83 | 57.30 | 0.18 | . | 0.80 | 137 |

# Appendix D: Item Response Theory Summary Statistics

This appendix contains the details of the Item Response Theory Summary Statistics outputs from Winsteps.

### Appendix Table D.1: Grade 3 HLA IRT Summary Output

```
TABLE 3.1 20210608_2021_GR3HLA_EFTOT.sav         ZOU428WS.TXT  Jun  8 2021 13:52
INPUT: 277 PERSON  57 ITEM  REPORTED: 277 PERSON  57 ITEM  124 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------------

     SUMMARY OF 277 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      22.3      56.8    -.856582 .309899      1.00    .04    .97   -.07 |
|  SEM        .7        .2     .058580 .002602       .01    .05    .01    .05 |
| P.SD      11.6       2.6     .973208 .043233       .18    .84    .23    .75 |
| S.SD      11.6       2.6     .974970 .043312       .18    .84    .23    .75 |
| MAX.      58.0      57.0    2.272791 .531465      1.68   2.77   2.35   4.19 |
| MIN.       5.0      19.0   -2.852860 .269023       .64  -2.08    .55  -1.84 |
|-----------------------------------------------------------------------------|
| REAL RMSE.324074 TRUE SD .917665  SEPARATION  2.83  PERSON RELIABILITY  .89 |
|MODEL RMSE.312900 TRUE SD .921535  SEPARATION  2.95  PERSON RELIABILITY  .90 |
| S.E. OF PERSON MEAN = .058580                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .91  SEM = 3.56
STANDARDIZED (50 ITEM) RELIABILITY = .88

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN     108.3     275.9     .000000 .152675       .99    .05    .97   -.04 |
|  SEM       9.7        .1     .157995 .006416       .02    .31    .04    .32 |
| P.SD      72.3       1.0    1.182323 .048016       .16   2.32    .27   2.43 |
| S.SD      72.9       1.0    1.192832 .048443       .16   2.34    .27   2.45 |
| MAX.     502.0     277.0    3.309657 .392616      1.41   6.13   1.70   6.29 |
| MIN.       7.0     273.0   -2.199555 .056271       .66  -4.37    .41  -3.64 |
|-----------------------------------------------------------------------------|
| REAL RMSE.163925 TRUE SD1.170904  SEPARATION  7.14  ITEM   RELIABILITY  .98 |
|MODEL RMSE.160048 TRUE SD1.171440  SEPARATION  7.32  ITEM   RELIABILITY  .98 |
| S.E. OF ITEM MEAN = .157995                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.67
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.2: Grade 4 HLA IRT Summary Output

```
TABLE 3.1 06092021_2021_GR4HLA_OT.sav            ZOU925WS.TXT  Jun  9 2021  9:54
INPUT: 253 PERSON  57 ITEM  REPORTED: 253 PERSON  57 ITEM  123 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------

     SUMMARY OF 253 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      26.9      57.0    -.378034 .290784      1.01    .01   1.00   -.08 |
|  SEM        .7        .0     .054259 .001912       .01    .06    .01    .05 |
| P.SD      10.7        .4     .861342 .030351       .20    .99    .21    .81 |
| S.SD      10.7        .4     .863049 .030411       .20    .99    .21    .81 |
| MAX.      58.0      57.0    2.353487 .420685      2.52   5.95   2.00   3.19 |
| MIN.       7.0      51.0   -2.370616 .266551       .62  -2.37    .61  -2.26 |
|-----------------------------------------------------------------------------|
| REAL RMSE.303871 TRUE SD .805960  SEPARATION  2.65  PERSON RELIABILITY  .88 |
|MODEL RMSE.292363 TRUE SD .810205  SEPARATION  2.77  PERSON RELIABILITY  .88 |
| S.E. OF PERSON MEAN = .054259                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .88  SEM = 3.65
STANDARDIZED (50 ITEM) RELIABILITY = .87

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN     119.6     252.9     .000000 .148361       .99   -.01   1.00    .07 |
|  SEM       8.2        .1     .142651 .006212       .02    .27    .03    .28 |
| P.SD      61.2        .5    1.067503 .046487       .13   1.98    .24   2.12 |
| S.SD      61.7        .5    1.076992 .046900       .13   2.00    .24   2.14 |
| MAX.     403.0     253.0    3.890290 .456806      1.26   4.71   1.74   4.35 |
| MIN.       5.0     250.0   -2.157316 .062078       .75  -3.48    .37  -3.54 |
|-----------------------------------------------------------------------------|
| REAL RMSE.158881 TRUE SD1.055613  SEPARATION  6.64  ITEM   RELIABILITY  .98 |
|MODEL RMSE.155473 TRUE SD1.056121  SEPARATION  6.79  ITEM   RELIABILITY  .98 |
| S.E. OF ITEM MEAN = .142651                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.66
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.3: Grade 5 HLA IRT Summary Output

```
TABLE 3.1 0609_2021_GR5HLA_ANALYSIS.sav          ZOU526WS.TXT  Jun 10 2021  7:18
INPUT: 252 PERSON  57 ITEM  REPORTED: 252 PERSON  57 ITEM  125 CATS WINSTEPS 4.8.2.0
-------------------------------------------------------------------------------------

     SUMMARY OF 252 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      26.1      57.0    -.603892 .292729      1.01    .03   1.00   -.04 |
|  SEM        .8        .0     .060468 .002424       .02    .06    .01    .05 |
| P.SD      11.9        .0     .957988 .038408       .25    .97    .21    .84 |
| S.SD      12.0        .0     .959894 .038484       .25    .97    .21    .84 |
| MAX.      61.0      57.0    2.704330 .484414      2.47   5.37   2.20   2.11 |
| MIN.       5.0      57.0   -2.807924 .265817       .58  -2.59    .56  -2.68 |
|-----------------------------------------------------------------------------|
| REAL RMSE.308294 TRUE SD .907025  SEPARATION  2.94  PERSON RELIABILITY  .90 |
|MODEL RMSE.295238 TRUE SD .911359  SEPARATION  3.09  PERSON RELIABILITY  .91 |
| S.E. OF PERSON MEAN = .060468                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .90  SEM = 3.81
STANDARDIZED (50 ITEM) RELIABILITY = .89

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN     115.6     252.0     .000000 .149801       .99   -.06   1.00    .01 |
|  SEM      13.9        .0     .138932 .003754       .02    .27    .03    .29 |
| P.SD     103.7        .0    1.039675 .028090       .13   2.04    .25   2.16 |
| S.SD     104.6        .0    1.048917 .028340       .14   2.06    .25   2.18 |
| MAX.     803.0     252.0    2.600892 .221686      1.29   4.11   1.68   4.92 |
| MIN.      21.0     252.0   -2.516130 .050974       .77  -3.63    .47  -3.41 |
|-----------------------------------------------------------------------------|
| REAL RMSE.156343 TRUE SD1.027852  SEPARATION  6.57  ITEM   RELIABILITY  .98 |
|MODEL RMSE.152412 TRUE SD1.028443  SEPARATION  6.75  ITEM   RELIABILITY  .98 |
| S.E. OF ITEM MEAN = .138932                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.45
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.4: Grade 6 HLA IRT Summary Output

```
TABLE 3.1 0609_2021_GR6HLA_ANALYSIS_OT.sav       ZOU107WS.TXT  Jun 10 2021  8: 1
INPUT: 165 PERSON  57 ITEM  REPORTED: 165 PERSON  57 ITEM  132 CATS WINSTEPS 4.8.2.0
-------------------------------------------------------------------------------------

     SUMMARY OF 165 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      25.5      56.9   -1.027469 .295764      1.01    .06   1.00    .04 |
|  SEM       1.0        .1     .080717 .003797       .02    .08    .03    .07 |
| P.SD      13.2       1.6    1.033678 .048625       .25    .98    .40    .94 |
| S.SD      13.3       1.6    1.036824 .048773       .25    .99    .40    .94 |
| MAX.      59.0      57.0    1.619552 .602085      1.87   3.15   2.96   2.77 |
| MIN.       3.0      37.0   -3.672145 .257935       .55  -2.29    .45  -1.93 |
|-----------------------------------------------------------------------------|
| REAL RMSE.313248 TRUE SD .985071  SEPARATION  3.14  PERSON RELIABILITY  .91 |
|MODEL RMSE.299735 TRUE SD .989267  SEPARATION  3.30  PERSON RELIABILITY  .92 |
| S.E. OF PERSON MEAN = .080717                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .91  SEM = 3.91
STANDARDIZED (50 ITEM) RELIABILITY = .91

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      73.8     164.6     .000000 .209163      1.00   -.03   1.00    .07 |
|  SEM       9.4        .1     .184910 .011650       .02    .21    .04    .23 |
| P.SD      70.1        .5    1.383740 .087181       .14   1.58    .27   1.68 |
| S.SD      70.7        .5    1.396040 .087956       .14   1.59    .28   1.70 |
| MAX.     447.0     165.0    2.922329 .462600      1.34   4.02   1.71   3.72 |
| MIN.       5.0     164.0   -2.840264 .071199       .72  -3.46    .33  -3.33 |
|-----------------------------------------------------------------------------|
| REAL RMSE.230825 TRUE SD1.364352  SEPARATION  5.91  ITEM   RELIABILITY  .97 |
|MODEL RMSE.226605 TRUE SD1.365059  SEPARATION  6.02  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .184910                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.52
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.5: Grade 7 HLA IRT Summary Output

```
TABLE 3.1 20210611_2021_GR7HLA_ANALYSIS.sav      ZOU794WS.TXT  Jun 11 2021 12:37
INPUT: 163 PERSON  57 ITEM  REPORTED: 163 PERSON  57 ITEM  134 CATS WINSTEPS 4.8.2.0
-------------------------------------------------------------------------------------

     SUMMARY OF 163 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      25.6      56.9    -.953991 .286145       .98   -.05   1.02    .05 |
|  SEM        .9        .1     .071853 .004192       .02    .08    .03    .08 |
| P.SD      11.9       1.3     .914539 .053356       .26    .96    .43    .96 |
| S.SD      12.0       1.3     .917358 .053521       .26    .96    .44    .96 |
| MAX.      66.0      57.0    2.017195 .528965      2.53   4.09   4.64   3.95 |
| MIN.       4.0      40.0   -3.304398 .242652       .49  -2.16    .41  -2.40 |
|-----------------------------------------------------------------------------|
| REAL RMSE.301799 TRUE SD .863308  SEPARATION  2.86  PERSON RELIABILITY  .89 |
|MODEL RMSE.291077 TRUE SD .866981  SEPARATION  2.98  PERSON RELIABILITY  .90 |
| S.E. OF PERSON MEAN = .071853                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .89  SEM = 4.02
STANDARDIZED (50 ITEM) RELIABILITY = .89

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      73.3     162.7     .000000 .199418      1.00    .04   1.02    .09 |
|  SEM       9.8        .1     .170408 .009626       .02    .20    .04    .22 |
| P.SD      73.5        .6    1.275216 .072033       .12   1.47    .31   1.62 |
| S.SD      74.1        .6    1.286552 .072673       .13   1.48    .31   1.64 |
| MAX.     489.0     163.0    3.112686 .514325      1.28   3.99   2.27   4.29 |
| MIN.       4.0     160.0   -2.263549 .070299       .82  -3.07    .44  -2.67 |
|-----------------------------------------------------------------------------|
| REAL RMSE.217003 TRUE SD1.256617  SEPARATION  5.79  ITEM   RELIABILITY  .97 |
|MODEL RMSE.212029 TRUE SD1.257466  SEPARATION  5.93  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .170408                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.54
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.6: Grade 8 HLA IRT Summary Output

```
TABLE 3.1 20210611_2021_GR8HLA_ANALYSIS.sav      ZOU386WS.TXT  Jun 11 2021 12:54
INPUT: 138 PERSON  56 ITEM  REPORTED: 138 PERSON  56 ITEM  129 CATS WINSTEPS 4.8.2.0
-------------------------------------------------------------------------------------

     SUMMARY OF 138 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      26.9      55.6    -.686975 .297071       .98   -.10   1.04    .00 |
|  SEM       1.1        .3     .088060 .004251       .02    .08    .04    .07 |
| P.SD      12.9       3.2    1.030717 .049756       .26    .94    .42    .84 |
| S.SD      12.9       3.3    1.034472 .049937       .26    .95    .42    .84 |
| MAX.      59.0      56.0    1.791601 .461668      2.22   3.03   3.21   3.44 |
| MIN.       6.0      20.0   -2.869593 .255178       .54  -1.89    .48  -1.49 |
|-----------------------------------------------------------------------------|
| REAL RMSE.317863 TRUE SD .980480  SEPARATION  3.08  PERSON RELIABILITY  .90 |
|MODEL RMSE.301209 TRUE SD .985724  SEPARATION  3.27  PERSON RELIABILITY  .91 |
| S.E. OF PERSON MEAN = .088060                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .91  SEM = 3.93
STANDARDIZED (50 ITEM) RELIABILITY = .91

     SUMMARY OF 56 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      66.3     137.0     .000000 .220780       .99   -.03   1.04    .16 |
|  SEM       7.3        .2     .186671 .012772       .02    .21    .06    .24 |
| P.SD      54.2       1.4    1.384392 .094720       .16   1.57    .43   1.77 |
| S.SD      54.7       1.4    1.396921 .095578       .16   1.59    .43   1.78 |
| MAX.     371.0     138.0    4.023173 .719933      1.35   3.49   3.24   4.26 |
| MIN.       2.0     128.0   -3.350357 .077542       .73  -3.01    .40  -2.26 |
|-----------------------------------------------------------------------------|
| REAL RMSE.245831 TRUE SD1.362391  SEPARATION  5.54  ITEM   RELIABILITY  .97 |
|MODEL RMSE.240241 TRUE SD1.363388  SEPARATION  5.68  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .186671                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.52
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.7: Grade 3 MA IRT Summary Output

```
TABLE 3.1 20210608_2021_GR3MA_OT.sav             ZOU711WS.TXT  Jun  8 2021 12:33
INPUT: 275 PERSON  55 ITEM  REPORTED: 275 PERSON  55 ITEM  113 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------------

     SUMMARY OF 275 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      19.1      54.6    -.861404 .342599      1.00   -.03   1.01    .04 |
|  SEM        .5        .2     .050424 .002204       .01    .06    .02    .05 |
| P.SD       7.9       3.5     .834666 .036484       .18    .99    .36    .76 |
| S.SD       7.9       3.5     .836188 .036551       .18    .99    .36    .76 |
| MAX.      51.0      55.0    2.663552 .623484      1.66   3.12   3.26   3.86 |
| MIN.       5.0      20.0   -2.477196 .307855       .65  -2.57    .47  -1.45 |
|-----------------------------------------------------------------------------|
| REAL RMSE.357563 TRUE SD .754199  SEPARATION  2.11  PERSON RELIABILITY  .82 |
|MODEL RMSE.344536 TRUE SD .760239  SEPARATION  2.21  PERSON RELIABILITY  .83 |
| S.E. OF PERSON MEAN = .050424                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .85  SEM = 3.02
STANDARDIZED (50 ITEM) RELIABILITY = .82

     SUMMARY OF 55 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      95.3     273.2     .000000 .164085      1.00   -.13   1.01    .03 |
|  SEM       8.0        .2     .181143 .007349       .01    .21    .03    .23 |
| P.SD      58.5       1.4    1.331122 .054002       .11   1.51    .21   1.71 |
| S.SD      59.0       1.4    1.343390 .054500       .11   1.53    .21   1.72 |
| MAX.     255.0     275.0    3.367047 .423742      1.21   2.78   1.66   3.24 |
| MIN.       6.0     272.0   -3.645631 .128682       .80  -4.28    .62  -4.03 |
|-----------------------------------------------------------------------------|
| REAL RMSE.176568 TRUE SD1.319359  SEPARATION  7.47  ITEM   RELIABILITY  .98 |
|MODEL RMSE.172743 TRUE SD1.319866  SEPARATION  7.64  ITEM   RELIABILITY  .98 |
| S.E. OF ITEM MEAN = .181143                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.97
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.8: Grade 4 MA IRT Summary Output

```
TABLE 3.1 06082021_2021_GR4MA_OT.sav             ZOU834WS.TXT  Jun  9 2021 12: 7
INPUT: 252 PERSON  55 ITEM  REPORTED: 252 PERSON  55 ITEM  112 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------------

     SUMMARY OF 252 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      20.2      55.0    -.817433 .310536      1.00   -.02   1.00    .00 |
|  SEM        .5        .0     .044030 .001539       .01    .05    .02    .05 |
| P.SD       7.7        .0     .697574 .024374       .11    .87    .36    .78 |
| S.SD       7.7        .0     .698962 .024423       .12    .87    .36    .78 |
| MAX.      44.0      55.0    1.390784 .420218      1.37   2.81   5.23   4.38 |
| MIN.       7.0      55.0   -2.298254 .286101       .70  -2.91    .65  -1.57 |
|-----------------------------------------------------------------------------|
| REAL RMSE.318965 TRUE SD .620379  SEPARATION  1.94  PERSON RELIABILITY  .79 |
|MODEL RMSE.311491 TRUE SD .624165  SEPARATION  2.00  PERSON RELIABILITY  .80 |
| S.E. OF PERSON MEAN = .044030                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .82  SEM = 3.30
STANDARDIZED (50 ITEM) RELIABILITY = .78

     SUMMARY OF 55 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      92.7     252.0     .000000 .162718      1.00   -.10   1.00   -.03 |
|  SEM       6.4        .0     .151217 .010392       .01    .24    .03    .24 |
| P.SD      46.9        .0    1.111211 .076368       .09   1.77    .19   1.78 |
| S.SD      47.3        .0    1.121453 .077072       .09   1.79    .19   1.80 |
| MAX.     268.0     252.0    3.581651 .507950      1.23   3.76   1.67   3.37 |
| MIN.       4.0     252.0   -2.765206 .088049       .84  -4.19    .36  -3.92 |
|-----------------------------------------------------------------------------|
| REAL RMSE.182251 TRUE SD1.096164  SEPARATION  6.01  ITEM   RELIABILITY  .97 |
|MODEL RMSE.179748 TRUE SD1.096577  SEPARATION  6.10  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .151217                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.85
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.9: Grade 5 MA IRT Summary Output

```
TABLE 3.1 06092021_2021_GR5MA_OT.sav             ZOU467WS.TXT  Jun  9 2021 14:20
INPUT: 249 PERSON  58 ITEM  REPORTED: 249 PERSON  58 ITEM  123 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------

     SUMMARY OF 249 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      20.2      57.7    -.862262 .297031      1.02    .14   1.00    .02 |
|  SEM        .5        .2     .042323 .002406       .01    .06    .01    .05 |
| P.SD       8.5       2.8     .666507 .037893       .19    .89    .21    .84 |
| S.SD       8.5       2.8     .667850 .037969       .19    .90    .21    .84 |
| MAX.      53.0      58.0    1.666422 .458747      1.80   3.18   2.06   2.73 |
| MIN.       6.0      20.0   -2.093960 .255880       .69  -2.50    .64  -1.95 |
|-----------------------------------------------------------------------------|
| REAL RMSE.310997 TRUE SD .589502  SEPARATION  1.90  PERSON RELIABILITY  .78 |
|MODEL RMSE.299438 TRUE SD .595457  SEPARATION  1.99  PERSON RELIABILITY  .80 |
| S.E. OF PERSON MEAN = .042323                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .82  SEM = 3.57
STANDARDIZED (50 ITEM) RELIABILITY = .77

     SUMMARY OF 58 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      86.9     247.8     .000000 .152443      1.00   -.04   1.00   -.05 |
|  SEM       5.8        .2     .121380 .005355       .01    .19    .02    .21 |
| P.SD      44.1       1.2     .916403 .040426       .09   1.46    .16   1.56 |
| S.SD      44.5       1.2     .924406 .040779       .10   1.48    .16   1.57 |
| MAX.     213.0     249.0    2.910282 .387800      1.38   3.61   1.45   2.55 |
| MIN.       7.0     246.0   -2.194631 .063130       .83  -3.51    .70  -3.51 |
|-----------------------------------------------------------------------------|
| REAL RMSE.160139 TRUE SD .902302  SEPARATION  5.63  ITEM   RELIABILITY  .97 |
|MODEL RMSE.157712 TRUE SD .902730  SEPARATION  5.72  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .121380                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.88
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.10: Grade 6 MA IRT Summary Output

```
TABLE 3.1 06092021_2021_GR6MA_OT.sav             ZOU606WS.TXT  Jun  9 2021 14: 8
INPUT: 162 PERSON  57 ITEM  REPORTED: 162 PERSON  57 ITEM  125 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------

     SUMMARY OF 162 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      17.1      57.0   -1.307709 .319143       .97   -.07   1.00   -.01 |
|  SEM        .8        .0     .064166 .005165       .01    .05    .02    .06 |
| P.SD       9.8        .0     .814176 .065535       .13    .61    .29    .74 |
| S.SD       9.8        .0     .816701 .065738       .13    .61    .29    .74 |
| MAX.      52.0      57.0    1.303631 .725290      1.49   2.24   3.12   2.75 |
| MIN.       2.0      57.0   -3.703216 .251306       .64  -2.00    .56  -2.17 |
|-----------------------------------------------------------------------------|
| REAL RMSE.330645 TRUE SD .744014  SEPARATION  2.25  PERSON RELIABILITY  .84 |
|MODEL RMSE.325802 TRUE SD .746147  SEPARATION  2.29  PERSON RELIABILITY  .84 |
| S.E. OF PERSON MEAN = .064166                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .88  SEM = 3.45
STANDARDIZED (50 ITEM) RELIABILITY = .82

     SUMMARY OF 57 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      48.7     162.0     .000000 .208481      1.00   -.01   1.00   -.04 |
|  SEM       3.7        .0     .129381 .010138       .02    .15    .03    .17 |
| P.SD      27.6        .0     .968198 .075862       .13   1.10    .25   1.29 |
| S.SD      27.8        .0     .976805 .076537       .13   1.11    .26   1.31 |
| MAX.     146.0     162.0    2.729051 .514875      1.30   2.46   1.56   2.65 |
| MIN.       4.0     162.0   -1.987141 .091056       .61  -2.79    .39  -2.98 |
|-----------------------------------------------------------------------------|
| REAL RMSE.226758 TRUE SD .941270  SEPARATION  4.15  ITEM   RELIABILITY  .95 |
|MODEL RMSE.221855 TRUE SD .942437  SEPARATION  4.25  ITEM   RELIABILITY  .95 |
| S.E. OF ITEM MEAN = .129381                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.73
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.11: Grade 7 MA IRT Summary Output

```
TABLE 3.1 06092021_2021_GR7MA_OT.sav             ZOU594WS.TXT  Jun 11 2021  8:25
INPUT: 162 PERSON  56 ITEM  REPORTED: 162 PERSON  56 ITEM  116 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------

     SUMMARY OF 162 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      13.5      55.9   -1.578730 .338243       .99    .01   1.01    .08 |
|  SEM        .4        .1     .043634 .003334       .01    .05    .03    .06 |
| P.SD       5.5       1.4     .553652 .042309       .10    .58    .43    .70 |
| S.SD       5.5       1.4     .555369 .042440       .10    .58    .43    .71 |
| MAX.      44.0      56.0    1.120912 .526320      1.39   2.10   4.29   3.29 |
| MIN.       4.0      38.0   -2.997401 .277942       .66  -2.67    .58  -1.22 |
|-----------------------------------------------------------------------------|
| REAL RMSE.347375 TRUE SD .431116  SEPARATION  1.24  PERSON RELIABILITY  .61 |
|MODEL RMSE.340878 TRUE SD .436271  SEPARATION  1.28  PERSON RELIABILITY  .62 |
| S.E. OF PERSON MEAN = .043634                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .69  SEM = 3.08
STANDARDIZED (50 ITEM) RELIABILITY = .59

     SUMMARY OF 56 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      38.9     161.7     .000000 .245980      1.00    .00   1.01    .04 |
|  SEM       3.2        .1     .156443 .020780       .01    .12    .02    .13 |
| P.SD      23.6        .5    1.160214 .154110       .07    .92    .15    .98 |
| S.SD      23.8        .5    1.170714 .155505       .07    .93    .15    .99 |
| MAX.     104.0     162.0    3.693870 1.00642      1.14   2.45   1.47   2.18 |
| MIN.       1.0     161.0   -1.693628 .119495       .86  -2.65    .46  -2.42 |
|-----------------------------------------------------------------------------|
| REAL RMSE.293146 TRUE SD1.122569  SEPARATION  3.83  ITEM   RELIABILITY  .94 |
|MODEL RMSE.290269 TRUE SD1.123317  SEPARATION  3.87  ITEM   RELIABILITY  .94 |
| S.E. OF ITEM MEAN = .156443                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.87
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

## Appendix Table D.12: Grade 8 MA IRT Summary Output

```
TABLE 3.1 06092021_2021_GR8MA_OT.sav             ZOU359WS.TXT  Jun 11 2021  8:34
INPUT: 135 PERSON  56 ITEM  REPORTED: 135 PERSON  56 ITEM  118 CATS WINSTEPS 4.8.2.0
--------------------------------------------------------------------------------

     SUMMARY OF 135 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      13.9      56.0   -1.493966 .340973      1.00    .04    .99    .05 |
|  SEM        .5        .0     .051945 .003875       .01    .06    .03    .06 |
| P.SD       5.8        .0     .601303 .044860       .12    .64    .31    .71 |
| S.SD       5.9        .0     .603542 .045027       .12    .65    .31    .72 |
| MAX.      43.0      56.0    1.006420 .530538      1.61   2.72   2.41   2.98 |
| MIN.       4.0      56.0   -2.988651 .277307       .75  -1.70    .61  -1.29 |
|-----------------------------------------------------------------------------|
| REAL RMSE.350672 TRUE SD .488461  SEPARATION  1.39  PERSON RELIABILITY  .66 |
|MODEL RMSE.343911 TRUE SD .493244  SEPARATION  1.43  PERSON RELIABILITY  .67 |
| S.E. OF PERSON MEAN = .051945                                               |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .73  SEM = 3.05
STANDARDIZED (50 ITEM) RELIABILITY = .65

     SUMMARY OF 56 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      33.5     135.0     .000000 .248453      1.00    .06    .99    .04 |
|  SEM       2.6        .0     .142139 .014532       .01    .12    .02    .14 |
| P.SD      19.1        .0    1.054128 .107769       .08    .91    .17   1.07 |
| S.SD      19.3        .0    1.063668 .108744       .08    .92    .17   1.08 |
| MAX.      85.0     135.0    2.907259 .717062      1.20   2.62   1.51   2.97 |
| MIN.       2.0     135.0   -2.073331 .142492       .82  -1.99    .56  -2.04 |
|-----------------------------------------------------------------------------|
| REAL RMSE.274789 TRUE SD1.017682  SEPARATION  3.70  ITEM   RELIABILITY  .93 |
|MODEL RMSE.270820 TRUE SD1.018746  SEPARATION  3.76  ITEM   RELIABILITY  .93 |
| S.E. OF ITEM MEAN = .142139                                                 |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.90
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000
```

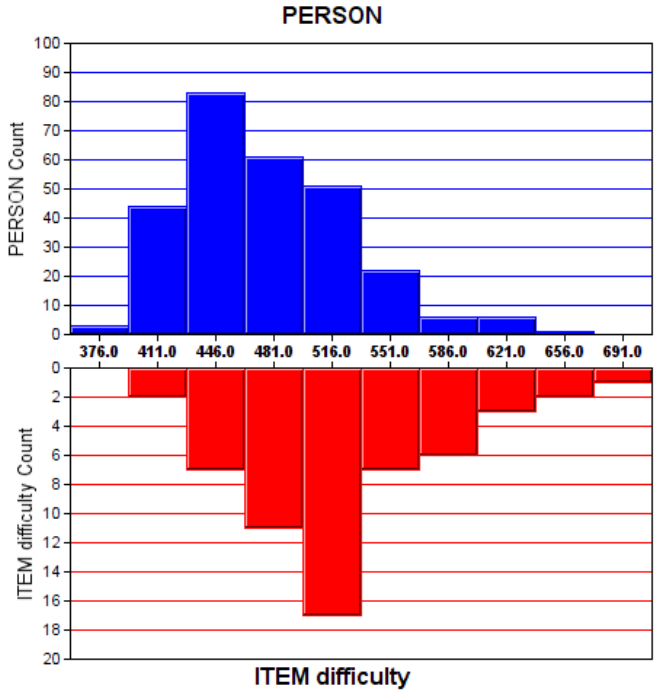
## Appendix Table D.13: Grade 8 SC IRT Summary Output

```
TABLE 3.1 06092021)2021_GR8Sc_student_redo.sav   ZOU363WS.TXT  Sep 14 2021 10:26
INPUT: 138 PERSON  58 ITEM  REPORTED: 138 PERSON  58 ITEM  124 CATS WINSTEPS 5.1.4.0
--------------------------------------------------------------------------------------

     SUMMARY OF 138 MEASURED PERSON
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      16.1      57.8  513.835571 21.9992      1.04    .23   1.21    .46 |
|  SEM        .7        .2    4.140488 .398078       .02    .06    .06    .07 |
| P.SD       7.7       2.7   48.463169 4.65939       .18    .71    .71    .86 |
| S.SD       7.7       2.7   48.639721 4.67636       .18    .71    .72    .86 |
| MAX.      38.0      58.0  629.405212 51.0142      1.82   2.35   7.94   4.68 |
| MIN.       2.0      26.0  383.071228 17.8114       .68  -1.58    .52  -1.21 |
|-----------------------------------------------------------------------------|
| REAL RMSE23.3095 TRUE SD42.48935  SEPARATION  1.82  PERSON RELIABILITY  .77 |
|MODEL RMSE22.4872 TRUE SD42.93024  SEPARATION  1.91  PERSON RELIABILITY  .78 |
| S.E. OF PERSON MEAN = 4.140488                                              |
-------------------------------------------------------------------------------
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98 (approximate due to missing data)
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .80  SEM = 3.41
(approximate due to missing data)
STANDARDIZED (50 ITEM) RELIABILITY = .76

     SUMMARY OF 58 MEASURED ITEM
-------------------------------------------------------------------------------
|          TOTAL                          MODEL         INFIT        OUTFIT    |
|          SCORE     COUNT     MEASURE    S.E.      MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------------------|
| MEAN      38.4     137.4  615.931458 17.4537      1.14    .18   1.21    .20 |
|  SEM       4.3        .1   10.990870 1.24459       .12    .31    .15    .27 |
| P.SD      32.3        .5   82.979240 9.39647       .91   2.32   1.12   2.08 |
| S.SD      32.6        .5   83.703972 9.47854       .92   2.34   1.13   2.09 |
| MAX.     173.0     138.0  849.130005 61.1251      7.42   8.89   8.53   7.33 |
| MIN.       2.0     137.0  480.290039 5.50794       .44  -4.22    .36  -3.72 |
|-----------------------------------------------------------------------------|
| REAL RMSE23.5037 TRUE SD79.58099  SEPARATION  3.39  ITEM   RELIABILITY  .92 |
|MODEL RMSE19.8223 TRUE SD80.57685  SEPARATION  4.06  ITEM   RELIABILITY  .94 |
| S.E. OF ITEM MEAN = 10.990870                                               |
-------------------------------------------------------------------------------
ITEM RAW SCORE-TO-MEASURE CORRELATION = -.60 (approximate due to missing data)
Global statistics: please see Table 44.
UMEAN=612.6851 USCALE=67.8289
```

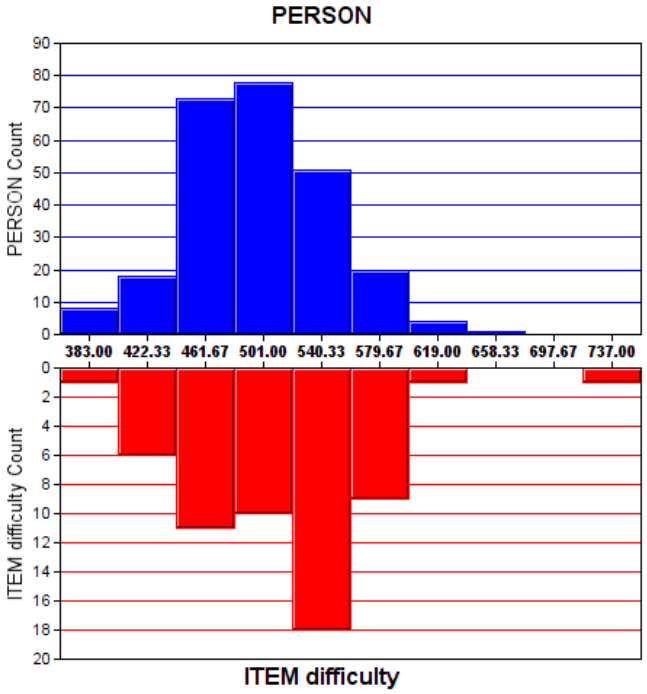
# Appendix E: : Person By Item Histograms and Item Maps

This appendix contains the details of the Item Response Theory Summary Statistics outputs from Winsteps.

### Appendix Figure E.1: Grade 3 HLA Item Histogram

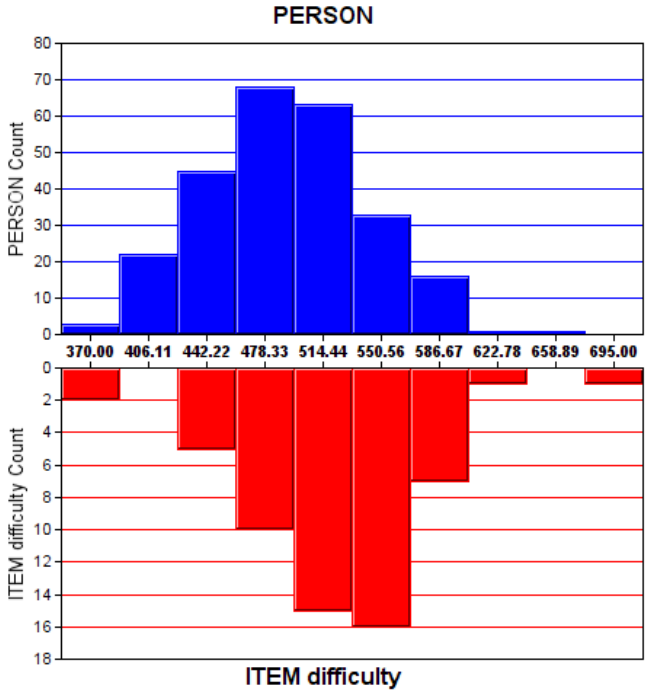



### Appendix Figure E.2: Grade 4 HLA Item

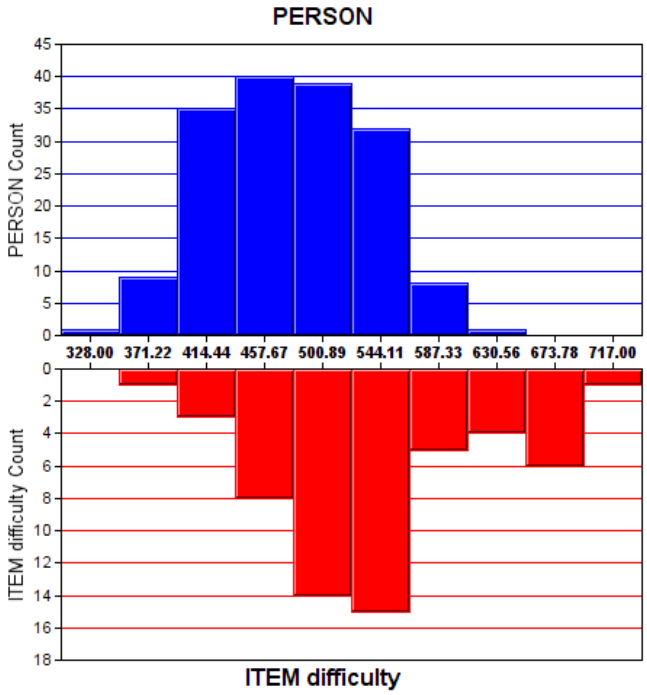



### Histogram

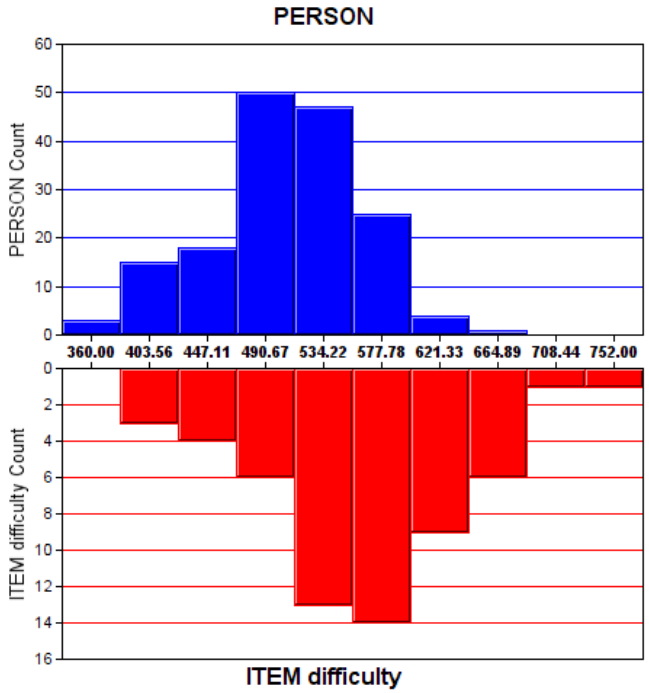
### Appendix Figure E.3: Grade 5 HLA Item Histogram



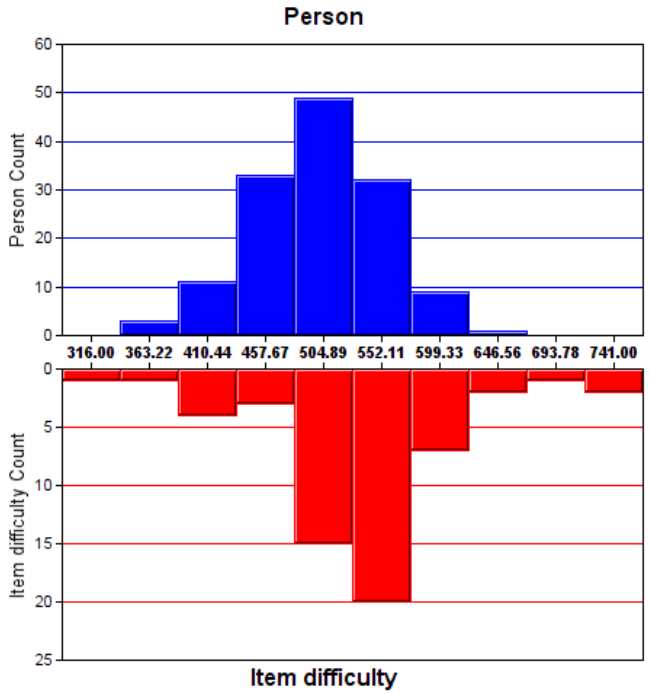

### Appendix Figure E.4: Grade 6 HLA Item Histogram



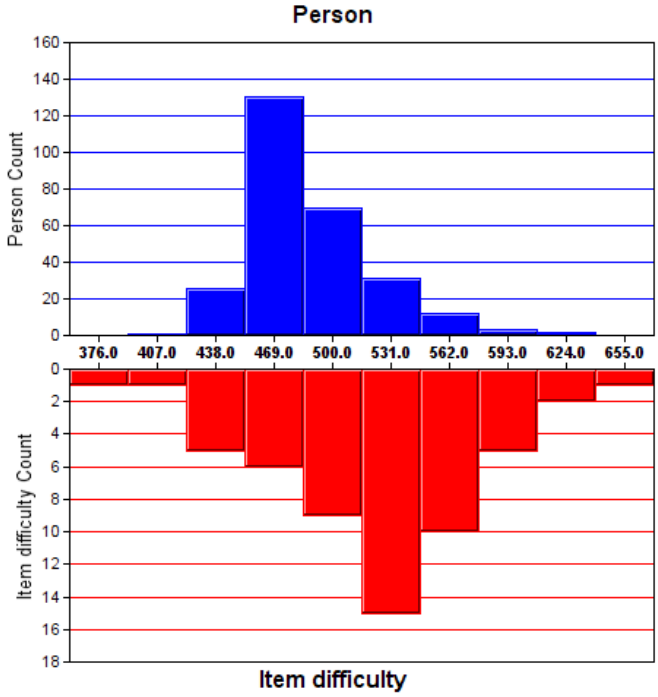
## Appendix Figure E.5: Grade 7 HLA Item Histogram



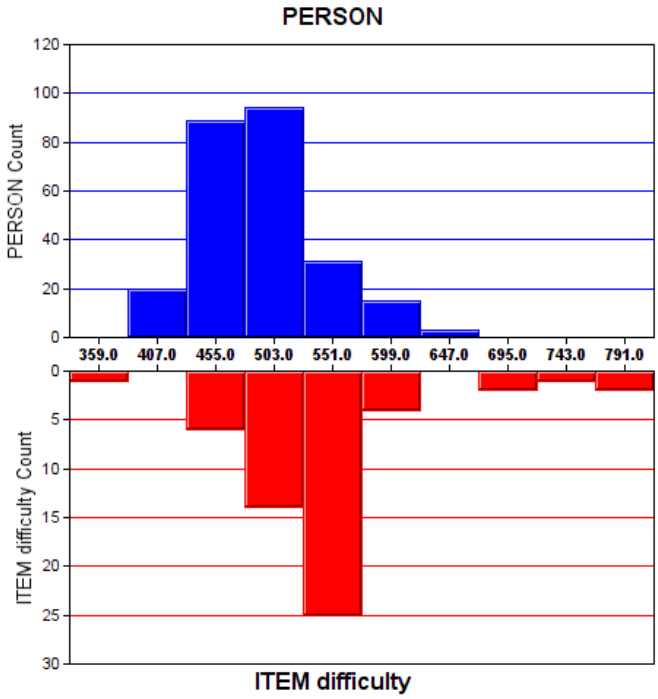

## Appendix Figure E.6: Grade 8 HLA Item Histogram



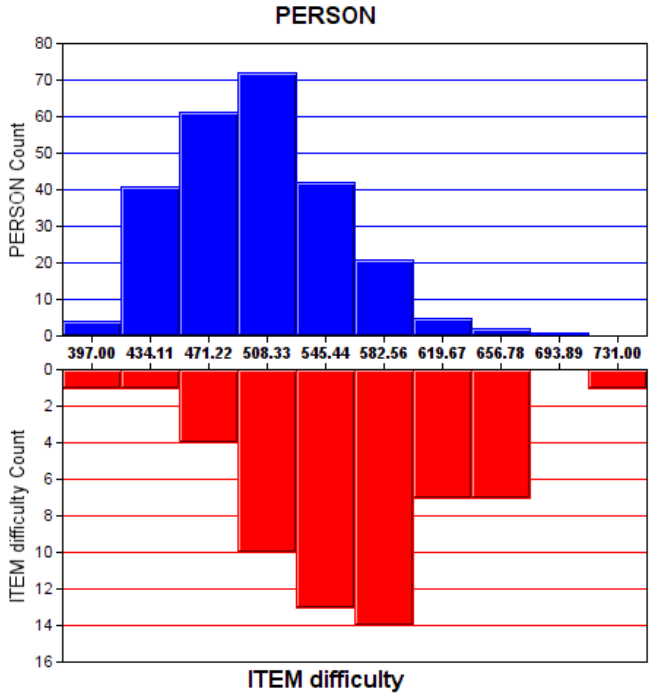

## Appendix Figure E.7: Grade 3 MA Item Histogram



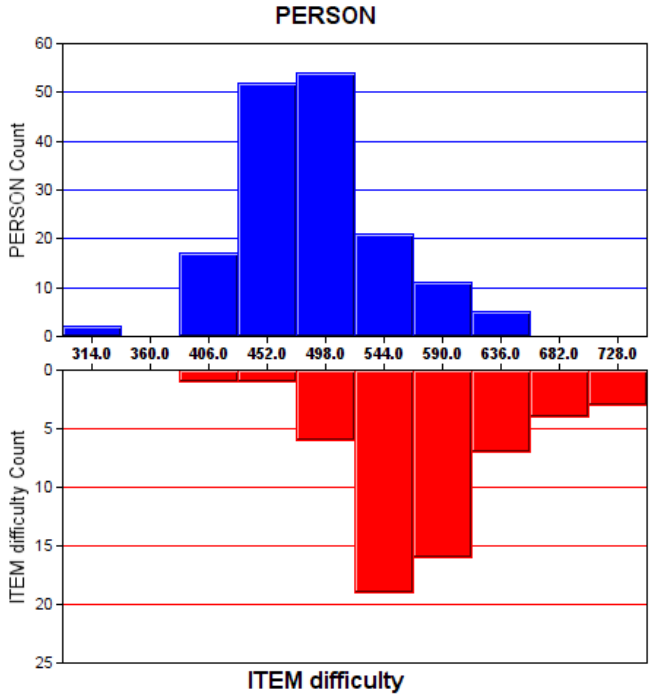

## Appendix Figure E.8: Grade 4 MA Item Histogram



## Appendix Figure E.9: Grade 5 MA Item Histogram

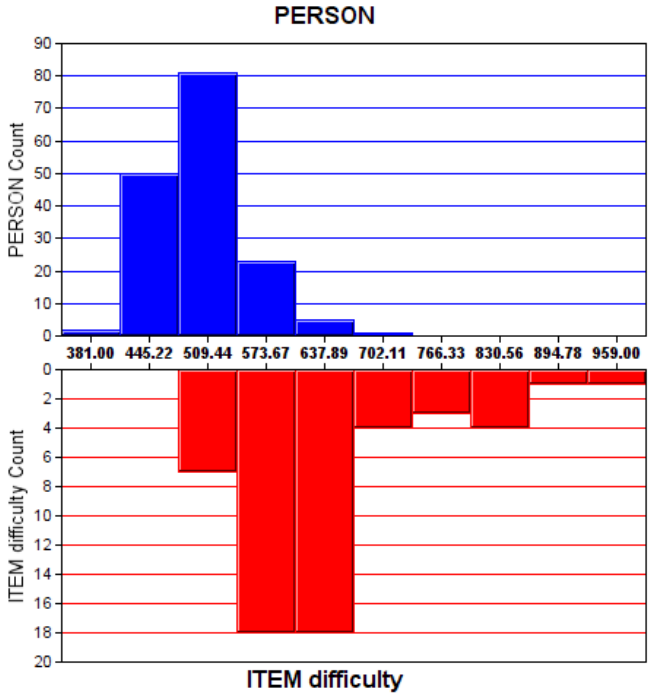



## Appendix Figure E.10: Grade 6 MA Item

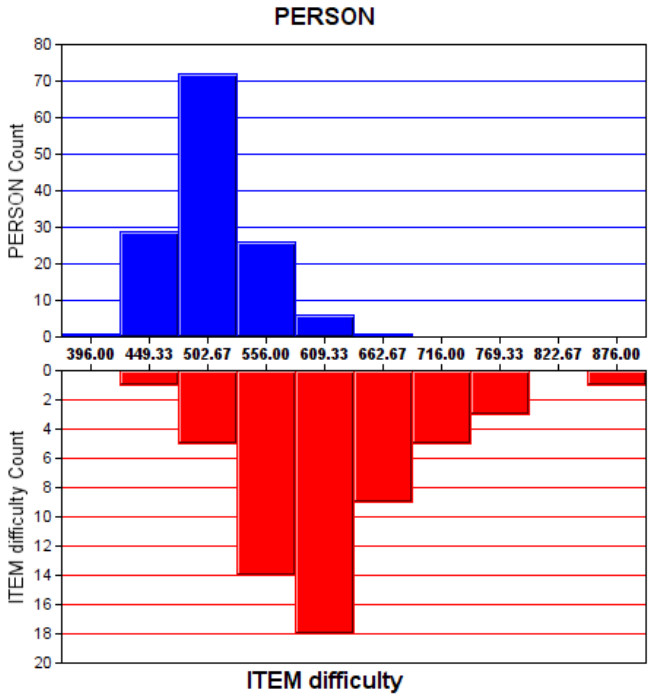



## Histogram

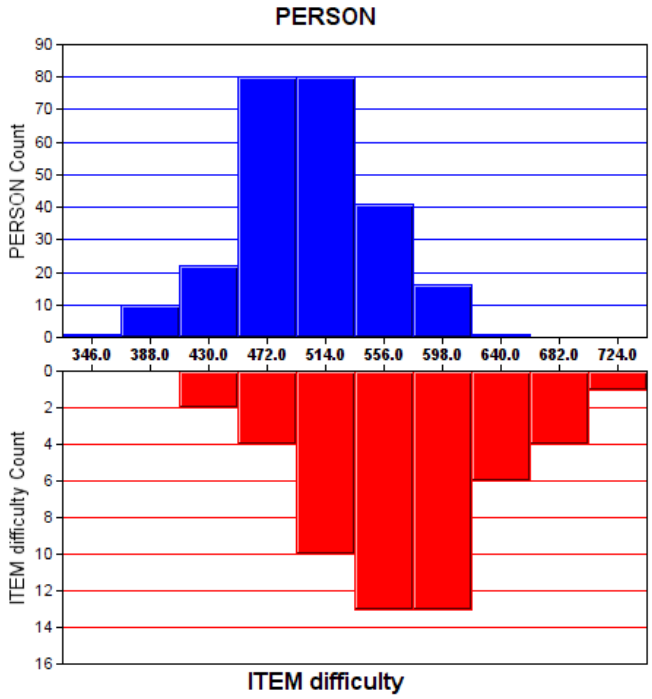
## Appendix Figure E.11: Grade 7 MA Item Histogram



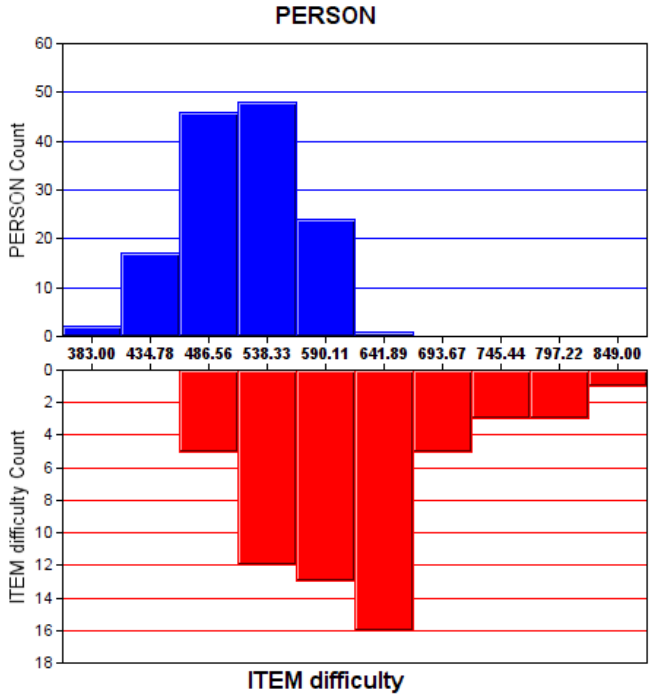

## Appendix Figure E.12: Grade 8 MA Item Histogram



## Appendix Figure E.13: Grade 5 SC Item Histogram




## Appendix Figure E.14: Grade 8 SC Item Histogram



# Appendix F: : Item Maps

This appendix contains the Item Maps from the Winsteps output.

### Appendix Figure F.1: Grade 3 HLA Item Map

```
TABLE 12.6 20210608_2021_GR3HLA_OT.sav           ZOU994WS.TXT  Aug  9 2021 13:47
INPUT: 277 PERSON  56 ITEM  REPORTED: 277 PERSON  56 ITEM  122 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5
    4                +
                     |
                     |
                     |
                     |
                     |
                     |   @127.1
                     |
                     |
    3                +            @379.2
                     |
                     |
                     |  @1285.1
                     |
                   . |T  @113.1
                     |
                     |
                     |
    2              . +
                   # |   @112.1   @138.2
                   # |  @1286.1
                   . |
                   # |  @1025.1
                   # |   @104.1  @1020.2
                     |                    @1024.3            @394.5
                     |S
                   # T|   @379.1  @1284.2
    1                +
                 .# |    @96.1
                         @87.1
                        @1023.1
               .###  |           @1024.2
                 .#  |  @1020.1
                        @1026.1
                 ##  |
                  .  |   @143.1
                        @1277.1
                         @138.1
                 ##  |
               .###  |   @156.1
                         @88.1
               #### S|   @101.1                     @394.4
                         @381.1
                          @95.1
                          @97.1
```

```
                          @92.1
                         @1284.1
    0            ##  +M  @108.1
            #######  |   @110.1
                         @1024.1
                          @119.1
                         @1478.1
                .##  |   @137.1
                         @1022.1
                          @158.1
                          @130.1
            .######  |  @1282.1
                 .#  |    @99.1            @394.3
                         @1281.1
                 .#  |   @161.1
                          @123.1
                          @114.1
       ############  |   @125.1
                           @89.1
                 ##  |
              ##### M|
   -1       .######  +  @1021.1   @394.2
                           @84.1
                          @107.1
                         @1283.1
                          @162.1
                 ##  |
           ########  |S  @117.1
                          @145.1
           ########  |
             .#####  |   @384.1
      #############  |   @394.1
                     |   @150.1
                          @383.1
            #######  |
           .####### S|    @91.1
                           @94.1
   -2        ######  +
              .####  |    @93.1
                 .#  |    @90.1
                     |
                .##  |T
                     |
                  .  |
                     |
                  # T|
   -3                +
               <less>|<freq> 0        1        2        3        4
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.2: Grade 4 HLA Item Map

```
TABLE 12.6 06092021_2021_GR4HLA_OT.sav           ZOU575WS.TXT  Aug  9 2021 13:49
INPUT: 253 PERSON  57 ITEM  REPORTED: 253 PERSON  57 ITEM  123 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5
    4                +
                     |  @1017.1
                     |
                     |
                     |
                     |
                     |
                     |
                     |
    3                +
                     |
                     |
                     |
                     |
                     |
                  .  |
                     |
                     |T            @35.2
    2                +  @1014.1             @42.3            @395.5
                     |    @11.1
                  #  |
                  #  |
                     |    @63.1           @1013.3
                     |
                  . T|
                  #  |                              @395.4
                .##  |S   @35.1
    1            ##  +    @56.1    @42.2
                          @57.1
               ####  |    @41.1
                        @1012.1
                        @1291.1
                .#  |    @25.1
                ##  |    @24.1
                        @1016.1
                ##  |  @1019.1
                        @1011.1
             ###### S|           @1013.2
               .###  |    @55.1            @395.3
                           @9.1
                          @22.1
          .########  |    @46.1
                          @40.1
                ##  |    @37.1
                          @61.1
    0        ######  +M   @23.1
                          @36.1
                          @51.1
                          @21.1
                          @26.1
                         @387.1
```

```
                          @62.1
             .####  |     @31.1
                          @50.1
                        @1015.1
                          @17.1
       .##########  |     @30.1
                          @47.1
                        @1013.1
                          @54.1
             ##### M|     @42.1   @395.2
            .#####  |     @15.1
            .#####  |     @34.1
         .#######  |      @8.1
                          @27.1
             .####  |     @18.1
             .####  |
   -1       #######  +     @60.1
             #####  |S    @16.1
                          @49.1
             ##### S|    @395.1
                          @38.1
                          @48.1
                          @14.1
                          @64.1
             #####  |     @12.1
                ##  |     @20.1
                .#  |
                 #  |    @389.1
                          @65.1
               .##  |      @7.1
                ##  |
   -2           ##  +
                   T|T    @13.1
                .#  |
                 .  |
                    |
                    |
                    |
                    |
                    |
   -3               +
              <less>|<freq> 0        1        2        3        4
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.3: Grade 5 HLA Item Map

```
TABLE 12.6 0609_2021_GR5HLA_ANALYSIS.sav         ZOU128WS.TXT  Aug  9 2021 13:50
INPUT: 252 PERSON  57 ITEM  REPORTED: 252 PERSON  57 ITEM  125 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5        6
    5                +
                     |
                     |
                     |
                     |
                     |                                @712.4
                     |
                     |
    4                +
                     |
                     |
                     |
                     |
                     |
                     |            @706.2
                     |
    3                +                     @722.3
                     |
                  .  |
                     |
                     |
                     |
                     |
                     |T
    2                +   @706.1
                         @677.1
                  .  |   @707.1
                     |
                  .  |   @673.1
                  .  |
                  #  |   @640.1
                         @681.1
                  . T|   @718.1                                        @1030.6
                ####  |
    1             .#  +S  @723.1
                         @637.1
                .###  |   @708.1            @712.3
                   #  |
                 .##  |   @693.1
                         @1072.1
                         @1215.1
                  .#  |  @1208.1
                         @642.1
                         @711.1
                         @713.1
                         @727.1
               ##### S|   @730.1   @722.2
                 ###  |   @719.1   @712.2
                         @629.1
               .####  |   @702.1
                         @716.1
```

```
                      @630.1
                     @1193.1
                     @1183.1
                      @714.1
 0           .##  +M  @633.1                           @1030.5
                      @726.1
          .#####  |   @720.1
                      @725.1
       #########  |   @631.1
                      @712.1
                      @690.1
          ######  |   @684.1
                      @724.1
            ####  |  @1186.1
                      @627.1
                      @636.1
                      @648.1
         .###### M|   @696.1
                      @728.1
                      @646.1
       #########  |   @722.1                   @1030.4
            ####  |   @625.1
                      @672.1
                      @709.1
-1      ########  +S
         .######  |   @689.1          @1030.3
             .##  |   @699.1
                      @634.1
                      @721.1
      .#########  |   @626.1  @1030.2
           .#### S|
            ####  |   @729.1
              ##  |  @1222.1
                     @1030.1
              ##  |
-2           .##  +
            .###  |T
              ##  |
               #  |
                 T|  @1074.1
                      @644.1
                  |
              .#  |
                  |
-3                +
            <less>|<freq> 0        1        2        3        4        5
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.4: Grade 6 HLA Item Map

```
TABLE 12.6 20210611_2021_GR7HLA_ANALYSIS.sav     ZOU763WS.TXT  Aug  9 2021 13:54
INPUT: 163 PERSON  57 ITEM  REPORTED: 163 PERSON  57 ITEM  134 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5        6
    4                +
                     |
                     |
                     |
                     |
                     |
                     |
                     |   @903.1
    3                +
                     |
                     |
                     |
                     |T
                     |
                     |
                     |   @886.1
                         @822.1
    2             .  +   @869.1
                         @870.1
                     |   @843.1
                     |
                     |  @1089.1
                         @874.1
                     |                    @878.3                    @1032.6
                     |   @884.1                   @872.4
                     |S @1185.1   @770.2
                  .  |  @1179.1
                         @883.1
                         @774.1
    1             .  +
                  . T|   @880.1            @889.3
                         @876.1
                        @1178.1
                     |                    @872.3
                  .  |
                 ##  |  @1088.1           @1096.3   @808.4
                        @1098.1
                  #  |  @1104.1   @872.2  @1097.3
                        @1182.1
                         @770.1
                         @891.1
                         @839.1
                .##  |            @889.2                    @1032.5
                                   @878.2
                  #  |   @892.1
                         @803.1
    0            ### S+M  @806.1            @808.3
                         @811.1
                         @902.1
               ####  |   @872.1
                         @879.1
               .###  |   @889.1
              .####  |   @777.1  @1096.2
                         @878.1
             .#####  |  @1175.1  @1097.2
               .###  |   @930.1
                         @834.1
                         @899.1
                ###  |  @1099.1
```

```
              .###  |   @762.1   @808.2           @1032.4
                        @897.1
                        @875.1
   -1      ######## M+   @829.1
                        @877.1
              .###  |  @1096.1
            .#####  |S
              ####  |   @808.1           @1032.3
               ###  |
                ##  |
               .##  |   @784.1
                        @763.1
                        @887.1
                .# S|   @790.1  @1032.2
                        @882.1
   -2             #  +   @769.1
                       @1097.1
                        @871.1
                .#  |  @1118.1
                 .  |   @885.1
                        @888.1
                       @1032.1
              .###  |
                ##  |T
                 #  |
                   T|
                 #  |
   -3            .  +
                    |
                 #  |
                    |
                    |
                    |
                    |
                    |
   -4               +
              <less>|<freq> 0        1        2        3        4        5
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.5: Grade 7 HLA Item Map

```
TABLE 12.6 20210611_2021_GR7HLA_ANALYSIS.sav     ZOU638WS.TXT  Aug  9 2021 13:57
INPUT: 163 PERSON  57 ITEM  REPORTED: 163 PERSON  57 ITEM  134 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5        6
    4                +
                     |
                     |
                     |
                     |
                     |
                     |
                     |   @903.1
    3                +
                     |
                     |
                     |
                     |T
                     |
                     |
                     |   @886.1
                         @822.1
    2             .  +   @869.1
                         @870.1
                     |   @843.1
                     |
                     |  @1089.1
                         @874.1
                     |                    @878.3                    @1032.6
                     |   @884.1                   @872.4
                     |S @1185.1   @770.2
                  .  |  @1179.1
                         @883.1
                         @774.1
    1             .  +
                  . T|   @880.1            @889.3
                         @876.1
                        @1178.1
                     |                    @872.3
                  .  |
                 ##  |  @1088.1           @1096.3   @808.4
                        @1098.1
                  #  |  @1104.1   @872.2  @1097.3
                        @1182.1
                         @770.1
                         @891.1
                         @839.1
                .##  |            @889.2                    @1032.5
                                   @878.2
                  #  |   @892.1
                         @803.1
    0            ### S+M  @806.1            @808.3
                         @811.1
                         @902.1
               ####  |   @872.1
                         @879.1
               .###  |   @889.1
              .####  |   @777.1  @1096.2
                         @878.1
             .#####  |  @1175.1  @1097.2
               .###  |   @930.1
                         @834.1
                         @899.1
                ###  |  @1099.1
```

```
             .###  |   @762.1   @808.2           @1032.4
                       @897.1
                       @875.1
   -1      ######## M+   @829.1
                       @877.1
             .###  |  @1096.1
           .#####  |S
             ####  |   @808.1           @1032.3
              ###  |
               ##  |
              .##  |   @784.1
                       @763.1
                       @887.1
               .# S|   @790.1  @1032.2
                       @882.1
   -2           #  +   @769.1
                      @1097.1
                       @871.1
               .#  |  @1118.1
                .  |   @885.1
                       @888.1
                      @1032.1
             .###  |
               ##  |T
                #  |
                  T|
                #  |
   -3           .  +
                   |
                #  |
                   |
                   |
                   |
                   |
                   |
   -4              +
             <less>|<freq> 0        1        2        3        4        5
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.6: Grade 8 HLA Item Map

```
TABLE 12.6 20210611_2021_GR8HLA_ANALYSIS.sav     ZOU814WS.TXT  Aug  9 2021 13:58
INPUT: 138 PERSON  56 ITEM  REPORTED: 138 PERSON  56 ITEM  129 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5        6
                     |   @793.1
    4                +
                     |
                     |
                     |
                     |
                     |                              @780.4
                     |   @802.1
                         @810.1
    3                +
                     |T
                     |
                     |   @766.1
                     |
                     |
                     |                     @911.3   @820.4
    2             .  +
                  .  |  @1092.1            @780.3
                  .  |
                  . T|S  @772.1
                  .  |   @913.1
                  .  |            @911.2   @820.3                    @1034.6
                  #  |   @764.1                   @1214.4
                         @901.1
    1             #  +  @1127.1
                         @867.1
                         @916.1
                         @924.1
                 .#  |   @894.1
                .###  |   @761.1           @1214.3
                 .#  |   @914.1                            @1034.5
                         @893.1
                         @771.1
                .## S|   @778.1
                        @1105.1
                        @1078.1
                 ###  |  @1201.1   @820.2
                         @905.1
                 .##  |M  @796.1  @1214.2
                         @920.1   @767.2
                         @912.1
                         @826.1
                         @926.1
    0             ##  +  @1210.1   @780.2
                .###  |                            @1034.4
                ####  |   @906.1
                        @1199.1
                         @805.1
               .####  |  @1079.1
                         @922.1
                        @1214.1
```

```
                        @785.1
                       @1190.1
                ## M|   @767.1
                        @820.1
                       @1212.1
                        @780.1
                        @925.1
           #######  |   @855.1
               ###  |   @921.1           @1034.3
   -1           .##  +
             .####  |   @833.1
                        @910.1
                  .  |S  @911.1
               ####  |  @1192.1  @1034.2
                 .# S|   @927.1
                 .#  |   @904.1
                 ##  |
   -2            .#  +   @929.1
                       @1034.1
                  #  |   @848.1
                 .#  |
                     |  @1126.1
                        @909.1
                 .# T|T
                 .#  |
                     |
   -3                +
                     |   @917.1
                     |
                     |
                     |
                     |
   -3                +
               <less>|<freq> 0        1        2        3        4        5
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.7: Grade 3 MA Item Map

```
TABLE 12.6 20210608_2021_GR3MA_OT.sav            ZOU110WS.TXT  Aug  9 2021 13:59
INPUT: 275 PERSON  55 ITEM  REPORTED: 275 PERSON  55 ITEM  113 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2
    4                +
                     |
                     |
                     |
                     |
                     |   @992.1
                     |
                     |
    3                +
                     |
                     |            @233.2
                                  @235.2
                   . |T
                     |   @233.1
                   . |  @1305.1
                     |
                     |  @1036.1
    2              . +            @234.2
                     |
                   . |   @234.1
                     |   @185.1
                         @235.1
                   . |  @1303.1
                     |S
                   . |
                   . |   @219.1
    1              # +
                   # |
                  .# T|   @371.1
                         @368.1
                         @995.1
                  .#  |   @217.1
                         @218.1
                         @211.1
                         @191.1
                         @226.1
                .####  |   @213.1
                         @210.1
                   #  |  @1035.1
                         @230.1
                  .#  |   @172.1
                         @209.1
                         @221.1
                  ##  |   @225.1
                         @374.1
    0           .#### S+M  @212.1
                         @182.1
                         @224.1
                         @208.1
                  ##  |   @214.1
```

```
                        @205.1
            #####  |    @231.1
                        @186.1
                        @223.1
        #########  |    @169.1
                        @204.1
                        @173.1
             .###  |    @180.1
                        @174.1
                        @229.1
            #####  |    @216.1
           ######  |    @188.1
     .########### M|
  -1      .#######  +    @207.1
      ###########  |    @193.1
    .############  |    @190.1
     .###########  |S   @206.1
      .#########  |    @201.1
                        @187.1
        #########  |
           .##### S|
                   |    @189.1
  -2            ##  +
             .###  |    @198.1
               ##  |    @215.1
                        @184.1
                        @202.1
                   |
                . T|
                   |T
                   |
                   |
  -3               +
                   |
                   |
                   |
                   |
                   |    @178.1
                   |
                   |
  -4               +
             <less>|<freq> 0        1
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.8: Grade 4 MA Item Map

```
TABLE 12.6 06082021_2021_GR4MA_OT.sav            ZOU030WS.TXT  Aug  9 2021 14: 2
INPUT: 252 PERSON  55 ITEM  REPORTED: 252 PERSON  55 ITEM  112 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2
    4                +
                     |
                     |
                     |
                     |   @244.1
                     |
                     |  @1010.1
                     |
                     |
    3                +   @252.1
                     |
                     |
                     |
                     |   @240.1
                     |
                     |
                     |T
                     |
    2                +   @239.1
                     |
                     |
                     |
                     |
                   . |
                     |
                     |            @375.2
                   . |S
    1              . +
                   . |
                  .# |
                   . |
                   # T|   @253.1
                  .# |   @246.1
                         @166.1
                         @261.1
                         @278.1
                  .# |   @241.1
                         @257.1
                        @1009.1
                         @259.1
                  ## |   @276.1
                        @1006.1
                        @1007.1
                  .# |   @373.1
                         @103.1
                         @243.1
                         @254.1
    0            .## +M  @256.1
                         @164.1
                         @168.1
                         @264.1
```

```
                        @247.1
                ## S|   @377.1
                        @236.1
                        @249.1
                        @157.1
                  #  |   @277.1
                        @250.1
                        @245.1
                        @171.1
             .####  |   @238.1   @262.2
                        @274.1
                        @378.1
                  #  |   @258.1
                        @165.1
                        @263.1
                ###  |
           #######  |   @170.1
                        @271.1
              .### M|   @154.1
                        @167.1
                        @375.1
          .#######  |   @109.1
                       @1005.1
  -1         .####  +   @265.1
             #####  |S  @135.1
                        @267.1
      .###########  |
           #######  |   @268.1
                        @140.1
               .##  |   @163.1
              .### S|
               ###  |   @262.1
                    |
                .#  |
  -2             .  +
                 .  |
                  T|T
                 #  |
                    |
                    |
                    |
                    |   @242.1
                    |
  -3                +
              <less>|<freq> 0        1
EACH "#" IS 3: EACH "." IS 1 TO 2
```

## Appendix Figure F.9: Grade 5 MA Item Map

```
TABLE 12.6 06092021_2021_GR5MA_OT.sav            ZOU720WS.TXT  Aug  9 2021 14: 0
INPUT: 249 PERSON  58 ITEM  REPORTED: 249 PERSON  58 ITEM  123 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3
    3                +
                     |   @420.1
                     |
                     |
                     |
                     |
                     |
                     |
                     |
                     |
    2                +
                     |
                     |T           @464.2
                  .  |           @1093.2
                     |   @417.1
                     |
                     |  @1093.1
                        @1217.1
                     |   @440.1
                     |  @1229.1
                  .  |            @463.2
    1             .  +  @1223.1
                        @1232.1
                  .  |S
                     |   @459.1            @435.3
                         @453.1
                  .  |   @449.1
                  .  |
                  # T|   @419.1
                         @445.1
                         @463.1
                         @432.1
                         @443.1
                  .  |   @429.1
                         @412.1
                        @1202.1
                         @462.1
                 ##  |   @428.1
                 .#  |   @442.1
                         @464.1
                         @436.1
                 .#  |   @439.1   @435.2
    0             .  +M  @454.1
                         @426.1
                        @1058.1
                         @437.1
                 .#  |  @1136.1
                         @450.1
                  . S|  @1121.1            @414.3
                         @425.1
```

```
              .###  |   @451.1
                       @1187.1
                        @455.1
                ##  |   @456.1   @414.2
                        @434.1
                        @448.1
                        @452.1
          .######  |   @435.1
                        @414.1
                        @422.1
                        @416.1
            .####  |   @431.1
                       @1130.1
                        @424.1
                        @415.1
           .#####  |   @457.1
             .###  |   @446.1
           .##### M|S  @444.1
  -1         #####  +
             .###  |
      .##########  |   @413.1
             .###  |  @1128.1
                        @441.1
              ###  |   @421.1
                  S|
            #####  |   @460.1
             .###  |
              .##  |T
              .##  |   @433.1
  -2               +
               .#  |
                  T|   @458.1
                   |
                   |
                   |
                   |
                   |
                   |
                   |
  -3               +
             <less>|<freq> 0        1        2
EACH "#" IS 3: EACH "." IS 1 TO 2
```

## Appendix Figure F.10: Grade 6 MA Item Map

```
TABLE 12.6 06092021_2021_GR6MA_OT.sav            ZOU603WS.TXT  Aug  9 2021 14: 4
INPUT: 162 PERSON  57 ITEM  REPORTED: 162 PERSON  57 ITEM  125 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4
    3                +
                     |
                     |   @482.1
                     |
                     |
                     |   @585.1
                     |
                     |
                     |
    2                +
                     |T @1225.1
                         @570.1
                     |   @575.1
                         @524.1
                     |            @502.2   @491.3
                     |
                     |  @1251.1
                  .  |                    @1062.3
                     |
                  .  |                              @469.4
    1                +S  @476.1                    @1131.4
                         @466.1
                         @577.1
                  .  |
                     |
                  #  |   @470.1
                  .  |   @484.1
                  .  |   @512.1  @1062.2
                         @534.1
                  # T|
                  .  |  @1253.1           @1131.3
                        @1256.1
                         @521.1
                         @499.1
                 .#  |   @581.1   @491.2
                         @487.1
                         @580.1
                         @520.1
    0             #  +M                    @469.3
                  .  |   @545.1
                        @1062.1
                     |   @480.1
                         @553.1
                         @517.1
                         @572.1
                 .#  |   @551.1
                         @490.1
                ### S|   @578.1
                         @579.1
                        @1200.1
                         @574.1
```

```
                .#  |           @1131.2
                                 @469.2
                 #  |   @502.1
                        @567.1
                        @563.1
                        @478.1
              .###  |   @526.1
                        @515.1
                        @468.1
                        @550.1
                        @495.1
                       @1131.1
               .##  |  @1101.1
                       @1063.1
   -1         #####  +S  @509.1
                       @1142.1
                        @514.1
                       @1254.1
                 .  |   @491.1
                        @537.1
                       @1203.1
                        @568.1
                        @535.1
        .#########  |   @469.1
                .## M|
           #######  |
              .###  |
             .####  |
             #####  |
          .#######  |T
   -2       .#####  +   @571.1
              .### S|
                    |
              ####  |
                    |
                 .  |
                 .  |
                    |
                   T|
   -3                +
                     |
                     |
                     |
                     |
                     |
                 #   |
                     |
                     |
   -4                +
              <less>|<freq> 0        1        2        3
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.11: Grade 7 MA Item Map

```
TABLE 12.6 06092021_2021_GR7MA_OT.sav            ZOU323WS.TXT  Aug  9 2021 14: 6
INPUT: 162 PERSON  56 ITEM  REPORTED: 162 PERSON  56 ITEM  116 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3
    4                +
                     |
                     |
                     |   @555.1
                     |
                     |
                     |
                     |
                     |
    3                +  @1252.1
                     |
                     |
                     |
                     |   @513.1
                     |
                     |T
                     |   @501.1
                     |
    2                +  @1066.1
                        @1247.1
                        @1264.1
                     |
                     |
                     |
                     |
                     |
                     |   @471.1
                     |
                  .  |S
    1                +                      @547.3
                     |   @552.1
                     |   @516.1
                     |  @1244.1
                     |  @1237.1
                         @467.1
                     |   @477.1
                     |   @475.1
                         @543.1
                         @522.1
                         @474.1
                     |   @479.1
                     |   @483.1
    0             #  +M           @562.2
                     |   @549.1
                         @492.1
                        @1259.1
                     |   @564.1   @547.2
                         @488.1   @481.2
                         @485.1
                         @511.1
                         @527.1
```

```
                        @561.1
                .#  |   @493.1
                   T|   @506.1
                        @559.1
                       @1234.1
                        @540.1
                .#  |   @486.1
                        @533.1
                 .  |   @503.1
                        @494.1
                 .  |   @565.1
                        @505.1
                        @489.1
                ##  |   @525.1
                        @496.1
                        @547.1
                       @1241.1
                        @498.1
   -1         .#### S+   @481.1
               .##  |S @1065.1
         #########  |   @557.1
              ####  |   @523.1
                       @1134.1
                        @541.1
            .####  |   @616.1
                        @536.1
          ####### M|
           ######  |   @562.1
                        @508.1
        ##########  |
         #########  |
   -2      #######  +
                   S|
            .####  |
              .##  |T
                   |
               ##  |
                  T|
                 .  |
                    |
   -3            .  +
              <less>|<freq> 0        1        2
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.12: Grade 8 MA Item Map

```
TABLE 12.6 20210611_2021_GR8HLA_ANALYSIS.sav     ZOU722WS.TXT  Aug  9 2021 14: 7
INPUT: 138 PERSON  56 ITEM  REPORTED: 138 PERSON  56 ITEM  129 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4        5        6
                     |   @793.1
    4                +
                     |
                     |
                     |
                     |
                     |                              @780.4
                     |   @802.1
                         @810.1
    3                +
                     |T
                     |
                     |   @766.1
                     |
                     |
                     |                     @911.3   @820.4
    2             .  +
                  .  |  @1092.1            @780.3
                  .  |
                  . T|S  @772.1
                  .  |   @913.1
                  .  |            @911.2   @820.3                    @1034.6
                  #  |   @764.1                   @1214.4
                         @901.1
    1             #  +  @1127.1
                         @867.1
                         @916.1
                         @924.1
                 .#  |   @894.1
                .###  |   @761.1           @1214.3
                 .#  |   @914.1                            @1034.5
                         @893.1
                         @771.1
                .## S|   @778.1
                        @1105.1
                        @1078.1
                 ###  |  @1201.1   @820.2
                         @905.1
                 .##  |M  @796.1  @1214.2
                         @920.1   @767.2
                         @912.1
                         @826.1
                         @926.1
    0             ##  +  @1210.1   @780.2
                .###  |                            @1034.4
                ####  |   @906.1
                        @1199.1
                         @805.1
               .####  |  @1079.1
                         @922.1
                        @1214.1
```

```
                        @785.1
                       @1190.1
                 ## M|   @767.1
                        @820.1
                       @1212.1
                        @780.1
                        @925.1
            #######  |   @855.1
                ###  |   @921.1           @1034.3
   -1           .##  +
              .####  |   @833.1
                        @910.1
                  .  |S  @911.1
               ####  |  @1192.1  @1034.2
                 .# S|   @927.1
                 .#  |   @904.1
                 ##  |
   -2            .#  +   @929.1
                       @1034.1
                  #  |   @848.1
                 .#  |
                     |  @1126.1
                        @909.1
                 .# T|T
                 .#  |
                     |
   -3                +
                     |   @917.1
                     |
                     |
                     |
                     |
   -3                +
               <less>|<freq> 0        1        2        3        4        5
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.13: Grade 5 SC Item Map

```
TABLE 12.6 06082021_2021_GR5SC_OT.sav            ZOU773WS.TXT  Aug  9 2021 14: 8
INPUT: 251 PERSON  53 ITEM  REPORTED: 251 PERSON  53 ITEM  121 CATS WINSTEPS 5.1.1.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4
    3                +
                     |
                     |
                     |
                     |
                     |
                     |
                     |  @1360.1
                     |
    2                +
                     |                             @1315.4
                     |T @1353.1
                     |
                     |  @1357.1
                     |  @1320.1
                     |  @1363.1
                     |                             @1350.4
                     |  @1369.1           @1331.3  @1372.4
                        @1346.1
                        @1368.1
    1                +  @1348.1  @1334.2
                        @1340.1
                     |S
                   .  |                    @1350.3
                     |  @1364.1           @1372.3
                        @1349.1           @1315.3
                   #  |  @1365.1
                        @1318.1
                        @1324.1
                   # T|                    @1341.3
                   #  |  @1354.1  @1372.2
                  ##  |  @1366.1  @1315.2
                                    @1350.2
                 ###  |  @1319.1
                        @1339.1
                        @1374.1
                        @1338.1
    0           .###  +M @1337.1  @1331.2
               ####  |  @1359.1
                        @1327.1
                        @1326.1
                        @1372.1
                  .#  |  @1333.1
                        @1351.1
              ##### S|  @1334.1
                        @1350.1
                        @1330.1
                        @1361.1
            .######  |  @1370.1  @1341.2
                        @1315.1
                        @1344.1
```

```
              .###  |  @1329.1
                    |  @1336.1
      .###########  |  @1358.1  @1356.2
                    |  @1367.1
                    |  @1325.1
          .######   |  @1373.1
                    |  @1332.1
                    |  @1371.1
         .#######   |S @1331.1
   -1      ###### M+  @1362.1
            #####   |  @1317.1
                    |  @1323.1
     #############  |  @1341.1
          .######   |  @1347.1
             ####   |
          .######   |
        ##########  |
               ### S|T @1328.1
                    |  @1321.1
                    |  @1322.1
   -2          .###  +
               .##   |
                ##   |  @1356.1
                     |
               .## T|
                     |
               .##   |
                     |
                     |
   -3                +
                     |
                 .   |
                     |
                     |
                     |
                     |
                     |
                     |
   -4                +
              <less>|<freq> 0        1        2        3
EACH "#" IS 2: EACH "." IS 1
```

## Appendix Figure F.14: Grade 8 SC Item Map

```
TABLE 12.6 06092021)2021_GR8Sc_student_redo.sav  ZOU097WS.TXT  Oct  5 2021 15:34
INPUT: 138 PERSON  58 ITEM  REPORTED: 138 PERSON  58 ITEM  124 CATS WINSTEPS 5.1.4.0
--------------------------------------------------------------------------------

MEASURE    PERSON - MAP - ITEM - 50% Cumulative probabilities (Rasch-Thurstonian thresholds)
               <more>|<rare> 1        2        3        4
    3                +
                     |   @959.1
                         @971.1
                         @961.1
                     |
                     |
                     |T
                     |
                     |
                     |
                     |
    2                +   @983.1
                         @958.1
                        @1110.1
                         @975.1
                     |
                     |
                     |
                     |   @984.1
                         @980.1
                     |   @951.1
                     |
                     |S  @947.1
                         @978.1
                     |   @979.1
    1                +
                     |  @1258.1
                         @974.1
                     |  @1056.1
                         @986.1
                     |   @987.1
                         @967.1
                     |
                     |
                     |   @955.1                    @945.4
                        @1238.1
                        @1260.1
                     |  @1111.1
                         @944.1
                  X  |
    0                +M                   @945.3   @937.4
                XX T|   @964.1
                         @970.1
            XXXXXX  |                   @1114.3
                     |
                     |  @1205.1   @945.2
                        @1263.1
                         @981.1
                         @954.1
                         @938.1
             XXXXX  |  @1265.1            @937.3
```

```
          XXXXXX  |   @949.1
                    @1266.1
                     @948.1
                     @977.1
           XXXXX  |   @960.1
                     @969.1
                     @953.1
           XXXXX S|   @936.1
                     @950.1
-1           XXX  +  @1267.1  @1114.2
                     @965.1
           XXXXX  |   @945.1
                     @956.1
                     @932.1
                     @939.1
                    @1054.1
          XXXXXX  |S  @952.1
                     @972.1
                    @1109.1
           XXXXX  |
   XXXXXXXXXXXXX  |   @942.1   @937.2
     XXXXXXXXXXX M|
           XXXXX  |  @1257.1
                     @937.1
      XXXXXXXXXX  |   @946.1
          XXXXXX  |  @1114.1
                     @985.1
-2         XXXXX  +
        XXXXXXXX  |
    XXXXXXXXXXXX  |   @962.1
           XXXXX S|
                  |
            XXXX  |T
           XXXXX  |
                  |
             XXX  |
-3               T+
               X  |
                  |
                  |
               X  |
                  |
                  |
                  |
                  |
-4                +
            <less>|<freq> 0        1        2        3
```

# Appendix G: : Item Response Theory Item Statistics

This appendix contains the details of the Item Response Theory (IRT) item analysis.

### Appendix Table G.1: 2021 HLA IRT Statistics

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 3 | 84 | -0.95 | 277 | 0.13 | 0.83 | -3.99 | 0.77 | -3.61 | 0.00 | 0.57 | 1.61 | 0.51 | 0.42 |
| HLA | 3 | 87 | 0.90 | 277 | 0.17 | 0.88 | -1.21 | 0.74 | -1.78 | 0.00 | 0.51 | 1.15 | 0.18 | 0.33 |
| HLA | 3 | 88 | 0.17 | 277 | 0.15 | 0.90 | -1.42 | 0.81 | -2.08 | 0.00 | 0.52 | 1.20 | 0.29 | 0.39 |
| HLA | 3 | 89 | -0.64 | 277 | 0.13 | 1.09 | 1.71 | 1.10 | 1.47 | 0.00 | 0.33 | 0.74 | 0.45 | 0.47 |
| HLA | 3 | 90 | -2.20 | 277 | 0.15 | 0.86 | -2.13 | 0.74 | -2.09 | 0.00 | 0.46 | 1.27 | 0.75 | 0.38 |
| HLA | 3 | 91 | -1.83 | 277 | 0.14 | 0.83 | -3.24 | 0.71 | -2.96 | 0.00 | 0.52 | 1.44 | 0.69 | 0.39 |
| HLA | 3 | 92 | 0.07 | 277 | 0.14 | 0.86 | -2.22 | 0.76 | -2.75 | 0.00 | 0.56 | 1.29 | 0.31 | 0.39 |
| HLA | 3 | 93 | -2.09 | 277 | 0.15 | 0.94 | -0.85 | 0.89 | -0.83 | 0.00 | 0.38 | 1.12 | 0.74 | 0.40 |
| HLA | 3 | 94 | -1.91 | 277 | 0.14 | 0.87 | -2.37 | 0.79 | -1.98 | 0.00 | 0.48 | 1.32 | 0.70 | 0.40 |
| HLA | 3 | 95 | 0.15 | 277 | 0.14 | 0.94 | -0.90 | 1.01 | 0.16 | 0.00 | 0.45 | 1.07 | 0.30 | 0.40 |
| HLA | 3 | 96 | 0.93 | 277 | 0.17 | 0.89 | -1.11 | 0.73 | -1.82 | 0.00 | 0.50 | 1.14 | 0.18 | 0.33 |
| HLA | 3 | 97 | 0.13 | 277 | 0.14 | 0.89 | -1.69 | 0.86 | -1.44 | 0.00 | 0.51 | 1.19 | 0.30 | 0.39 |
| HLA | 3 | 99 | -0.48 | 277 | 0.13 | 0.97 | -0.64 | 0.97 | -0.44 | 0.00 | 0.44 | 1.09 | 0.42 | 0.44 |
| HLA | 3 | 101 | 0.15 | 277 | 0.14 | 0.92 | -1.21 | 0.85 | -1.62 | 0.00 | 0.50 | 1.16 | 0.30 | 0.40 |
| HLA | 3 | 104 | 1.46 | 276 | 0.20 | 0.80 | -1.56 | 0.51 | -2.71 | 0.00 | 0.55 | 1.19 | 0.12 | 0.27 |
| HLA | 3 | 107 | -0.99 | 277 | 0.13 | 1.15 | 3.09 | 1.13 | 1.78 | 0.00 | 0.27 | 0.52 | 0.52 | 0.49 |
| HLA | 3 | 108 | -0.01 | 277 | 0.14 | 0.80 | -3.24 | 0.73 | -3.39 | 0.00 | 0.61 | 1.40 | 0.32 | 0.38 |
| HLA | 3 | 110 | -0.08 | 276 | 0.14 | 1.07 | 1.13 | 1.11 | 1.29 | 0.00 | 0.34 | 0.84 | 0.34 | 0.44 |
| HLA | 3 | 112 | 1.85 | 276 | 0.22 | 0.95 | -0.25 | 0.62 | -1.57 | 0.00 | 0.41 | 1.08 | 0.09 | 0.26 |
| HLA | 3 | 113 | 2.39 | 276 | 0.27 | 0.99 | 0.01 | 1.10 | 0.39 | 0.00 | 0.26 | 1.00 | 0.06 | 0.22 |
| HLA | 3 | 114 | -0.52 | 276 | 0.13 | 1.14 | 2.56 | 1.23 | 3.16 | 0.00 | 0.27 | 0.57 | 0.42 | 0.48 |
| HLA | 3 | 117 | -1.24 | 276 | 0.13 | 0.88 | -2.78 | 0.82 | -2.54 | 0.00 | 0.51 | 1.44 | 0.57 | 0.43 |
| HLA | 3 | 119 | -0.13 | 276 | 0.14 | 1.25 | 3.73 | 1.32 | 3.51 | 0.00 | 0.18 | 0.47 | 0.35 | 0.48 |
| HLA | 3 | 123 | -0.51 | 275 | 0.13 | 1.33 | 5.72 | 1.50 | 6.27 | 0.00 | 0.08 | 0.02 | 0.42 | 0.52 |
| HLA | 3 | 125 | -0.61 | 276 | 0.13 | 0.97 | -0.52 | 0.97 | -0.39 | 0.00 | 0.44 | 1.08 | 0.44 | 0.45 |
| HLA | 3 | 127 | 3.31 | 275 | 0.39 | 0.87 | -0.29 | 0.41 | -1.16 | 0.00 | 0.33 | 1.09 | 0.03 | 0.14 |
| HLA | 3 | 130 | -0.25 | 276 | 0.14 | 1.23 | 3.64 | 1.33 | 3.93 | 0.00 | 0.19 | 0.44 | 0.37 | 0.49 |
| HLA | 3 | 137 | -0.17 | 275 | 0.14 | 1.06 | 1.06 | 1.09 | 1.09 | 0.00 | 0.35 | 0.85 | 0.36 | 0.45 |
| HLA | 3 | 138 | 1.14 | 275 | 0.13 | 0.95 | -0.37 | 0.80 | -1.34 | 0.00 | 0.54 | 1.07 | 0.29 | 0.46 |
| HLA | 3 | 143 | 0.48 | 275 | 0.15 | 1.12 | 1.40 | 1.25 | 1.98 | 0.00 | 0.27 | 0.81 | 0.24 | 0.41 |
| HLA | 3 | 145 | -1.26 | 275 | 0.13 | 0.81 | -4.37 | 0.74 | -3.64 | 0.00 | 0.57 | 1.65 | 0.58 | 0.41 |
| HLA | 3 | 150 | -1.66 | 275 | 0.14 | 0.92 | -1.62 | 0.88 | -1.21 | 0.00 | 0.44 | 1.24 | 0.66 | 0.42 |
| HLA | 3 | 156 | 0.23 | 275 | 0.15 | 1.14 | 1.87 | 1.28 | 2.51 | 0.00 | 0.26 | 0.74 | 0.28 | 0.44 |
| HLA | 3 | 158 | -0.23 | 275 | 0.14 | 1.05 | 0.86 | 1.08 | 1.01 | 0.00 | 0.36 | 0.87 | 0.37 | 0.45 |
| HLA | 3 | 161 | -0.51 | 276 | 0.13 | 0.99 | -0.18 | 0.99 | -0.06 | 0.00 | 0.42 | 1.02 | 0.42 | 0.45 |
| HLA | 3 | 162 | -1.03 | 276 | 0.13 | 0.95 | -1.11 | 0.91 | -1.39 | 0.00 | 0.45 | 1.20 | 0.53 | 0.45 |
| HLA | 3 | 379 | 1.98 | 276 | 0.16 | 0.87 | -0.92 | 0.65 | -1.90 | 0.00 | 0.53 | 1.11 | 0.17 | 0.34 |
| HLA | 3 | 381 | 0.15 | 277 | 0.14 | 0.86 | -1.99 | 0.78 | -2.40 | 0.00 | 0.55 | 1.25 | 0.30 | 0.39 |
| HLA | 3 | 383 | -1.71 | 276 | 0.14 | 1.10 | 1.91 | 1.31 | 2.88 | 0.00 | 0.23 | 0.66 | 0.67 | 0.46 |
| HLA | 3 | 384 | -1.44 | 275 | 0.13 | 1.14 | 2.81 | 1.15 | 1.70 | 0.00 | 0.24 | 0.57 | 0.61 | 0.48 |
| HLA | 3 | 394 | -0.29 | 273 | 0.06 | 1.09 | 1.08 | 1.07 | 0.72 | 0.00 | 0.73 | 0.94 | 1.84 | 1.12 |
| HLA | 3 | 1020 | 1.00 | 276 | 0.13 | 0.86 | -1.09 | 0.63 | -1.76 | 0.00 | 0.60 | 1.10 | 0.25 | 0.44 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 3 | 1021 | -0.95 | 275 | 0.13 | 1.18 | 3.65 | 1.17 | 2.45 | 0.00 | 0.24 | 0.41 | 0.51 | 0.50 |
| HLA | 3 | 1022 | -0.23 | 276 | 0.14 | 1.41 | 6.13 | 1.57 | 6.29 | 0.00 | 0.02 | 0.04 | 0.37 | 0.52 |
| HLA | 3 | 1023 | 0.87 | 277 | 0.17 | 0.91 | -0.88 | 0.83 | -1.15 | 0.00 | 0.47 | 1.10 | 0.19 | 0.34 |
| HLA | 3 | 1024 | 0.63 | 276 | 0.09 | 0.66 | -3.24 | 0.57 | -3.34 | 0.00 | 0.75 | 1.23 | 0.50 | 0.52 |
| HLA | 3 | 1025 | 1.54 | 276 | 0.20 | 1.13 | 0.93 | 1.24 | 1.06 | 0.00 | 0.22 | 0.90 | 0.12 | 0.32 |
| HLA | 3 | 1026 | 0.61 | 277 | 0.16 | 0.87 | -1.49 | 0.76 | -1.95 | 0.00 | 0.53 | 1.18 | 0.22 | 0.36 |
| HLA | 3 | 1277 | 0.48 | 275 | 0.15 | 1.35 | 3.85 | 1.70 | 4.87 | 0.00 | 0.04 | 0.46 | 0.24 | 0.46 |
| HLA | 3 | 1280 | 0.37 | 274 | 0.15 | 1.29 | 3.43 | 1.41 | 3.26 | 0.00 | 0.12 | 0.56 | 0.26 | 0.45 |
| HLA | 3 | 1281 | -0.49 | 275 | 0.13 | 1.10 | 1.79 | 1.08 | 1.11 | 0.00 | 0.33 | 0.76 | 0.42 | 0.47 |
| HLA | 3 | 1282 | -0.38 | 275 | 0.14 | 1.08 | 1.46 | 1.16 | 2.18 | 0.00 | 0.32 | 0.75 | 0.40 | 0.46 |
| HLA | 3 | 1283 | -1.00 | 274 | 0.13 | 0.96 | -0.87 | 0.92 | -1.15 | 0.00 | 0.44 | 1.16 | 0.52 | 0.45 |
| HLA | 3 | 1284 | 0.56 | 274 | 0.11 | 0.78 | -2.20 | 0.69 | -2.26 | 0.00 | 0.67 | 1.17 | 0.39 | 0.49 |
| HLA | 3 | 1285 | 2.63 | 275 | 0.30 | 0.93 | -0.21 | 0.72 | -0.64 | 0.00 | 0.32 | 1.05 | 0.05 | 0.20 |
| HLA | 3 | 1286 | 1.80 | 275 | 0.22 | 0.98 | -0.11 | 1.02 | 0.17 | 0.00 | 0.32 | 1.01 | 0.09 | 0.27 |
| HLA | 3 | 1478 | -0.17 | 274 | 0.14 | 1.07 | 1.22 | 1.14 | 1.67 | 0.00 | 0.33 | 0.81 | 0.35 | 0.45 |
| HLA | 4 | 7 | -1.82 | 253 | 0.16 | 0.86 | -1.74 | 0.84 | -1.22 | 0.00 | 0.46 | 1.19 | 0.78 | 0.36 |
| HLA | 4 | 8 | -0.71 | 253 | 0.14 | 0.86 | -3.02 | 0.84 | -2.50 | 0.00 | 0.52 | 1.49 | 0.57 | 0.43 |
| HLA | 4 | 9 | 0.29 | 253 | 0.14 | 0.93 | -1.27 | 0.89 | -1.49 | 0.00 | 0.45 | 1.20 | 0.36 | 0.43 |
| HLA | 4 | 11 | 1.85 | 253 | 0.20 | 0.92 | -0.53 | 0.83 | -0.76 | 0.00 | 0.37 | 1.07 | 0.12 | 0.30 |
| HLA | 4 | 12 | -1.34 | 253 | 0.15 | 0.96 | -0.66 | 0.95 | -0.54 | 0.00 | 0.39 | 1.09 | 0.70 | 0.42 |
| HLA | 4 | 13 | -2.16 | 253 | 0.17 | 0.95 | -0.43 | 0.90 | -0.55 | 0.00 | 0.34 | 1.06 | 0.83 | 0.35 |
| HLA | 4 | 14 | -1.25 | 253 | 0.14 | 1.04 | 0.66 | 0.98 | -0.19 | 0.00 | 0.32 | 0.94 | 0.68 | 0.44 |
| HLA | 4 | 15 | -0.43 | 253 | 0.14 | 0.91 | -2.08 | 0.87 | -2.19 | 0.00 | 0.48 | 1.38 | 0.51 | 0.44 |
| HLA | 4 | 16 | -1.07 | 253 | 0.14 | 0.87 | -2.48 | 0.82 | -2.40 | 0.00 | 0.50 | 1.37 | 0.64 | 0.42 |
| HLA | 4 | 17 | -0.13 | 253 | 0.14 | 0.88 | -2.61 | 0.87 | -2.27 | 0.00 | 0.50 | 1.43 | 0.45 | 0.43 |
| HLA | 4 | 18 | -0.82 | 253 | 0.14 | 1.07 | 1.33 | 1.08 | 1.22 | 0.00 | 0.29 | 0.77 | 0.59 | 0.47 |
| HLA | 4 | 20 | -1.40 | 253 | 0.15 | 0.79 | -3.48 | 0.69 | -3.45 | 0.00 | 0.58 | 1.45 | 0.71 | 0.38 |
| HLA | 4 | 21 | 0.00 | 253 | 0.14 | 1.08 | 1.66 | 1.12 | 1.82 | 0.00 | 0.28 | 0.70 | 0.42 | 0.48 |
| HLA | 4 | 22 | 0.29 | 253 | 0.14 | 1.08 | 1.47 | 1.11 | 1.39 | 0.00 | 0.27 | 0.77 | 0.36 | 0.46 |
| HLA | 4 | 23 | 0.05 | 253 | 0.14 | 1.19 | 3.54 | 1.24 | 3.32 | 0.00 | 0.16 | 0.38 | 0.41 | 0.50 |
| HLA | 4 | 24 | 0.66 | 253 | 0.15 | 0.88 | -1.79 | 0.80 | -2.15 | 0.00 | 0.49 | 1.25 | 0.29 | 0.40 |
| HLA | 4 | 25 | 0.75 | 253 | 0.15 | 1.26 | 3.40 | 1.45 | 3.75 | 0.00 | 0.04 | 0.49 | 0.27 | 0.47 |
| HLA | 4 | 26 | 0.00 | 253 | 0.14 | 1.04 | 0.76 | 1.03 | 0.46 | 0.00 | 0.33 | 0.89 | 0.42 | 0.47 |
| HLA | 4 | 27 | -0.71 | 253 | 0.14 | 1.09 | 1.82 | 1.19 | 2.80 | 0.00 | 0.26 | 0.63 | 0.57 | 0.48 |
| HLA | 4 | 30 | -0.17 | 253 | 0.14 | 1.09 | 1.85 | 1.13 | 2.03 | 0.00 | 0.27 | 0.65 | 0.45 | 0.48 |
| HLA | 4 | 31 | -0.10 | 253 | 0.14 | 1.03 | 0.64 | 1.06 | 0.97 | 0.00 | 0.33 | 0.87 | 0.44 | 0.47 |
| HLA | 4 | 34 | -0.50 | 253 | 0.14 | 1.04 | 0.94 | 1.05 | 0.85 | 0.00 | 0.32 | 0.84 | 0.53 | 0.47 |
| HLA | 4 | 35 | 1.60 | 253 | 0.14 | 0.76 | -1.73 | 0.54 | -2.46 | 0.00 | 0.55 | 1.14 | 0.22 | 0.40 |
| HLA | 4 | 36 | 0.05 | 253 | 0.14 | 1.25 | 4.71 | 1.32 | 4.35 | 0.00 | 0.09 | 0.16 | 0.41 | 0.51 |
| HLA | 4 | 37 | 0.15 | 253 | 0.14 | 1.16 | 2.97 | 1.20 | 2.69 | 0.00 | 0.19 | 0.51 | 0.39 | 0.49 |
| HLA | 4 | 38 | -1.21 | 253 | 0.14 | 1.07 | 1.15 | 1.09 | 1.06 | 0.00 | 0.27 | 0.83 | 0.67 | 0.45 |
| HLA | 4 | 40 | 0.19 | 253 | 0.14 | 0.99 | -0.26 | 1.02 | 0.26 | 0.00 | 0.38 | 1.02 | 0.38 | 0.45 |
| HLA | 4 | 41 | 0.91 | 253 | 0.16 | 1.11 | 1.39 | 1.33 | 2.57 | 0.00 | 0.18 | 0.77 | 0.25 | 0.43 |
| HLA | 4 | 42 | 0.92 | 253 | 0.09 | 0.75 | -2.86 | 0.66 | -3.54 | 0.00 | 0.69 | 1.32 | 0.68 | 0.60 |
| HLA | 4 | 46 | 0.21 | 253 | 0.14 | 1.06 | 1.20 | 1.09 | 1.22 | 0.00 | 0.29 | 0.81 | 0.38 | 0.46 |
| HLA | 4 | 47 | -0.23 | 253 | 0.14 | 0.95 | -0.99 | 0.95 | -0.89 | 0.00 | 0.42 | 1.17 | 0.47 | 0.45 |
| HLA | 4 | 48 | -1.21 | 253 | 0.14 | 0.88 | -2.20 | 0.83 | -1.97 | 0.00 | 0.49 | 1.31 | 0.67 | 0.41 |
| HLA | 4 | 49 | -1.11 | 253 | 0.14 | 0.87 | -2.49 | 0.79 | -2.70 | 0.00 | 0.51 | 1.38 | 0.65 | 0.41 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 4 | 50 | -0.12 | 253 | 0.14 | 0.86 | -3.10 | 0.85 | -2.48 | 0.00 | 0.52 | 1.49 | 0.44 | 0.43 |
| HLA | 4 | 51 | 0.02 | 253 | 0.14 | 1.17 | 3.23 | 1.23 | 3.33 | 0.00 | 0.18 | 0.42 | 0.42 | 0.49 |
| HLA | 4 | 54 | -0.26 | 253 | 0.14 | 0.95 | -0.98 | 0.96 | -0.74 | 0.00 | 0.42 | 1.16 | 0.47 | 0.45 |
| HLA | 4 | 55 | 0.31 | 253 | 0.14 | 1.18 | 2.99 | 1.27 | 3.20 | 0.00 | 0.16 | 0.50 | 0.36 | 0.48 |
| HLA | 4 | 56 | 1.04 | 253 | 0.16 | 1.14 | 1.56 | 1.34 | 2.44 | 0.00 | 0.14 | 0.75 | 0.23 | 0.42 |
| HLA | 4 | 57 | 0.99 | 253 | 0.16 | 1.23 | 2.58 | 1.46 | 3.25 | 0.00 | 0.06 | 0.63 | 0.23 | 0.44 |
| HLA | 4 | 60 | -0.99 | 253 | 0.14 | 0.87 | -2.60 | 0.85 | -2.09 | 0.00 | 0.50 | 1.38 | 0.63 | 0.42 |
| HLA | 4 | 61 | 0.13 | 253 | 0.14 | 1.06 | 1.21 | 1.06 | 0.92 | 0.00 | 0.30 | 0.81 | 0.39 | 0.47 |
| HLA | 4 | 62 | 0.00 | 253 | 0.14 | 1.09 | 1.86 | 1.16 | 2.31 | 0.00 | 0.26 | 0.65 | 0.42 | 0.48 |
| HLA | 4 | 63 | 1.53 | 253 | 0.18 | 1.17 | 1.49 | 1.74 | 3.52 | 0.00 | 0.02 | 0.74 | 0.16 | 0.38 |
| HLA | 4 | 64 | -1.27 | 253 | 0.14 | 0.91 | -1.47 | 0.84 | -1.81 | 0.00 | 0.45 | 1.23 | 0.68 | 0.42 |
| HLA | 4 | 65 | -1.68 | 253 | 0.15 | 0.91 | -1.23 | 0.81 | -1.61 | 0.00 | 0.44 | 1.17 | 0.75 | 0.39 |
| HLA | 4 | 387 | 0.00 | 253 | 0.14 | 1.00 | 0.06 | 1.03 | 0.42 | 0.00 | 0.36 | 0.97 | 0.42 | 0.46 |
| HLA | 4 | 389 | -1.63 | 253 | 0.15 | 0.83 | -2.34 | 0.73 | -2.44 | 0.00 | 0.52 | 1.29 | 0.75 | 0.37 |
| HLA | 4 | 395 | 0.42 | 250 | 0.06 | 1.15 | 1.66 | 1.15 | 1.58 | 0.00 | 0.61 | 0.83 | 1.61 | 1.09 |
| HLA | 4 | 1011 | 0.55 | 252 | 0.15 | 0.98 | -0.23 | 1.01 | 0.15 | 0.00 | 0.36 | 1.01 | 0.31 | 0.43 |
| HLA | 4 | 1012 | 0.91 | 252 | 0.16 | 0.82 | -2.39 | 0.75 | -2.25 | 0.00 | 0.53 | 1.28 | 0.25 | 0.37 |
| HLA | 4 | 1013 | 0.62 | 252 | 0.08 | 0.84 | -1.88 | 0.76 | -2.20 | 0.00 | 0.66 | 1.19 | 0.80 | 0.73 |
| HLA | 4 | 1014 | 2.02 | 252 | 0.21 | 0.96 | -0.25 | 0.80 | -0.85 | 0.00 | 0.32 | 1.05 | 0.11 | 0.29 |
| HLA | 4 | 1015 | -0.12 | 252 | 0.14 | 1.06 | 1.30 | 1.09 | 1.43 | 0.00 | 0.30 | 0.76 | 0.44 | 0.47 |
| HLA | 4 | 1016 | 0.66 | 253 | 0.15 | 1.06 | 0.93 | 1.17 | 1.69 | 0.00 | 0.26 | 0.84 | 0.29 | 0.44 |
| HLA | 4 | 1017 | 3.89 | 253 | 0.46 | 0.92 | -0.05 | 0.37 | -1.19 | 0.00 | 0.26 | 1.07 | 0.02 | 0.13 |
| HLA | 4 | 1019 | 0.60 | 253 | 0.15 | 0.95 | -0.79 | 0.90 | -1.01 | 0.00 | 0.42 | 1.12 | 0.30 | 0.42 |
| HLA | 4 | 1291 | 0.87 | 253 | 0.15 | 0.93 | -0.92 | 0.89 | -0.95 | 0.00 | 0.42 | 1.12 | 0.25 | 0.39 |
| HLA | 5 | 625 | -0.85 | 252 | 0.14 | 1.17 | 3.20 | 1.27 | 3.49 | 0.00 | 0.22 | 0.41 | 0.55 | 0.49 |
| HLA | 5 | 626 | -1.40 | 252 | 0.14 | 0.92 | -1.45 | 0.87 | -1.41 | 0.00 | 0.46 | 1.22 | 0.66 | 0.42 |
| HLA | 5 | 627 | -0.47 | 252 | 0.14 | 1.22 | 4.11 | 1.29 | 3.97 | 0.00 | 0.18 | 0.26 | 0.47 | 0.50 |
| HLA | 5 | 629 | 0.19 | 252 | 0.15 | 0.92 | -1.27 | 0.88 | -1.37 | 0.00 | 0.48 | 1.18 | 0.34 | 0.42 |
| HLA | 5 | 630 | 0.15 | 252 | 0.14 | 1.11 | 1.77 | 1.13 | 1.45 | 0.00 | 0.29 | 0.75 | 0.35 | 0.46 |
| HLA | 5 | 631 | -0.20 | 252 | 0.14 | 0.93 | -1.39 | 0.92 | -1.09 | 0.00 | 0.47 | 1.21 | 0.41 | 0.43 |
| HLA | 5 | 633 | 0.04 | 252 | 0.14 | 1.07 | 1.12 | 1.21 | 2.37 | 0.00 | 0.31 | 0.78 | 0.37 | 0.45 |
| HLA | 5 | 634 | -1.22 | 252 | 0.14 | 1.04 | 0.72 | 1.01 | 0.14 | 0.00 | 0.35 | 0.92 | 0.62 | 0.45 |
| HLA | 5 | 636 | -0.48 | 252 | 0.14 | 0.92 | -1.56 | 0.91 | -1.29 | 0.00 | 0.48 | 1.24 | 0.47 | 0.44 |
| HLA | 5 | 637 | 1.04 | 252 | 0.17 | 0.84 | -1.75 | 0.79 | -1.36 | 0.00 | 0.51 | 1.19 | 0.20 | 0.34 |
| HLA | 5 | 640 | 1.38 | 252 | 0.19 | 1.01 | 0.14 | 0.94 | -0.25 | 0.00 | 0.34 | 1.01 | 0.15 | 0.34 |
| HLA | 5 | 642 | 0.50 | 252 | 0.15 | 0.95 | -0.71 | 0.86 | -1.30 | 0.00 | 0.45 | 1.12 | 0.28 | 0.40 |
| HLA | 5 | 644 | -2.52 | 252 | 0.18 | 0.80 | -1.99 | 0.65 | -2.04 | 0.00 | 0.50 | 1.22 | 0.84 | 0.31 |
| HLA | 5 | 646 | -0.67 | 252 | 0.14 | 1.03 | 0.64 | 1.02 | 0.31 | 0.00 | 0.37 | 0.91 | 0.51 | 0.46 |
| HLA | 5 | 648 | -0.56 | 252 | 0.14 | 1.07 | 1.39 | 1.06 | 0.82 | 0.00 | 0.34 | 0.79 | 0.49 | 0.47 |
| HLA | 5 | 672 | -0.92 | 252 | 0.14 | 1.21 | 3.96 | 1.30 | 3.75 | 0.00 | 0.18 | 0.28 | 0.56 | 0.50 |
| HLA | 5 | 673 | 1.69 | 252 | 0.20 | 1.07 | 0.55 | 1.45 | 1.80 | 0.00 | 0.19 | 0.90 | 0.12 | 0.32 |
| HLA | 5 | 677 | 1.96 | 252 | 0.22 | 0.83 | -1.12 | 0.49 | -2.28 | 0.00 | 0.48 | 1.16 | 0.10 | 0.26 |
| HLA | 5 | 681 | 1.35 | 252 | 0.18 | 1.00 | 0.02 | 1.00 | 0.06 | 0.00 | 0.33 | 1.00 | 0.16 | 0.34 |
| HLA | 5 | 684 | -0.33 | 252 | 0.14 | 0.84 | -3.32 | 0.81 | -2.83 | 0.00 | 0.56 | 1.49 | 0.44 | 0.41 |
| HLA | 5 | 689 | -1.14 | 252 | 0.14 | 0.87 | -2.53 | 0.82 | -2.33 | 0.00 | 0.52 | 1.39 | 0.61 | 0.42 |
| HLA | 5 | 690 | -0.27 | 252 | 0.14 | 0.86 | -2.73 | 0.81 | -2.82 | 0.00 | 0.54 | 1.43 | 0.43 | 0.42 |
| HLA | 5 | 693 | 0.64 | 252 | 0.16 | 1.07 | 0.85 | 1.04 | 0.39 | 0.00 | 0.32 | 0.91 | 0.26 | 0.42 |
| HLA | 5 | 696 | -0.58 | 252 | 0.14 | 0.83 | -3.63 | 0.83 | -2.70 | 0.00 | 0.56 | 1.54 | 0.49 | 0.42 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 5 | 699 | -1.20 | 252 | 0.14 | 1.01 | 0.18 | 1.03 | 0.40 | 0.00 | 0.37 | 0.97 | 0.62 | 0.45 |
| HLA | 5 | 702 | 0.17 | 252 | 0.15 | 0.90 | -1.55 | 0.89 | -1.19 | 0.00 | 0.48 | 1.20 | 0.34 | 0.41 |
| HLA | 5 | 706 | 2.60 | 252 | 0.22 | 0.85 | -0.63 | 0.47 | -1.76 | 0.00 | 0.42 | 1.09 | 0.08 | 0.26 |
| HLA | 5 | 707 | 1.91 | 252 | 0.22 | 1.03 | 0.25 | 1.24 | 0.95 | 0.00 | 0.24 | 0.96 | 0.10 | 0.29 |
| HLA | 5 | 708 | 0.87 | 252 | 0.16 | 0.94 | -0.63 | 0.84 | -1.14 | 0.00 | 0.44 | 1.10 | 0.22 | 0.37 |
| HLA | 5 | 709 | -0.92 | 252 | 0.14 | 0.95 | -0.95 | 0.93 | -1.00 | 0.00 | 0.44 | 1.16 | 0.56 | 0.44 |
| HLA | 5 | 711 | 0.50 | 252 | 0.15 | 1.15 | 2.03 | 1.25 | 2.09 | 0.00 | 0.23 | 0.71 | 0.28 | 0.44 |
| HLA | 5 | 712 | 1.33 | 252 | 0.08 | 0.83 | -1.73 | 0.72 | -1.85 | 0.00 | 0.70 | 1.12 | 0.78 | 0.74 |
| HLA | 5 | 713 | 0.45 | 252 | 0.15 | 0.84 | -2.32 | 0.74 | -2.60 | 0.00 | 0.55 | 1.30 | 0.29 | 0.38 |
| HLA | 5 | 714 | 0.09 | 252 | 0.14 | 0.89 | -1.83 | 0.85 | -1.85 | 0.00 | 0.51 | 1.26 | 0.36 | 0.41 |
| HLA | 5 | 716 | 0.15 | 252 | 0.14 | 1.24 | 3.65 | 1.37 | 3.78 | 0.00 | 0.15 | 0.42 | 0.35 | 0.49 |
| HLA | 5 | 718 | 1.22 | 252 | 0.18 | 1.22 | 1.94 | 1.55 | 2.78 | 0.00 | 0.10 | 0.73 | 0.17 | 0.39 |
| HLA | 5 | 719 | 0.25 | 252 | 0.15 | 0.80 | -3.21 | 0.71 | -3.34 | 0.00 | 0.59 | 1.43 | 0.33 | 0.39 |
| HLA | 5 | 720 | -0.10 | 252 | 0.14 | 0.91 | -1.69 | 0.93 | -0.90 | 0.00 | 0.48 | 1.23 | 0.39 | 0.43 |
| HLA | 5 | 721 | -1.24 | 252 | 0.14 | 0.86 | -2.67 | 0.79 | -2.63 | 0.00 | 0.53 | 1.41 | 0.63 | 0.41 |
| HLA | 5 | 722 | 0.88 | 252 | 0.09 | 0.95 | -0.66 | 0.88 | -1.30 | 0.00 | 0.61 | 1.11 | 0.81 | 0.67 |
| HLA | 5 | 723 | 1.04 | 252 | 0.17 | 0.81 | -2.10 | 0.66 | -2.45 | 0.00 | 0.55 | 1.24 | 0.20 | 0.33 |
| HLA | 5 | 724 | -0.41 | 252 | 0.14 | 1.17 | 3.26 | 1.22 | 3.03 | 0.00 | 0.23 | 0.44 | 0.46 | 0.49 |
| HLA | 5 | 725 | -0.18 | 252 | 0.14 | 0.98 | -0.32 | 1.01 | 0.14 | 0.00 | 0.42 | 1.03 | 0.41 | 0.44 |
| HLA | 5 | 726 | -0.02 | 252 | 0.14 | 1.03 | 0.60 | 1.04 | 0.54 | 0.00 | 0.37 | 0.92 | 0.38 | 0.45 |
| HLA | 5 | 727 | 0.45 | 252 | 0.15 | 0.83 | -2.53 | 0.75 | -2.50 | 0.00 | 0.56 | 1.32 | 0.29 | 0.38 |
| HLA | 5 | 728 | -0.62 | 252 | 0.14 | 0.96 | -0.78 | 0.94 | -0.94 | 0.00 | 0.44 | 1.14 | 0.50 | 0.45 |
| HLA | 5 | 729 | -1.57 | 252 | 0.15 | 1.12 | 1.93 | 1.29 | 2.55 | 0.00 | 0.21 | 0.66 | 0.69 | 0.45 |
| HLA | 5 | 730 | 0.39 | 252 | 0.15 | 1.12 | 1.75 | 1.30 | 2.67 | 0.00 | 0.25 | 0.72 | 0.30 | 0.45 |
| HLA | 5 | 1030 | -0.62 | 252 | 0.05 | 1.10 | 1.14 | 1.12 | 1.21 | 0.00 | 0.71 | 0.87 | 3.19 | 1.30 |
| HLA | 5 | 1072 | 0.62 | 252 | 0.16 | 1.07 | 0.88 | 1.12 | 1.01 | 0.00 | 0.31 | 0.89 | 0.26 | 0.42 |
| HLA | 5 | 1074 | -2.48 | 252 | 0.18 | 0.96 | -0.30 | 1.03 | 0.22 | 0.00 | 0.32 | 1.03 | 0.83 | 0.35 |
| HLA | 5 | 1183 | 0.11 | 252 | 0.14 | 1.13 | 2.08 | 1.09 | 1.02 | 0.00 | 0.29 | 0.73 | 0.35 | 0.47 |
| HLA | 5 | 1186 | -0.45 | 252 | 0.14 | 1.12 | 2.32 | 1.19 | 2.61 | 0.00 | 0.28 | 0.58 | 0.46 | 0.48 |
| HLA | 5 | 1193 | 0.13 | 252 | 0.14 | 1.05 | 0.78 | 1.02 | 0.20 | 0.00 | 0.36 | 0.91 | 0.35 | 0.45 |
| HLA | 5 | 1208 | 0.52 | 252 | 0.15 | 1.21 | 2.73 | 1.44 | 3.50 | 0.00 | 0.15 | 0.58 | 0.28 | 0.45 |
| HLA | 5 | 1215 | 0.57 | 252 | 0.15 | 1.29 | 3.57 | 1.68 | 4.92 | 0.00 | 0.05 | 0.43 | 0.27 | 0.46 |
| HLA | 5 | 1222 | -1.79 | 252 | 0.15 | 0.77 | -3.56 | 0.63 | -3.41 | 0.00 | 0.59 | 1.44 | 0.73 | 0.36 |
| HLA | 6 | 624 | -1.79 | 165 | 0.18 | 0.94 | -0.80 | 0.99 | -0.04 | 0.00 | 0.45 | 1.11 | 0.65 | 0.42 |
| HLA | 6 | 628 | -1.79 | 165 | 0.18 | 0.87 | -1.76 | 0.84 | -1.42 | 0.00 | 0.52 | 1.29 | 0.65 | 0.41 |
| HLA | 6 | 632 | -0.41 | 165 | 0.18 | 1.07 | 0.97 | 1.20 | 1.80 | 0.00 | 0.35 | 0.80 | 0.38 | 0.45 |
| HLA | 6 | 635 | -2.84 | 165 | 0.22 | 0.97 | -0.18 | 0.93 | -0.23 | 0.00 | 0.36 | 1.03 | 0.82 | 0.36 |
| HLA | 6 | 638 | -2.46 | 165 | 0.20 | 1.18 | 1.76 | 1.61 | 2.89 | 0.00 | 0.16 | 0.64 | 0.76 | 0.43 |
| HLA | 6 | 639 | -0.34 | 165 | 0.18 | 1.00 | 0.06 | 1.21 | 1.75 | 0.00 | 0.40 | 0.92 | 0.36 | 0.43 |
| HLA | 6 | 641 | 0.21 | 165 | 0.19 | 0.86 | -1.54 | 0.75 | -1.71 | 0.00 | 0.53 | 1.24 | 0.27 | 0.37 |
| HLA | 6 | 643 | -0.79 | 165 | 0.09 | 1.08 | 0.75 | 1.05 | 0.38 | 0.00 | 0.67 | 0.92 | 1.30 | 0.88 |
| HLA | 6 | 645 | -0.38 | 165 | 0.18 | 0.90 | -1.28 | 0.97 | -0.24 | 0.00 | 0.50 | 1.17 | 0.37 | 0.41 |
| HLA | 6 | 647 | 0.99 | 165 | 0.23 | 1.01 | 0.15 | 0.98 | 0.00 | 0.00 | 0.32 | 0.99 | 0.16 | 0.34 |
| HLA | 6 | 649 | -0.15 | 165 | 0.18 | 1.19 | 2.20 | 1.37 | 2.68 | 0.00 | 0.23 | 0.57 | 0.33 | 0.46 |
| HLA | 6 | 650 | 0.28 | 164 | 0.20 | 0.94 | -0.62 | 0.95 | -0.26 | 0.00 | 0.44 | 1.09 | 0.26 | 0.39 |
| HLA | 6 | 651 | 1.21 | 165 | 0.24 | 0.89 | -0.68 | 0.65 | -1.33 | 0.00 | 0.43 | 1.13 | 0.13 | 0.30 |
| HLA | 6 | 652 | -1.14 | 165 | 0.17 | 0.96 | -0.57 | 0.93 | -0.79 | 0.00 | 0.48 | 1.12 | 0.52 | 0.44 |
| HLA | 6 | 653 | -1.69 | 165 | 0.18 | 0.85 | -2.21 | 0.78 | -2.11 | 0.00 | 0.56 | 1.38 | 0.63 | 0.40 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 6 | 655 | -1.49 | 164 | 0.18 | 0.96 | -0.53 | 0.95 | -0.47 | 0.00 | 0.46 | 1.10 | 0.59 | 0.43 |
| HLA | 6 | 656 | -0.22 | 164 | 0.18 | 1.04 | 0.57 | 1.10 | 0.81 | 0.00 | 0.38 | 0.89 | 0.34 | 0.44 |
| HLA | 6 | 657 | -0.72 | 165 | 0.17 | 0.87 | -1.94 | 0.84 | -1.74 | 0.00 | 0.55 | 1.34 | 0.44 | 0.41 |
| HLA | 6 | 659 | -0.56 | 165 | 0.18 | 1.29 | 3.71 | 1.42 | 3.72 | 0.00 | 0.16 | 0.24 | 0.41 | 0.50 |
| HLA | 6 | 660 | 2.92 | 165 | 0.46 | 1.01 | 0.17 | 0.74 | -0.18 | 0.00 | 0.17 | 1.00 | 0.03 | 0.17 |
| HLA | 6 | 661 | -0.28 | 165 | 0.18 | 1.15 | 1.88 | 1.22 | 1.79 | 0.00 | 0.29 | 0.66 | 0.35 | 0.46 |
| HLA | 6 | 662 | -1.14 | 165 | 0.17 | 1.02 | 0.26 | 1.01 | 0.09 | 0.00 | 0.42 | 0.96 | 0.52 | 0.45 |
| HLA | 6 | 663 | 2.72 | 164 | 0.42 | 1.04 | 0.23 | 1.20 | 0.51 | 0.00 | 0.13 | 0.97 | 0.04 | 0.19 |
| HLA | 6 | 664 | 0.66 | 165 | 0.11 | 0.84 | -1.31 | 0.56 | -1.96 | 0.00 | 0.67 | 1.12 | 0.56 | 0.63 |
| HLA | 6 | 665 | -0.08 | 165 | 0.18 | 0.77 | -2.96 | 0.68 | -2.70 | 0.00 | 0.62 | 1.45 | 0.32 | 0.37 |
| HLA | 6 | 666 | 0.68 | 164 | 0.11 | 1.10 | 0.82 | 1.01 | 0.14 | 0.00 | 0.59 | 0.94 | 0.77 | 0.78 |
| HLA | 6 | 667 | -1.09 | 164 | 0.17 | 1.03 | 0.40 | 1.00 | -0.01 | 0.00 | 0.42 | 0.95 | 0.51 | 0.45 |
| HLA | 6 | 668 | 1.15 | 164 | 0.24 | 0.84 | -1.09 | 0.77 | -0.82 | 0.00 | 0.47 | 1.16 | 0.14 | 0.30 |
| HLA | 6 | 669 | -0.35 | 164 | 0.18 | 1.01 | 0.12 | 1.06 | 0.55 | 0.00 | 0.41 | 0.96 | 0.37 | 0.44 |
| HLA | 6 | 674 | 2.72 | 164 | 0.42 | 0.92 | -0.11 | 0.67 | -0.39 | 0.00 | 0.27 | 1.06 | 0.04 | 0.18 |
| HLA | 6 | 675 | 0.20 | 164 | 0.19 | 0.95 | -0.55 | 0.84 | -1.02 | 0.00 | 0.46 | 1.11 | 0.27 | 0.39 |
| HLA | 6 | 676 | 2.92 | 164 | 0.46 | 1.06 | 0.27 | 1.32 | 0.66 | 0.00 | 0.08 | 0.95 | 0.03 | 0.17 |
| HLA | 6 | 678 | -0.84 | 165 | 0.17 | 0.78 | -3.46 | 0.72 | -3.33 | 0.00 | 0.64 | 1.61 | 0.46 | 0.39 |
| HLA | 6 | 679 | 0.28 | 164 | 0.20 | 1.09 | 0.89 | 1.07 | 0.45 | 0.00 | 0.33 | 0.88 | 0.26 | 0.42 |
| HLA | 6 | 680 | -0.52 | 165 | 0.08 | 0.74 | -2.73 | 0.70 | -2.68 | 0.00 | 0.80 | 1.25 | 1.70 | 0.79 |
| HLA | 6 | 682 | -0.34 | 165 | 0.18 | 1.34 | 4.02 | 1.46 | 3.64 | 0.00 | 0.12 | 0.22 | 0.36 | 0.50 |
| HLA | 6 | 683 | -1.89 | 165 | 0.18 | 0.92 | -1.03 | 0.94 | -0.41 | 0.00 | 0.47 | 1.15 | 0.67 | 0.41 |
| HLA | 6 | 687 | 1.46 | 165 | 0.26 | 0.94 | -0.29 | 0.83 | -0.45 | 0.00 | 0.36 | 1.06 | 0.11 | 0.29 |
| HLA | 6 | 688 | -0.08 | 165 | 0.18 | 0.78 | -2.75 | 0.68 | -2.66 | 0.00 | 0.61 | 1.43 | 0.32 | 0.37 |
| HLA | 6 | 691 | 2.16 | 165 | 0.34 | 1.00 | 0.08 | 1.48 | 1.04 | 0.00 | 0.20 | 0.98 | 0.06 | 0.23 |
| HLA | 6 | 692 | 0.65 | 164 | 0.21 | 1.21 | 1.75 | 1.71 | 2.92 | 0.00 | 0.12 | 0.65 | 0.20 | 0.41 |
| HLA | 6 | 694 | 1.66 | 164 | 0.18 | 0.72 | -2.48 | 0.60 | -2.57 | 0.00 | 0.64 | 1.31 | 0.27 | 0.36 |
| HLA | 6 | 697 | -0.41 | 164 | 0.18 | 1.07 | 0.97 | 1.20 | 1.76 | 0.00 | 0.35 | 0.77 | 0.38 | 0.45 |
| HLA | 6 | 698 | 1.86 | 165 | 0.30 | 1.05 | 0.27 | 0.96 | 0.03 | 0.00 | 0.22 | 0.97 | 0.08 | 0.26 |
| HLA | 6 | 700 | -1.33 | 164 | 0.17 | 0.92 | -1.16 | 0.88 | -1.28 | 0.00 | 0.51 | 1.23 | 0.56 | 0.43 |
| HLA | 6 | 701 | 2.72 | 164 | 0.42 | 0.92 | -0.11 | 0.33 | -1.28 | 0.00 | 0.32 | 1.09 | 0.04 | 0.18 |
| HLA | 6 | 703 | -1.17 | 165 | 0.17 | 1.20 | 2.83 | 1.27 | 2.81 | 0.00 | 0.25 | 0.41 | 0.53 | 0.49 |
| HLA | 6 | 704 | -1.35 | 165 | 0.17 | 0.90 | -1.42 | 0.92 | -0.86 | 0.00 | 0.51 | 1.24 | 0.56 | 0.42 |
| HLA | 6 | 1031 | -0.75 | 164 | 0.07 | 1.30 | 2.66 | 1.30 | 2.65 | 0.00 | 0.68 | 0.64 | 2.73 | 1.25 |
| HLA | 6 | 1075 | -0.28 | 165 | 0.18 | 1.21 | 2.57 | 1.34 | 2.71 | 0.00 | 0.23 | 0.51 | 0.35 | 0.47 |
| HLA | 6 | 1083 | -0.41 | 165 | 0.18 | 0.97 | -0.42 | 0.91 | -0.83 | 0.00 | 0.47 | 1.10 | 0.38 | 0.43 |
| HLA | 6 | 1169 | 0.28 | 164 | 0.20 | 1.08 | 0.81 | 1.23 | 1.35 | 0.00 | 0.30 | 0.84 | 0.26 | 0.41 |
| HLA | 6 | 1170 | 2.41 | 164 | 0.37 | 0.95 | -0.05 | 1.16 | 0.47 | 0.00 | 0.22 | 1.01 | 0.05 | 0.20 |
| HLA | 6 | 1171 | -0.18 | 165 | 0.18 | 1.08 | 0.93 | 1.14 | 1.13 | 0.00 | 0.34 | 0.82 | 0.33 | 0.44 |
| HLA | 6 | 1172 | -1.73 | 165 | 0.18 | 1.07 | 1.02 | 1.15 | 1.25 | 0.00 | 0.34 | 0.79 | 0.64 | 0.45 |
| HLA | 6 | 1173 | 0.21 | 165 | 0.11 | 1.01 | 0.12 | 0.88 | -0.77 | 0.00 | 0.63 | 1.04 | 0.75 | 0.72 |
| HLA | 6 | 1309 | 0.61 | 165 | 0.21 | 0.87 | -1.16 | 0.72 | -1.47 | 0.00 | 0.50 | 1.18 | 0.21 | 0.35 |
| HLA | 7 | 762 | -0.82 | 163 | 0.17 | 0.96 | -0.74 | 0.91 | -1.08 | 0.00 | 0.43 | 1.19 | 0.47 | 0.45 |
| HLA | 7 | 763 | -1.77 | 163 | 0.18 | 1.19 | 2.33 | 1.24 | 1.98 | 0.00 | 0.18 | 0.56 | 0.67 | 0.47 |
| HLA | 7 | 769 | -1.94 | 163 | 0.18 | 1.03 | 0.33 | 1.15 | 1.16 | 0.00 | 0.32 | 0.90 | 0.70 | 0.43 |
| HLA | 7 | 770 | 0.79 | 162 | 0.15 | 0.83 | -1.12 | 0.63 | -1.58 | 0.00 | 0.52 | 1.13 | 0.28 | 0.46 |
| HLA | 7 | 774 | 1.06 | 163 | 0.23 | 0.88 | -0.77 | 0.81 | -0.73 | 0.00 | 0.41 | 1.12 | 0.15 | 0.32 |
| HLA | 7 | 777 | -0.31 | 163 | 0.17 | 1.19 | 2.74 | 1.29 | 2.64 | 0.00 | 0.16 | 0.42 | 0.37 | 0.49 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 7 | 784 | -1.74 | 163 | 0.18 | 1.06 | 0.80 | 1.11 | 1.02 | 0.00 | 0.31 | 0.84 | 0.66 | 0.45 |
| HLA | 7 | 790 | -1.84 | 163 | 0.18 | 0.83 | -2.18 | 0.84 | -1.39 | 0.00 | 0.53 | 1.34 | 0.68 | 0.39 |
| HLA | 7 | 803 | 0.14 | 163 | 0.19 | 1.03 | 0.41 | 1.03 | 0.27 | 0.00 | 0.31 | 0.94 | 0.28 | 0.43 |
| HLA | 7 | 806 | 0.04 | 163 | 0.18 | 1.01 | 0.17 | 1.01 | 0.09 | 0.00 | 0.34 | 0.97 | 0.30 | 0.43 |
| HLA | 7 | 808 | -0.44 | 163 | 0.08 | 0.95 | -0.45 | 0.91 | -0.68 | 0.00 | 0.67 | 1.06 | 1.46 | 0.99 |
| HLA | 7 | 811 | 0.00 | 163 | 0.18 | 0.98 | -0.24 | 0.91 | -0.71 | 0.00 | 0.39 | 1.08 | 0.31 | 0.43 |
| HLA | 7 | 822 | 2.11 | 162 | 0.34 | 1.01 | 0.13 | 1.43 | 1.01 | 0.00 | 0.15 | 0.97 | 0.06 | 0.23 |
| HLA | 7 | 829 | -0.94 | 162 | 0.17 | 1.25 | 3.99 | 1.35 | 3.92 | 0.00 | 0.12 | 0.03 | 0.50 | 0.51 |
| HLA | 7 | 834 | -0.62 | 162 | 0.17 | 0.89 | -1.99 | 0.87 | -1.52 | 0.00 | 0.49 | 1.39 | 0.43 | 0.43 |
| HLA | 7 | 839 | 0.31 | 162 | 0.19 | 0.87 | -1.38 | 0.78 | -1.46 | 0.00 | 0.47 | 1.22 | 0.25 | 0.38 |
| HLA | 7 | 843 | 1.91 | 163 | 0.31 | 0.98 | 0.01 | 0.76 | -0.55 | 0.00 | 0.27 | 1.03 | 0.07 | 0.25 |
| HLA | 7 | 869 | 2.01 | 163 | 0.32 | 0.83 | -0.62 | 0.44 | -1.60 | 0.00 | 0.42 | 1.13 | 0.07 | 0.22 |
| HLA | 7 | 870 | 2.00 | 162 | 0.32 | 0.87 | -0.45 | 1.14 | 0.46 | 0.00 | 0.32 | 1.07 | 0.07 | 0.23 |
| HLA | 7 | 871 | -1.97 | 163 | 0.19 | 1.03 | 0.33 | 0.97 | -0.16 | 0.00 | 0.35 | 0.98 | 0.71 | 0.43 |
| HLA | 7 | 872 | 0.63 | 162 | 0.10 | 1.17 | 1.02 | 0.99 | 0.05 | 0.00 | 0.50 | 0.98 | 0.51 | 0.82 |
| HLA | 7 | 874 | 1.57 | 162 | 0.27 | 0.93 | -0.30 | 0.68 | -1.01 | 0.00 | 0.35 | 1.07 | 0.10 | 0.28 |
| HLA | 7 | 875 | -0.90 | 163 | 0.17 | 0.92 | -1.41 | 0.91 | -1.11 | 0.00 | 0.46 | 1.29 | 0.49 | 0.44 |
| HLA | 7 | 876 | 0.91 | 162 | 0.22 | 1.26 | 1.80 | 1.60 | 2.34 | 0.00 | -0.01 | 0.68 | 0.17 | 0.40 |
| HLA | 7 | 877 | -0.96 | 163 | 0.17 | 1.16 | 2.73 | 1.25 | 2.90 | 0.00 | 0.20 | 0.35 | 0.50 | 0.50 |
| HLA | 7 | 878 | 0.45 | 163 | 0.11 | 0.89 | -0.86 | 0.71 | -1.52 | 0.00 | 0.58 | 1.10 | 0.58 | 0.69 |
| HLA | 7 | 879 | -0.09 | 163 | 0.18 | 1.28 | 3.50 | 1.59 | 4.29 | 0.00 | 0.02 | 0.22 | 0.33 | 0.49 |
| HLA | 7 | 880 | 0.91 | 163 | 0.22 | 0.99 | -0.04 | 0.93 | -0.27 | 0.00 | 0.32 | 1.03 | 0.17 | 0.35 |
| HLA | 7 | 882 | -1.91 | 163 | 0.18 | 1.01 | 0.21 | 0.94 | -0.44 | 0.00 | 0.37 | 1.00 | 0.69 | 0.43 |
| HLA | 7 | 883 | 1.06 | 163 | 0.23 | 1.01 | 0.10 | 1.07 | 0.37 | 0.00 | 0.26 | 0.97 | 0.15 | 0.34 |
| HLA | 7 | 884 | 1.36 | 162 | 0.26 | 0.97 | -0.14 | 0.75 | -0.84 | 0.00 | 0.32 | 1.05 | 0.12 | 0.30 |
| HLA | 7 | 885 | -2.19 | 163 | 0.19 | 0.93 | -0.68 | 0.86 | -0.96 | 0.00 | 0.44 | 1.12 | 0.74 | 0.39 |
| HLA | 7 | 886 | 2.12 | 163 | 0.34 | 1.10 | 0.46 | 1.86 | 1.72 | 0.00 | 0.03 | 0.89 | 0.06 | 0.24 |
| HLA | 7 | 887 | -1.77 | 163 | 0.18 | 0.83 | -2.23 | 0.75 | -2.39 | 0.00 | 0.55 | 1.39 | 0.67 | 0.40 |
| HLA | 7 | 888 | -2.26 | 163 | 0.20 | 1.15 | 1.44 | 1.38 | 2.23 | 0.00 | 0.17 | 0.73 | 0.75 | 0.43 |
| HLA | 7 | 889 | 0.32 | 162 | 0.10 | 0.97 | -0.16 | 0.83 | -0.71 | 0.00 | 0.53 | 1.03 | 0.56 | 0.74 |
| HLA | 7 | 891 | 0.31 | 162 | 0.19 | 0.91 | -0.92 | 1.14 | 0.89 | 0.00 | 0.39 | 1.09 | 0.25 | 0.39 |
| HLA | 7 | 892 | 0.14 | 163 | 0.19 | 1.02 | 0.32 | 1.07 | 0.53 | 0.00 | 0.31 | 0.94 | 0.28 | 0.43 |
| HLA | 7 | 897 | -0.82 | 163 | 0.17 | 1.06 | 1.11 | 1.07 | 0.88 | 0.00 | 0.32 | 0.76 | 0.47 | 0.48 |
| HLA | 7 | 899 | -0.68 | 162 | 0.17 | 0.87 | -2.34 | 0.80 | -2.48 | 0.00 | 0.52 | 1.51 | 0.44 | 0.43 |
| HLA | 7 | 902 | -0.03 | 162 | 0.18 | 0.90 | -1.39 | 0.80 | -1.68 | 0.00 | 0.47 | 1.27 | 0.31 | 0.41 |
| HLA | 7 | 903 | 3.11 | 163 | 0.51 | 1.04 | 0.24 | 0.74 | -0.17 | 0.00 | 0.12 | 0.99 | 0.02 | 0.16 |
| HLA | 7 | 930 | -0.58 | 163 | 0.17 | 1.15 | 2.36 | 1.17 | 1.83 | 0.00 | 0.23 | 0.50 | 0.42 | 0.49 |
| HLA | 7 | 1032 | -0.78 | 160 | 0.07 | 0.92 | -0.66 | 0.93 | -0.57 | 0.00 | 0.74 | 1.06 | 3.06 | 1.08 |
| HLA | 7 | 1088 | 0.55 | 163 | 0.20 | 0.91 | -0.80 | 1.02 | 0.18 | 0.00 | 0.38 | 1.09 | 0.21 | 0.37 |
| HLA | 7 | 1089 | 1.57 | 163 | 0.27 | 1.06 | 0.34 | 1.10 | 0.41 | 0.00 | 0.18 | 0.96 | 0.10 | 0.29 |
| HLA | 7 | 1096 | -0.33 | 163 | 0.09 | 1.04 | 0.45 | 0.97 | -0.19 | 0.00 | 0.57 | 0.97 | 1.03 | 0.87 |
| HLA | 7 | 1097 | -0.69 | 163 | 0.10 | 0.82 | -1.88 | 0.79 | -2.13 | 0.00 | 0.69 | 1.36 | 1.29 | 0.74 |
| HLA | 7 | 1098 | 0.51 | 163 | 0.20 | 1.11 | 1.07 | 1.14 | 0.84 | 0.00 | 0.20 | 0.84 | 0.22 | 0.41 |
| HLA | 7 | 1099 | -0.79 | 163 | 0.17 | 0.95 | -0.84 | 0.96 | -0.51 | 0.00 | 0.43 | 1.17 | 0.47 | 0.45 |
| HLA | 7 | 1104 | 0.39 | 162 | 0.20 | 1.15 | 1.52 | 1.24 | 1.44 | 0.00 | 0.16 | 0.74 | 0.24 | 0.43 |
| HLA | 7 | 1118 | -2.11 | 163 | 0.19 | 1.23 | 2.30 | 1.40 | 2.52 | 0.00 | 0.11 | 0.57 | 0.73 | 0.46 |
| HLA | 7 | 1175 | -0.50 | 163 | 0.17 | 0.82 | -3.07 | 0.77 | -2.67 | 0.00 | 0.56 | 1.59 | 0.40 | 0.41 |
| HLA | 7 | 1178 | 0.81 | 163 | 0.22 | 0.92 | -0.57 | 0.83 | -0.77 | 0.00 | 0.39 | 1.10 | 0.18 | 0.35 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 7 | 1179 | 1.12 | 162 | 0.24 | 0.88 | -0.77 | 0.64 | -1.58 | 0.00 | 0.44 | 1.14 | 0.14 | 0.31 |
| HLA | 7 | 1182 | 0.36 | 163 | 0.19 | 0.83 | -1.85 | 0.82 | -1.14 | 0.00 | 0.50 | 1.27 | 0.25 | 0.37 |
| HLA | 7 | 1185 | 1.24 | 163 | 0.24 | 1.13 | 0.82 | 2.27 | 3.58 | 0.00 | 0.05 | 0.81 | 0.13 | 0.34 |
| HLA | 8 | 761 | 0.56 | 137 | 0.21 | 0.81 | -1.93 | 0.67 | -2.04 | 0.00 | 0.57 | 1.33 | 0.26 | 0.36 |
| HLA | 8 | 764 | 1.04 | 136 | 0.24 | 1.07 | 0.53 | 1.40 | 1.57 | 0.00 | 0.26 | 0.88 | 0.19 | 0.38 |
| HLA | 8 | 766 | 2.39 | 136 | 0.36 | 0.97 | -0.03 | 0.77 | -0.32 | 0.00 | 0.30 | 1.04 | 0.07 | 0.24 |
| HLA | 8 | 767 | -0.34 | 138 | 0.12 | 0.90 | -0.95 | 0.78 | -1.34 | 0.00 | 0.65 | 1.14 | 0.83 | 0.67 |
| HLA | 8 | 771 | 0.40 | 138 | 0.21 | 0.85 | -1.68 | 0.71 | -1.97 | 0.00 | 0.55 | 1.31 | 0.29 | 0.38 |
| HLA | 8 | 772 | 1.48 | 137 | 0.26 | 0.85 | -0.91 | 0.70 | -0.99 | 0.00 | 0.46 | 1.15 | 0.14 | 0.30 |
| HLA | 8 | 778 | 0.28 | 136 | 0.20 | 1.03 | 0.32 | 1.00 | 0.06 | 0.00 | 0.39 | 0.96 | 0.31 | 0.43 |
| HLA | 8 | 780 | 1.01 | 137 | 0.11 | 0.82 | -1.61 | 0.77 | -1.54 | 0.00 | 0.71 | 1.18 | 0.94 | 0.71 |
| HLA | 8 | 785 | -0.58 | 138 | 0.19 | 1.02 | 0.28 | 0.96 | -0.36 | 0.00 | 0.42 | 0.99 | 0.48 | 0.46 |
| HLA | 8 | 793 | 4.02 | 137 | 0.72 | 0.95 | 0.15 | 0.40 | -0.54 | 0.00 | 0.20 | 1.05 | 0.01 | 0.12 |
| HLA | 8 | 796 | 0.06 | 137 | 0.20 | 1.30 | 3.36 | 1.53 | 3.53 | 0.00 | 0.12 | 0.24 | 0.35 | 0.49 |
| HLA | 8 | 802 | 3.06 | 138 | 0.47 | 1.01 | 0.16 | 0.72 | -0.21 | 0.00 | 0.19 | 1.00 | 0.04 | 0.18 |
| HLA | 8 | 805 | -0.48 | 136 | 0.19 | 1.23 | 3.05 | 1.29 | 2.61 | 0.00 | 0.22 | 0.31 | 0.46 | 0.50 |
| HLA | 8 | 810 | 3.05 | 137 | 0.47 | 0.99 | 0.10 | 0.63 | -0.39 | 0.00 | 0.22 | 1.03 | 0.04 | 0.18 |
| HLA | 8 | 820 | 0.66 | 137 | 0.11 | 0.73 | -2.25 | 0.68 | -2.20 | 0.00 | 0.72 | 1.25 | 0.92 | 0.69 |
| HLA | 8 | 826 | -0.04 | 136 | 0.20 | 1.22 | 2.62 | 1.35 | 2.61 | 0.00 | 0.21 | 0.44 | 0.37 | 0.48 |
| HLA | 8 | 833 | -1.22 | 137 | 0.19 | 0.85 | -2.05 | 0.78 | -2.02 | 0.00 | 0.56 | 1.41 | 0.61 | 0.41 |
| HLA | 8 | 848 | -2.29 | 138 | 0.23 | 0.92 | -0.60 | 0.96 | -0.13 | 0.00 | 0.42 | 1.09 | 0.79 | 0.36 |
| HLA | 8 | 855 | -0.90 | 138 | 0.19 | 1.01 | 0.21 | 1.09 | 0.85 | 0.00 | 0.40 | 0.92 | 0.54 | 0.45 |
| HLA | 8 | 867 | 0.86 | 138 | 0.22 | 1.17 | 1.36 | 1.64 | 2.60 | 0.00 | 0.18 | 0.72 | 0.22 | 0.41 |
| HLA | 8 | 893 | 0.43 | 137 | 0.21 | 1.31 | 2.94 | 1.55 | 2.93 | 0.00 | 0.10 | 0.40 | 0.28 | 0.47 |
| HLA | 8 | 894 | 0.67 | 138 | 0.21 | 0.89 | -1.00 | 0.88 | -0.59 | 0.00 | 0.47 | 1.15 | 0.25 | 0.37 |
| HLA | 8 | 901 | 0.98 | 136 | 0.23 | 0.77 | -1.89 | 0.57 | -2.16 | 0.00 | 0.58 | 1.30 | 0.20 | 0.32 |
| HLA | 8 | 904 | -1.91 | 138 | 0.21 | 1.00 | 0.05 | 1.09 | 0.56 | 0.00 | 0.37 | 0.97 | 0.73 | 0.41 |
| HLA | 8 | 905 | 0.14 | 137 | 0.20 | 1.15 | 1.69 | 1.11 | 0.84 | 0.00 | 0.29 | 0.71 | 0.34 | 0.46 |
| HLA | 8 | 906 | -0.39 | 137 | 0.19 | 1.02 | 0.27 | 1.06 | 0.56 | 0.00 | 0.40 | 0.93 | 0.44 | 0.45 |
| HLA | 8 | 909 | -2.62 | 138 | 0.24 | 0.88 | -0.80 | 1.15 | 0.63 | 0.00 | 0.41 | 1.10 | 0.83 | 0.33 |
| HLA | 8 | 910 | -1.22 | 137 | 0.19 | 1.01 | 0.16 | 0.98 | -0.11 | 0.00 | 0.42 | 0.99 | 0.61 | 0.44 |
| HLA | 8 | 911 | 0.57 | 138 | 0.14 | 0.89 | -0.80 | 0.89 | -0.89 | 0.00 | 0.61 | 1.13 | 0.82 | 0.59 |
| HLA | 8 | 912 | -0.02 | 137 | 0.20 | 1.00 | 0.06 | 1.04 | 0.36 | 0.00 | 0.41 | 0.98 | 0.37 | 0.44 |
| HLA | 8 | 913 | 1.30 | 138 | 0.25 | 1.14 | 0.91 | 1.11 | 0.49 | 0.00 | 0.22 | 0.88 | 0.16 | 0.36 |
| HLA | 8 | 914 | 0.44 | 138 | 0.21 | 1.18 | 1.78 | 1.56 | 2.97 | 0.00 | 0.19 | 0.59 | 0.28 | 0.45 |
| HLA | 8 | 916 | 0.84 | 137 | 0.22 | 1.22 | 1.78 | 1.74 | 2.95 | 0.00 | 0.12 | 0.63 | 0.22 | 0.42 |
| HLA | 8 | 917 | -3.35 | 138 | 0.31 | 0.85 | -0.65 | 0.47 | -1.51 | 0.00 | 0.44 | 1.15 | 0.91 | 0.26 |
| HLA | 8 | 920 | 0.00 | 136 | 0.20 | 1.02 | 0.26 | 1.06 | 0.52 | 0.00 | 0.39 | 0.93 | 0.36 | 0.44 |
| HLA | 8 | 921 | -0.94 | 138 | 0.19 | 0.91 | -1.21 | 0.93 | -0.62 | 0.00 | 0.49 | 1.23 | 0.55 | 0.43 |
| HLA | 8 | 922 | -0.53 | 137 | 0.19 | 0.87 | -1.94 | 0.81 | -1.98 | 0.00 | 0.55 | 1.41 | 0.47 | 0.42 |
| HLA | 8 | 924 | 0.83 | 136 | 0.22 | 0.99 | -0.08 | 1.34 | 1.54 | 0.00 | 0.33 | 0.94 | 0.22 | 0.38 |
| HLA | 8 | 925 | -0.78 | 137 | 0.19 | 0.90 | -1.47 | 0.87 | -1.36 | 0.00 | 0.52 | 1.31 | 0.52 | 0.43 |
| HLA | 8 | 926 | -0.06 | 137 | 0.19 | 1.27 | 3.12 | 1.51 | 3.64 | 0.00 | 0.15 | 0.27 | 0.37 | 0.49 |
| HLA | 8 | 927 | -1.65 | 138 | 0.20 | 0.95 | -0.58 | 0.97 | -0.18 | 0.00 | 0.44 | 1.09 | 0.69 | 0.41 |
| HLA | 8 | 929 | -2.14 | 138 | 0.22 | 0.80 | -1.82 | 0.64 | -2.02 | 0.00 | 0.56 | 1.30 | 0.77 | 0.35 |
| HLA | 8 | 1034 | -0.57 | 128 | 0.08 | 0.94 | -0.44 | 0.97 | -0.18 | 0.00 | 0.79 | 1.08 | 2.90 | 1.11 |
| HLA | 8 | 1078 | 0.26 | 137 | 0.20 | 1.35 | 3.49 | 1.59 | 3.45 | 0.00 | 0.07 | 0.26 | 0.31 | 0.49 |
| HLA | 8 | 1079 | -0.53 | 137 | 0.19 | 0.99 | -0.05 | 1.01 | 0.11 | 0.00 | 0.43 | 1.01 | 0.47 | 0.45 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HLA | 8 | 1092 | 1.69 | 136 | 0.28 | 1.27 | 1.38 | 3.24 | 4.26 | 0.00 | -0.09 | 0.63 | 0.12 | 0.34 |
| HLA | 8 | 1105 | 0.26 | 137 | 0.20 | 1.23 | 2.42 | 1.44 | 2.67 | 0.00 | 0.17 | 0.48 | 0.31 | 0.47 |
| HLA | 8 | 1126 | -2.56 | 138 | 0.24 | 0.76 | -1.82 | 0.57 | -1.91 | 0.00 | 0.56 | 1.27 | 0.83 | 0.31 |
| HLA | 8 | 1127 | 0.91 | 138 | 0.23 | 0.95 | -0.33 | 0.91 | -0.36 | 0.00 | 0.41 | 1.07 | 0.21 | 0.37 |
| HLA | 8 | 1190 | -0.64 | 137 | 0.19 | 0.89 | -1.64 | 0.85 | -1.58 | 0.00 | 0.53 | 1.35 | 0.49 | 0.43 |
| HLA | 8 | 1192 | -1.60 | 136 | 0.20 | 0.95 | -0.59 | 0.90 | -0.66 | 0.00 | 0.45 | 1.12 | 0.68 | 0.41 |
| HLA | 8 | 1199 | -0.45 | 136 | 0.19 | 0.80 | -3.01 | 0.80 | -2.09 | 0.00 | 0.60 | 1.56 | 0.45 | 0.40 |
| HLA | 8 | 1201 | 0.20 | 136 | 0.20 | 0.81 | -2.24 | 0.71 | -2.26 | 0.00 | 0.58 | 1.41 | 0.32 | 0.38 |
| HLA | 8 | 1210 | -0.09 | 137 | 0.19 | 1.04 | 0.49 | 1.12 | 1.00 | 0.00 | 0.37 | 0.87 | 0.38 | 0.45 |
| HLA | 8 | 1212 | -0.75 | 137 | 0.19 | 1.03 | 0.50 | 0.99 | -0.02 | 0.00 | 0.41 | 0.93 | 0.51 | 0.46 |
| HLA | 8 | 1214 | 0.25 | 137 | 0.09 | 0.88 | -0.90 | 0.98 | -0.03 | 0.00 | 0.71 | 1.10 | 1.05 | 0.86 |

## Appendix Table G.2: 2021 SC: IRT Statistics

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 4 | 244 | 3.58 | 252 | 0.51 | 1.03 | 0.23 | 1.67 | 1.10 | 0.00 | 0.00 | 0.96 | 0.02 | 0.13 |
| MA | 4 | 166 | 0.41 | 252 | 0.15 | 0.93 | -0.85 | 0.94 | -0.55 | 0.00 | 0.39 | 1.09 | 0.25 | 0.40 |
| MA | 4 | 247 | -0.02 | 252 | 0.14 | 1.02 | 0.31 | 1.02 | 0.30 | 0.00 | 0.29 | 0.96 | 0.33 | 0.45 |
| MA | 4 | 171 | -0.28 | 252 | 0.14 | 0.94 | -1.10 | 0.93 | -1.11 | 0.00 | 0.40 | 1.19 | 0.38 | 0.45 |
| MA | 4 | 1005 | -0.90 | 252 | 0.13 | 0.88 | -3.24 | 0.86 | -3.16 | 0.00 | 0.47 | 1.67 | 0.52 | 0.45 |
| MA | 4 | 254 | 0.06 | 252 | 0.14 | 1.09 | 1.35 | 1.11 | 1.43 | 0.00 | 0.19 | 0.80 | 0.31 | 0.46 |
| MA | 4 | 239 | 2.04 | 252 | 0.26 | 0.88 | -0.52 | 0.51 | -2.06 | 0.00 | 0.43 | 1.10 | 0.07 | 0.23 |
| MA | 4 | 165 | -0.48 | 252 | 0.13 | 0.98 | -0.41 | 0.99 | -0.13 | 0.00 | 0.34 | 1.07 | 0.42 | 0.46 |
| MA | 4 | 265 | -1.01 | 252 | 0.13 | 1.14 | 3.76 | 1.17 | 3.25 | 0.00 | 0.10 | 0.18 | 0.54 | 0.51 |
| MA | 4 | 259 | 0.29 | 252 | 0.15 | 1.07 | 0.91 | 1.09 | 0.96 | 0.00 | 0.22 | 0.88 | 0.27 | 0.43 |
| MA | 4 | 256 | 0.04 | 252 | 0.14 | 0.99 | -0.13 | 1.03 | 0.40 | 0.00 | 0.32 | 1.00 | 0.31 | 0.44 |
| MA | 4 | 250 | -0.20 | 252 | 0.14 | 0.92 | -1.62 | 0.90 | -1.65 | 0.00 | 0.44 | 1.26 | 0.36 | 0.44 |
| MA | 4 | 164 | 0.02 | 252 | 0.14 | 1.11 | 1.70 | 1.18 | 2.35 | 0.00 | 0.15 | 0.72 | 0.32 | 0.46 |
| MA | 4 | 1006 | 0.27 | 252 | 0.15 | 1.12 | 1.59 | 1.16 | 1.73 | 0.00 | 0.14 | 0.78 | 0.27 | 0.45 |
| MA | 4 | 263 | -0.50 | 252 | 0.13 | 1.02 | 0.51 | 1.02 | 0.43 | 0.00 | 0.29 | 0.91 | 0.42 | 0.47 |
| MA | 4 | 261 | 0.41 | 252 | 0.15 | 0.98 | -0.19 | 1.04 | 0.43 | 0.00 | 0.31 | 1.00 | 0.25 | 0.41 |
| MA | 4 | 168 | 0.02 | 252 | 0.14 | 0.88 | -2.09 | 0.84 | -2.20 | 0.00 | 0.49 | 1.30 | 0.32 | 0.41 |
| MA | 4 | 163 | -1.41 | 252 | 0.14 | 1.01 | 0.14 | 0.98 | -0.36 | 0.00 | 0.29 | 1.00 | 0.63 | 0.46 |
| MA | 4 | 103 | 0.12 | 252 | 0.15 | 0.93 | -1.00 | 0.96 | -0.51 | 0.00 | 0.39 | 1.12 | 0.30 | 0.42 |
| MA | 4 | 245 | -0.20 | 252 | 0.14 | 0.99 | -0.24 | 1.00 | 0.08 | 0.00 | 0.33 | 1.03 | 0.36 | 0.45 |
| MA | 4 | 167 | -0.80 | 252 | 0.13 | 1.09 | 2.30 | 1.11 | 2.20 | 0.00 | 0.19 | 0.50 | 0.49 | 0.50 |
| MA | 4 | 1010 | 3.35 | 252 | 0.46 | 0.98 | 0.09 | 0.72 | -0.37 | 0.00 | 0.19 | 1.03 | 0.02 | 0.14 |
| MA | 4 | 277 | -0.18 | 252 | 0.14 | 0.93 | -1.40 | 0.93 | -1.14 | 0.00 | 0.42 | 1.21 | 0.36 | 0.44 |
| MA | 4 | 240 | 2.52 | 252 | 0.31 | 0.98 | 0.01 | 0.84 | -0.35 | 0.00 | 0.22 | 1.02 | 0.04 | 0.20 |
| MA | 4 | 264 | 0.00 | 252 | 0.14 | 1.22 | 3.41 | 1.25 | 3.22 | 0.00 | 0.02 | 0.47 | 0.32 | 0.49 |
| MA | 4 | 154 | -0.78 | 252 | 0.13 | 0.88 | -3.42 | 0.85 | -3.33 | 0.00 | 0.49 | 1.69 | 0.49 | 0.44 |
| MA | 4 | 271 | -0.66 | 252 | 0.13 | 0.94 | -1.55 | 0.92 | -1.76 | 0.00 | 0.40 | 1.33 | 0.46 | 0.46 |
| MA | 4 | 253 | 0.56 | 252 | 0.16 | 1.06 | 0.75 | 1.12 | 1.09 | 0.00 | 0.20 | 0.90 | 0.22 | 0.41 |
| MA | 4 | 375 | 0.24 | 252 | 0.11 | 0.97 | -0.41 | 0.94 | -0.78 | 0.00 | 0.46 | 1.09 | 0.58 | 0.58 |
| MA | 3 | 992 | 3.37 | 275 | 0.42 | 0.87 | -0.23 | 0.62 | -0.58 | 0.00 | 0.33 | 1.07 | 0.02 | 0.13 |
| MA | 3 | 371 | 0.78 | 275 | 0.16 | 0.98 | -0.17 | 1.10 | 0.73 | 0.00 | 0.34 | 0.99 | 0.19 | 0.36 |
| MA | 3 | 173 | -0.41 | 275 | 0.13 | 1.01 | 0.22 | 1.00 | 0.06 | 0.00 | 0.35 | 0.97 | 0.40 | 0.46 |
| MA | 3 | 226 | 0.57 | 275 | 0.16 | 1.09 | 0.99 | 1.24 | 1.90 | 0.00 | 0.23 | 0.85 | 0.22 | 0.40 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 3 | 233 | 2.62 | 275 | 0.34 | 1.13 | 0.42 | 0.62 | -0.22 | 0.00 | 0.25 | 0.99 | 0.03 | 0.19 |
| MA | 3 | 174 | -0.48 | 275 | 0.13 | 0.81 | -4.28 | 0.77 | -4.03 | 0.00 | 0.58 | 1.65 | 0.41 | 0.41 |
| MA | 3 | 1036 | 2.07 | 275 | 0.25 | 0.98 | -0.01 | 1.16 | 0.64 | 0.00 | 0.26 | 0.99 | 0.07 | 0.24 |
| MA | 3 | 210 | 0.50 | 275 | 0.15 | 1.07 | 0.78 | 1.09 | 0.77 | 0.00 | 0.28 | 0.91 | 0.23 | 0.40 |
| MA | 3 | 207 | -1.00 | 275 | 0.13 | 0.95 | -1.38 | 0.93 | -1.15 | 0.00 | 0.40 | 1.25 | 0.52 | 0.46 |
| MA | 3 | 212 | 0.04 | 273 | 0.14 | 0.84 | -2.63 | 0.81 | -2.38 | 0.00 | 0.54 | 1.32 | 0.31 | 0.39 |
| MA | 3 | 172 | 0.31 | 273 | 0.15 | 0.80 | -2.78 | 0.70 | -3.33 | 0.00 | 0.60 | 1.33 | 0.26 | 0.37 |
| MA | 3 | 198 | -2.15 | 273 | 0.15 | 0.98 | -0.31 | 0.95 | -0.33 | 0.00 | 0.29 | 1.04 | 0.75 | 0.41 |
| MA | 3 | 368 | 0.77 | 273 | 0.17 | 0.85 | -1.54 | 0.71 | -2.30 | 0.00 | 0.53 | 1.18 | 0.19 | 0.34 |
| MA | 3 | 191 | 0.61 | 272 | 0.16 | 0.96 | -0.43 | 0.88 | -1.03 | 0.00 | 0.42 | 1.07 | 0.21 | 0.37 |
| MA | 3 | 193 | -1.18 | 272 | 0.13 | 1.05 | 1.39 | 1.11 | 1.56 | 0.00 | 0.26 | 0.71 | 0.56 | 0.48 |
| MA | 3 | 189 | -1.88 | 272 | 0.14 | 1.00 | 0.03 | 1.37 | 3.20 | 0.00 | 0.25 | 0.93 | 0.71 | 0.43 |
| MA | 3 | 995 | 0.71 | 272 | 0.16 | 1.13 | 1.32 | 1.11 | 0.83 | 0.00 | 0.22 | 0.87 | 0.20 | 0.40 |
| MA | 3 | 229 | -0.56 | 272 | 0.13 | 1.02 | 0.54 | 1.02 | 0.31 | 0.00 | 0.33 | 0.92 | 0.43 | 0.47 |
| MA | 3 | 374 | 0.15 | 272 | 0.14 | 1.21 | 2.78 | 1.27 | 2.80 | 0.00 | 0.13 | 0.63 | 0.29 | 0.46 |
| MA | 3 | 184 | -2.28 | 272 | 0.15 | 0.95 | -0.58 | 0.86 | -1.03 | 0.00 | 0.32 | 1.09 | 0.78 | 0.39 |
| MA | 3 | 186 | -0.27 | 272 | 0.14 | 1.07 | 1.35 | 1.10 | 1.43 | 0.00 | 0.27 | 0.79 | 0.37 | 0.47 |
| MA | 3 | 1035 | 0.39 | 272 | 0.15 | 1.05 | 0.59 | 1.12 | 1.10 | 0.00 | 0.29 | 0.91 | 0.25 | 0.41 |
| MA | 3 | 201 | -1.49 | 272 | 0.13 | 0.93 | -1.67 | 0.90 | -1.28 | 0.00 | 0.40 | 1.26 | 0.63 | 0.44 |
| MA | 3 | 211 | 0.66 | 272 | 0.16 | 1.18 | 1.84 | 1.38 | 2.75 | 0.00 | 0.13 | 0.76 | 0.21 | 0.41 |
| MA | 3 | 234 | 1.84 | 272 | 0.22 | 0.84 | -0.45 | 0.89 | 0.01 | 0.00 | 0.41 | 1.02 | 0.07 | 0.26 |
| MA | 3 | 216 | -0.58 | 272 | 0.13 | 1.04 | 0.84 | 1.04 | 0.76 | 0.00 | 0.31 | 0.86 | 0.43 | 0.47 |
| MA | 3 | 235 | 2.18 | 272 | 0.21 | 0.89 | -0.46 | 0.64 | -1.21 | 0.00 | 0.46 | 1.07 | 0.09 | 0.27 |
| MA | 3 | 209 | 0.28 | 272 | 0.15 | 1.08 | 1.04 | 1.15 | 1.49 | 0.00 | 0.26 | 0.86 | 0.26 | 0.43 |
| MA | 3 | 213 | 0.53 | 272 | 0.16 | 0.93 | -0.75 | 0.94 | -0.52 | 0.00 | 0.42 | 1.08 | 0.22 | 0.38 |
| MA | 3 | 224 | -0.05 | 272 | 0.14 | 1.06 | 1.02 | 1.09 | 1.19 | 0.00 | 0.29 | 0.86 | 0.32 | 0.45 |
| MA | 3 | 204 | -0.35 | 272 | 0.13 | 0.86 | -2.81 | 0.84 | -2.56 | 0.00 | 0.52 | 1.41 | 0.38 | 0.42 |
| MA | 3 | 230 | 0.37 | 272 | 0.15 | 1.10 | 1.20 | 1.11 | 1.04 | 0.00 | 0.26 | 0.86 | 0.25 | 0.42 |
| MA | 3 | 190 | -1.28 | 272 | 0.13 | 1.01 | 0.23 | 0.98 | -0.29 | 0.00 | 0.32 | 0.99 | 0.58 | 0.47 |
| MA | 3 | 180 | -0.45 | 272 | 0.13 | 0.97 | -0.63 | 0.95 | -0.72 | 0.00 | 0.40 | 1.11 | 0.40 | 0.45 |
| MA | 3 | 188 | -0.80 | 272 | 0.13 | 0.89 | -2.78 | 0.88 | -2.17 | 0.00 | 0.47 | 1.48 | 0.48 | 0.44 |
| MA | 3 | 214 | -0.07 | 272 | 0.14 | 0.87 | -2.11 | 0.85 | -2.03 | 0.00 | 0.50 | 1.27 | 0.33 | 0.41 |
| MA | 3 | 223 | -0.27 | 272 | 0.14 | 1.13 | 2.24 | 1.15 | 2.08 | 0.00 | 0.22 | 0.66 | 0.37 | 0.48 |
| MA | 3 | 205 | -0.11 | 272 | 0.14 | 1.10 | 1.56 | 1.12 | 1.52 | 0.00 | 0.26 | 0.78 | 0.33 | 0.46 |
| MA | 3 | 217 | 0.68 | 272 | 0.16 | 1.08 | 0.83 | 1.15 | 1.17 | 0.00 | 0.25 | 0.90 | 0.20 | 0.39 |
| MA | 3 | 1305 | 2.41 | 272 | 0.29 | 1.01 | 0.11 | 0.87 | -0.26 | 0.00 | 0.27 | 1.01 | 0.05 | 0.21 |
| MA | 3 | 187 | -1.51 | 272 | 0.13 | 0.92 | -1.76 | 0.87 | -1.63 | 0.00 | 0.41 | 1.30 | 0.63 | 0.44 |
| MA | 3 | 208 | -0.05 | 272 | 0.14 | 0.89 | -1.89 | 0.88 | -1.57 | 0.00 | 0.49 | 1.24 | 0.32 | 0.41 |
| MA | 3 | 218 | 0.68 | 272 | 0.16 | 1.10 | 1.07 | 1.28 | 2.03 | 0.00 | 0.21 | 0.85 | 0.20 | 0.39 |
| MA | 3 | 185 | 1.68 | 272 | 0.22 | 1.10 | 0.64 | 1.39 | 1.58 | 0.00 | 0.17 | 0.91 | 0.10 | 0.29 |
| MA | 4 | 135 | -1.10 | 252 | 0.13 | 0.87 | -3.61 | 0.85 | -2.91 | 0.00 | 0.48 | 1.70 | 0.56 | 0.44 |
| MA | 4 | 140 | -1.35 | 252 | 0.14 | 0.92 | -1.86 | 0.91 | -1.51 | 0.00 | 0.40 | 1.33 | 0.62 | 0.45 |
| MA | 4 | 109 | -0.90 | 252 | 0.13 | 0.89 | -2.97 | 0.89 | -2.48 | 0.00 | 0.45 | 1.60 | 0.52 | 0.45 |
| MA | 4 | 257 | 0.34 | 252 | 0.15 | 1.08 | 1.01 | 1.10 | 1.09 | 0.00 | 0.20 | 0.87 | 0.26 | 0.43 |
| MA | 4 | 157 | -0.16 | 252 | 0.14 | 0.94 | -1.05 | 0.96 | -0.53 | 0.00 | 0.39 | 1.14 | 0.35 | 0.44 |
| MA | 4 | 236 | -0.10 | 252 | 0.14 | 0.94 | -1.13 | 0.94 | -0.95 | 0.00 | 0.40 | 1.17 | 0.34 | 0.43 |
| MA | 4 | 170 | -0.66 | 252 | 0.13 | 1.13 | 3.17 | 1.17 | 3.37 | 0.00 | 0.13 | 0.31 | 0.46 | 0.50 |
| MA | 4 | 1009 | 0.29 | 252 | 0.15 | 0.97 | -0.41 | 0.98 | -0.23 | 0.00 | 0.35 | 1.05 | 0.27 | 0.41 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 4 | 262 | -0.97 | 252 | 0.09 | 0.98 | -0.36 | 1.04 | 0.59 | 0.00 | 0.45 | 1.06 | 1.06 | 0.71 |
| MA | 4 | 238 | -0.31 | 252 | 0.14 | 0.99 | -0.15 | 1.00 | -0.02 | 0.00 | 0.33 | 1.02 | 0.38 | 0.46 |
| MA | 4 | 268 | -1.30 | 252 | 0.13 | 1.10 | 2.43 | 1.19 | 3.01 | 0.00 | 0.13 | 0.47 | 0.60 | 0.49 |
| MA | 4 | 276 | 0.27 | 252 | 0.15 | 1.03 | 0.43 | 1.07 | 0.76 | 0.00 | 0.26 | 0.93 | 0.27 | 0.43 |
| MA | 3 | 178 | -3.65 | 275 | 0.24 | 0.95 | -0.18 | 0.91 | -0.22 | 0.00 | 0.21 | 1.03 | 0.93 | 0.25 |
| MA | 3 | 182 | -0.01 | 275 | 0.14 | 1.02 | 0.37 | 1.04 | 0.52 | 0.00 | 0.33 | 0.95 | 0.32 | 0.44 |
| MA | 3 | 206 | -1.37 | 275 | 0.13 | 0.95 | -1.35 | 0.93 | -0.91 | 0.00 | 0.38 | 1.22 | 0.60 | 0.45 |
| MA | 3 | 1303 | 1.51 | 275 | 0.21 | 1.17 | 1.13 | 1.16 | 0.80 | 0.00 | 0.16 | 0.90 | 0.11 | 0.32 |
| MA | 3 | 225 | 0.17 | 275 | 0.14 | 1.19 | 2.56 | 1.27 | 2.80 | 0.00 | 0.14 | 0.65 | 0.28 | 0.46 |
| MA | 3 | 215 | -2.22 | 275 | 0.15 | 0.93 | -0.88 | 0.92 | -0.62 | 0.00 | 0.33 | 1.10 | 0.77 | 0.39 |
| MA | 3 | 169 | -0.32 | 275 | 0.13 | 0.89 | -2.13 | 0.86 | -2.29 | 0.00 | 0.49 | 1.32 | 0.38 | 0.43 |
| MA | 3 | 231 | -0.20 | 275 | 0.14 | 1.10 | 1.70 | 1.12 | 1.63 | 0.00 | 0.25 | 0.75 | 0.35 | 0.47 |
| MA | 3 | 219 | 1.17 | 275 | 0.18 | 1.17 | 1.34 | 1.66 | 3.24 | 0.00 | 0.08 | 0.80 | 0.14 | 0.35 |
| MA | 3 | 202 | -2.31 | 275 | 0.15 | 0.93 | -0.91 | 0.79 | -1.63 | 0.00 | 0.36 | 1.14 | 0.78 | 0.38 |
| MA | 3 | 221 | 0.23 | 275 | 0.15 | 0.85 | -2.11 | 0.80 | -2.30 | 0.00 | 0.53 | 1.25 | 0.27 | 0.38 |
| MA | 4 | 267 | -1.15 | 252 | 0.13 | 0.85 | -4.19 | 0.80 | -3.92 | 0.00 | 0.52 | 1.82 | 0.57 | 0.43 |
| MA | 4 | 242 | -2.77 | 252 | 0.18 | 0.96 | -0.31 | 0.85 | -0.85 | 0.00 | 0.28 | 1.05 | 0.86 | 0.33 |
| MA | 4 | 274 | -0.33 | 252 | 0.14 | 1.01 | 0.14 | 0.99 | -0.14 | 0.00 | 0.32 | 0.99 | 0.39 | 0.46 |
| MA | 4 | 246 | 0.43 | 252 | 0.15 | 0.97 | -0.40 | 1.00 | 0.04 | 0.00 | 0.34 | 1.04 | 0.24 | 0.40 |
| MA | 4 | 373 | 0.16 | 252 | 0.15 | 1.11 | 1.55 | 1.16 | 1.86 | 0.00 | 0.15 | 0.77 | 0.29 | 0.45 |
| MA | 4 | 278 | 0.41 | 252 | 0.15 | 1.07 | 0.85 | 1.05 | 0.51 | 0.00 | 0.23 | 0.91 | 0.25 | 0.42 |
| MA | 4 | 1007 | 0.25 | 252 | 0.15 | 1.23 | 2.99 | 1.31 | 3.13 | 0.00 | -0.01 | 0.57 | 0.27 | 0.47 |
| MA | 4 | 377 | -0.08 | 252 | 0.14 | 0.91 | -1.66 | 0.89 | -1.65 | 0.00 | 0.45 | 1.25 | 0.34 | 0.43 |
| MA | 4 | 243 | 0.10 | 252 | 0.14 | 1.06 | 0.86 | 1.09 | 1.16 | 0.00 | 0.23 | 0.87 | 0.30 | 0.45 |
| MA | 4 | 378 | -0.33 | 252 | 0.14 | 0.84 | -3.37 | 0.82 | -3.32 | 0.00 | 0.53 | 1.56 | 0.39 | 0.42 |
| MA | 4 | 241 | 0.36 | 252 | 0.15 | 1.16 | 1.96 | 1.22 | 2.11 | 0.00 | 0.09 | 0.74 | 0.25 | 0.45 |
| MA | 4 | 252 | 3.00 | 252 | 0.39 | 0.90 | -0.16 | 0.36 | -1.74 | 0.00 | 0.36 | 1.08 | 0.03 | 0.15 |
| MA | 4 | 258 | -0.46 | 252 | 0.13 | 1.06 | 1.28 | 1.06 | 1.23 | 0.00 | 0.24 | 0.76 | 0.42 | 0.48 |
| MA | 4 | 249 | -0.14 | 252 | 0.14 | 1.03 | 0.48 | 1.02 | 0.30 | 0.00 | 0.29 | 0.93 | 0.35 | 0.46 |
| MA | 5 | 422 | -0.51 | 249 | 0.13 | 0.95 | -1.20 | 0.94 | -1.26 | 0.00 | 0.38 | 1.24 | 0.42 | 0.46 |
| MA | 5 | 1128 | -1.33 | 249 | 0.14 | 1.02 | 0.49 | 1.07 | 1.13 | 0.00 | 0.24 | 0.86 | 0.60 | 0.47 |
| MA | 5 | 459 | 0.81 | 249 | 0.17 | 1.00 | 0.00 | 0.96 | -0.27 | 0.00 | 0.28 | 1.01 | 0.18 | 0.37 |
| MA | 5 | 455 | -0.32 | 249 | 0.14 | 1.03 | 0.72 | 1.05 | 0.80 | 0.00 | 0.25 | 0.87 | 0.38 | 0.47 |
| MA | 5 | 1217 | 1.38 | 249 | 0.21 | 1.10 | 0.73 | 1.27 | 1.34 | 0.00 | 0.05 | 0.90 | 0.11 | 0.32 |
| MA | 5 | 434 | -0.40 | 249 | 0.14 | 1.00 | -0.03 | 1.00 | -0.06 | 0.00 | 0.31 | 1.01 | 0.39 | 0.47 |
| MA | 5 | 432 | 0.46 | 249 | 0.16 | 1.09 | 1.08 | 1.17 | 1.54 | 0.00 | 0.13 | 0.85 | 0.23 | 0.42 |
| MA | 5 | 417 | 1.56 | 249 | 0.22 | 0.93 | -0.36 | 0.76 | -1.11 | 0.00 | 0.34 | 1.06 | 0.10 | 0.28 |
| MA | 5 | 424 | -0.58 | 249 | 0.13 | 1.06 | 1.53 | 1.06 | 1.23 | 0.00 | 0.21 | 0.70 | 0.43 | 0.49 |
| MA | 5 | 441 | -1.35 | 249 | 0.14 | 0.93 | -1.66 | 0.90 | -1.72 | 0.00 | 0.39 | 1.33 | 0.61 | 0.45 |
| MA | 5 | 1136 | -0.05 | 249 | 0.14 | 1.16 | 2.66 | 1.19 | 2.52 | 0.00 | 0.06 | 0.59 | 0.32 | 0.48 |
| MA | 5 | 431 | -0.56 | 249 | 0.13 | 0.86 | -3.50 | 0.84 | -3.51 | 0.00 | 0.51 | 1.67 | 0.43 | 0.44 |
| MA | 5 | 1223 | 1.00 | 249 | 0.18 | 1.03 | 0.26 | 1.15 | 0.97 | 0.00 | 0.18 | 0.95 | 0.15 | 0.35 |
| MA | 5 | 463 | 0.78 | 249 | 0.13 | 0.83 | -1.21 | 0.72 | -1.39 | 0.00 | 0.52 | 1.09 | 0.23 | 0.45 |
| MA | 5 | 413 | -1.22 | 249 | 0.13 | 0.92 | -2.20 | 0.88 | -2.25 | 0.00 | 0.42 | 1.46 | 0.58 | 0.45 |
| MA | 5 | 442 | 0.20 | 249 | 0.15 | 1.06 | 0.89 | 1.08 | 0.90 | 0.00 | 0.20 | 0.88 | 0.27 | 0.44 |
| MA | 5 | 450 | -0.05 | 249 | 0.14 | 0.98 | -0.39 | 1.03 | 0.37 | 0.00 | 0.32 | 1.03 | 0.32 | 0.44 |
| MA | 5 | 1202 | 0.36 | 249 | 0.15 | 0.93 | -0.81 | 0.91 | -0.94 | 0.00 | 0.38 | 1.11 | 0.25 | 0.40 |
| MA | 5 | 1130 | -0.56 | 249 | 0.13 | 0.86 | -3.51 | 0.84 | -3.40 | 0.00 | 0.50 | 1.67 | 0.43 | 0.44 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 5 | 414 | -0.34 | 249 | 0.06 | 1.38 | 3.61 | 1.45 | 2.20 | 0.00 | 0.44 | 0.84 | 0.86 | 1.18 |
| MA | 5 | 444 | -0.95 | 248 | 0.13 | 1.07 | 1.94 | 1.08 | 1.76 | 0.00 | 0.19 | 0.56 | 0.52 | 0.49 |
| MA | 5 | 460 | -1.59 | 248 | 0.14 | 0.94 | -1.27 | 0.89 | -1.51 | 0.00 | 0.37 | 1.23 | 0.66 | 0.44 |
| MA | 5 | 1232 | 1.00 | 248 | 0.18 | 0.96 | -0.32 | 0.90 | -0.63 | 0.00 | 0.33 | 1.05 | 0.15 | 0.34 |
| MA | 5 | 420 | 2.91 | 248 | 0.39 | 0.99 | 0.09 | 0.72 | -0.54 | 0.00 | 0.20 | 1.02 | 0.03 | 0.16 |
| MA | 5 | 462 | 0.36 | 248 | 0.15 | 1.07 | 0.85 | 1.14 | 1.36 | 0.00 | 0.17 | 0.87 | 0.25 | 0.43 |
| MA | 5 | 436 | 0.15 | 248 | 0.15 | 0.99 | -0.15 | 0.97 | -0.34 | 0.00 | 0.32 | 1.03 | 0.28 | 0.43 |
| MA | 5 | 1229 | 1.25 | 248 | 0.20 | 0.89 | -0.77 | 0.70 | -1.78 | 0.00 | 0.44 | 1.11 | 0.13 | 0.30 |
| MA | 5 | 457 | -0.70 | 248 | 0.13 | 1.06 | 1.46 | 1.06 | 1.20 | 0.00 | 0.22 | 0.70 | 0.46 | 0.49 |
| MA | 5 | 439 | 0.07 | 248 | 0.15 | 0.96 | -0.68 | 0.98 | -0.27 | 0.00 | 0.35 | 1.08 | 0.30 | 0.43 |
| MA | 5 | 440 | 1.29 | 248 | 0.20 | 1.09 | 0.66 | 1.39 | 1.94 | 0.00 | 0.04 | 0.89 | 0.12 | 0.33 |
| MA | 5 | 415 | -0.59 | 248 | 0.13 | 1.01 | 0.16 | 1.04 | 0.73 | 0.00 | 0.29 | 0.94 | 0.44 | 0.47 |
| MA | 5 | 429 | 0.43 | 248 | 0.16 | 1.05 | 0.59 | 1.13 | 1.23 | 0.00 | 0.19 | 0.90 | 0.23 | 0.41 |
| MA | 5 | 445 | 0.48 | 248 | 0.16 | 0.92 | -0.96 | 0.91 | -0.84 | 0.00 | 0.39 | 1.11 | 0.23 | 0.38 |
| MA | 5 | 412 | 0.43 | 248 | 0.16 | 0.83 | -2.14 | 0.78 | -2.23 | 0.00 | 0.53 | 1.26 | 0.23 | 0.37 |
| MA | 5 | 426 | -0.02 | 248 | 0.14 | 1.02 | 0.33 | 1.03 | 0.41 | 0.00 | 0.27 | 0.95 | 0.31 | 0.45 |
| MA | 5 | 448 | -0.41 | 248 | 0.14 | 0.97 | -0.57 | 0.97 | -0.58 | 0.00 | 0.34 | 1.11 | 0.40 | 0.46 |
| MA | 5 | 421 | -1.38 | 248 | 0.14 | 0.99 | -0.31 | 0.97 | -0.55 | 0.00 | 0.31 | 1.08 | 0.61 | 0.46 |
| MA | 5 | 446 | -0.84 | 248 | 0.13 | 1.06 | 1.49 | 1.06 | 1.28 | 0.00 | 0.22 | 0.67 | 0.49 | 0.49 |
| MA | 5 | 1093 | 1.53 | 248 | 0.21 | 1.04 | 0.22 | 0.88 | -0.11 | 0.00 | 0.26 | 1.00 | 0.07 | 0.31 |
| MA | 5 | 443 | 0.45 | 248 | 0.16 | 1.03 | 0.34 | 1.06 | 0.59 | 0.00 | 0.23 | 0.95 | 0.23 | 0.41 |
| MA | 5 | 454 | 0.00 | 248 | 0.14 | 0.93 | -1.10 | 0.91 | -1.20 | 0.00 | 0.40 | 1.16 | 0.31 | 0.43 |
| MA | 5 | 425 | -0.25 | 246 | 0.14 | 1.11 | 2.07 | 1.13 | 1.98 | 0.00 | 0.14 | 0.64 | 0.36 | 0.48 |
| MA | 5 | 419 | 0.55 | 246 | 0.16 | 1.12 | 1.29 | 1.17 | 1.47 | 0.00 | 0.10 | 0.83 | 0.22 | 0.42 |
| MA | 5 | 433 | -1.92 | 246 | 0.15 | 0.90 | -1.50 | 0.82 | -2.02 | 0.00 | 0.41 | 1.23 | 0.72 | 0.41 |
| MA | 5 | 458 | -2.19 | 246 | 0.16 | 1.06 | 0.78 | 1.21 | 1.75 | 0.00 | 0.10 | 0.86 | 0.77 | 0.42 |
| MA | 5 | 416 | -0.53 | 246 | 0.14 | 0.86 | -3.40 | 0.84 | -3.42 | 0.00 | 0.51 | 1.65 | 0.42 | 0.44 |
| MA | 5 | 456 | -0.40 | 246 | 0.14 | 0.92 | -1.72 | 0.92 | -1.52 | 0.00 | 0.41 | 1.30 | 0.39 | 0.45 |
| MA | 5 | 449 | 0.71 | 246 | 0.17 | 1.04 | 0.41 | 1.01 | 0.15 | 0.00 | 0.23 | 0.97 | 0.19 | 0.38 |
| MA | 5 | 435 | 0.15 | 246 | 0.08 | 1.03 | 0.35 | 0.92 | -0.58 | 0.00 | 0.52 | 1.01 | 0.65 | 0.81 |
| MA | 5 | 452 | -0.44 | 246 | 0.14 | 1.12 | 2.57 | 1.14 | 2.55 | 0.00 | 0.13 | 0.50 | 0.40 | 0.49 |
| MA | 5 | 1187 | -0.32 | 246 | 0.14 | 0.93 | -1.46 | 0.93 | -1.25 | 0.00 | 0.40 | 1.24 | 0.38 | 0.45 |
| MA | 5 | 451 | -0.30 | 246 | 0.14 | 0.92 | -1.74 | 0.89 | -1.92 | 0.00 | 0.43 | 1.31 | 0.37 | 0.44 |
| MA | 5 | 1058 | -0.03 | 246 | 0.14 | 1.04 | 0.71 | 1.06 | 0.85 | 0.00 | 0.23 | 0.89 | 0.32 | 0.45 |
| MA | 5 | 464 | 1.02 | 246 | 0.13 | 0.89 | -0.96 | 0.75 | -1.97 | 0.00 | 0.51 | 1.12 | 0.29 | 0.46 |
| MA | 5 | 437 | -0.05 | 246 | 0.14 | 1.08 | 1.35 | 1.12 | 1.62 | 0.00 | 0.17 | 0.78 | 0.32 | 0.46 |
| MA | 5 | 1121 | -0.23 | 246 | 0.14 | 1.07 | 1.36 | 1.12 | 1.88 | 0.00 | 0.18 | 0.74 | 0.36 | 0.47 |
| MA | 5 | 453 | 0.80 | 246 | 0.17 | 0.92 | -0.72 | 0.83 | -1.26 | 0.00 | 0.40 | 1.10 | 0.18 | 0.35 |
| MA | 5 | 428 | 0.26 | 246 | 0.15 | 1.09 | 1.27 | 1.15 | 1.56 | 0.00 | 0.15 | 0.82 | 0.26 | 0.44 |
| MA | 6 | 581 | 0.10 | 162 | 0.20 | 0.87 | -1.15 | 0.79 | -1.41 | 0.00 | 0.49 | 1.18 | 0.22 | 0.36 |
| MA | 6 | 568 | -1.13 | 162 | 0.17 | 0.99 | -0.10 | 0.97 | -0.42 | 0.00 | 0.36 | 1.05 | 0.46 | 0.47 |
| MA | 6 | 579 | -0.44 | 162 | 0.18 | 1.02 | 0.24 | 1.11 | 1.08 | 0.00 | 0.32 | 0.94 | 0.31 | 0.44 |
| MA | 6 | 470 | 0.72 | 162 | 0.24 | 1.01 | 0.14 | 1.12 | 0.57 | 0.00 | 0.26 | 0.97 | 0.14 | 0.33 |
| MA | 6 | 468 | -0.78 | 162 | 0.17 | 0.83 | -2.79 | 0.79 | -2.62 | 0.00 | 0.55 | 1.53 | 0.38 | 0.41 |
| MA | 6 | 1200 | -0.44 | 162 | 0.18 | 1.08 | 0.95 | 1.08 | 0.79 | 0.00 | 0.26 | 0.84 | 0.31 | 0.45 |
| MA | 6 | 551 | -0.34 | 162 | 0.18 | 1.06 | 0.71 | 1.09 | 0.79 | 0.00 | 0.27 | 0.87 | 0.30 | 0.44 |
| MA | 6 | 480 | -0.17 | 162 | 0.19 | 1.04 | 0.43 | 1.02 | 0.17 | 0.00 | 0.31 | 0.94 | 0.27 | 0.42 |
| MA | 6 | 469 | -0.17 | 162 | 0.09 | 0.92 | -0.58 | 0.79 | -1.41 | 0.00 | 0.68 | 1.11 | 0.90 | 0.83 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 6 | 585 | 2.49 | 162 | 0.46 | 0.98 | 0.08 | 1.56 | 1.02 | 0.00 | 0.14 | 0.99 | 0.03 | 0.17 |
| MA | 6 | 578 | -0.41 | 162 | 0.18 | 1.02 | 0.21 | 1.04 | 0.43 | 0.00 | 0.32 | 0.95 | 0.31 | 0.44 |
| MA | 6 | 1251 | 1.42 | 162 | 0.30 | 0.80 | -0.85 | 0.49 | -1.74 | 0.00 | 0.51 | 1.15 | 0.08 | 0.23 |
| MA | 6 | 490 | -0.38 | 162 | 0.18 | 1.04 | 0.48 | 1.03 | 0.31 | 0.00 | 0.31 | 0.93 | 0.30 | 0.44 |
| MA | 6 | 1256 | 0.23 | 162 | 0.21 | 1.10 | 0.81 | 1.16 | 0.95 | 0.00 | 0.21 | 0.88 | 0.20 | 0.40 |
| MA | 6 | 502 | 0.51 | 162 | 0.16 | 0.81 | -1.73 | 0.76 | -1.94 | 0.00 | 0.59 | 1.23 | 0.38 | 0.45 |
| MA | 6 | 484 | 0.61 | 162 | 0.23 | 0.97 | -0.15 | 0.95 | -0.18 | 0.00 | 0.34 | 1.03 | 0.15 | 0.34 |
| MA | 6 | 1131 | -0.02 | 162 | 0.09 | 0.71 | -2.22 | 0.54 | -2.61 | 0.00 | 0.75 | 1.16 | 0.72 | 0.71 |
| MA | 6 | 1062 | 0.55 | 162 | 0.14 | 0.61 | -2.44 | 0.39 | -2.98 | 0.00 | 0.72 | 1.19 | 0.32 | 0.44 |
| MA | 6 | 537 | -1.08 | 162 | 0.17 | 0.96 | -0.65 | 0.96 | -0.53 | 0.00 | 0.39 | 1.15 | 0.44 | 0.46 |
| MA | 6 | 567 | -0.63 | 162 | 0.18 | 1.03 | 0.42 | 1.03 | 0.33 | 0.00 | 0.32 | 0.93 | 0.35 | 0.45 |
| MA | 6 | 577 | 0.96 | 162 | 0.26 | 1.25 | 1.35 | 1.46 | 1.61 | 0.00 | -0.01 | 0.79 | 0.12 | 0.34 |
| MA | 6 | 1142 | -0.99 | 162 | 0.17 | 0.95 | -0.94 | 0.93 | -0.94 | 0.00 | 0.41 | 1.21 | 0.43 | 0.45 |
| MA | 6 | 487 | 0.10 | 162 | 0.20 | 1.30 | 2.46 | 1.46 | 2.65 | 0.00 | -0.02 | 0.59 | 0.22 | 0.44 |
| MA | 6 | 580 | 0.06 | 162 | 0.20 | 1.20 | 1.77 | 1.32 | 2.00 | 0.00 | 0.09 | 0.70 | 0.23 | 0.43 |
| MA | 6 | 526 | -0.72 | 162 | 0.17 | 1.09 | 1.34 | 1.08 | 0.93 | 0.00 | 0.25 | 0.75 | 0.37 | 0.47 |
| MA | 6 | 1253 | 0.27 | 162 | 0.21 | 0.87 | -1.06 | 0.84 | -0.91 | 0.00 | 0.47 | 1.14 | 0.20 | 0.35 |
| MA | 6 | 534 | 0.41 | 162 | 0.22 | 1.00 | 0.05 | 1.01 | 0.10 | 0.00 | 0.32 | 1.00 | 0.18 | 0.36 |
| MA | 6 | 1225 | 1.85 | 162 | 0.35 | 1.00 | 0.09 | 0.95 | 0.03 | 0.00 | 0.23 | 1.01 | 0.06 | 0.22 |
| MA | 6 | 520 | 0.06 | 162 | 0.20 | 1.17 | 1.46 | 1.39 | 2.33 | 0.00 | 0.14 | 0.76 | 0.23 | 0.42 |
| MA | 6 | 499 | 0.18 | 162 | 0.21 | 1.10 | 0.90 | 1.22 | 1.30 | 0.00 | 0.19 | 0.84 | 0.21 | 0.40 |
| MA | 6 | 535 | -1.13 | 162 | 0.17 | 0.94 | -1.05 | 0.91 | -1.21 | 0.00 | 0.42 | 1.26 | 0.46 | 0.45 |
| MA | 6 | 571 | -1.99 | 162 | 0.17 | 0.90 | -1.75 | 0.82 | -1.85 | 0.00 | 0.45 | 1.38 | 0.64 | 0.43 |
| MA | 6 | 553 | -0.17 | 162 | 0.19 | 1.02 | 0.26 | 1.20 | 1.51 | 0.00 | 0.30 | 0.93 | 0.27 | 0.42 |
| MA | 6 | 563 | -0.63 | 162 | 0.18 | 0.99 | -0.16 | 0.97 | -0.35 | 0.00 | 0.37 | 1.04 | 0.35 | 0.44 |
| MA | 6 | 550 | -0.78 | 162 | 0.17 | 0.89 | -1.67 | 0.87 | -1.54 | 0.00 | 0.47 | 1.33 | 0.38 | 0.43 |
| MA | 6 | 515 | -0.72 | 162 | 0.17 | 1.04 | 0.56 | 1.03 | 0.34 | 0.00 | 0.31 | 0.90 | 0.37 | 0.46 |
| MA | 6 | 509 | -0.96 | 162 | 0.17 | 0.98 | -0.32 | 0.96 | -0.51 | 0.00 | 0.38 | 1.09 | 0.42 | 0.46 |
| MA | 6 | 495 | -0.78 | 162 | 0.17 | 1.08 | 1.16 | 1.09 | 1.07 | 0.00 | 0.26 | 0.76 | 0.38 | 0.47 |
| MA | 6 | 574 | -0.47 | 162 | 0.18 | 0.91 | -1.14 | 0.86 | -1.34 | 0.00 | 0.46 | 1.21 | 0.32 | 0.42 |
| MA | 6 | 478 | -0.66 | 162 | 0.18 | 0.97 | -0.43 | 0.93 | -0.73 | 0.00 | 0.40 | 1.11 | 0.36 | 0.44 |
| MA | 6 | 575 | 1.73 | 162 | 0.34 | 0.95 | -0.11 | 0.52 | -1.31 | 0.00 | 0.37 | 1.07 | 0.06 | 0.23 |
| MA | 6 | 491 | 0.23 | 162 | 0.12 | 0.86 | -1.22 | 0.83 | -1.25 | 0.00 | 0.62 | 1.15 | 0.61 | 0.62 |
| MA | 6 | 512 | 0.46 | 162 | 0.22 | 1.16 | 1.15 | 1.20 | 1.03 | 0.00 | 0.14 | 0.84 | 0.17 | 0.38 |
| MA | 6 | 521 | 0.23 | 162 | 0.21 | 1.29 | 2.26 | 1.38 | 2.10 | 0.00 | 0.00 | 0.65 | 0.20 | 0.43 |
| MA | 6 | 1101 | -0.90 | 162 | 0.17 | 1.03 | 0.52 | 1.10 | 1.22 | 0.00 | 0.30 | 0.86 | 0.41 | 0.47 |
| MA | 6 | 572 | -0.27 | 162 | 0.19 | 1.06 | 0.70 | 1.08 | 0.71 | 0.00 | 0.27 | 0.89 | 0.28 | 0.43 |
| MA | 6 | 476 | 1.03 | 162 | 0.26 | 1.22 | 1.15 | 1.46 | 1.56 | 0.00 | 0.01 | 0.82 | 0.11 | 0.33 |
| MA | 6 | 1203 | -1.08 | 162 | 0.17 | 0.97 | -0.52 | 0.95 | -0.68 | 0.00 | 0.39 | 1.13 | 0.44 | 0.46 |
| MA | 6 | 524 | 1.73 | 162 | 0.34 | 1.04 | 0.23 | 1.04 | 0.23 | 0.00 | 0.19 | 0.98 | 0.06 | 0.24 |
| MA | 6 | 514 | -0.99 | 162 | 0.17 | 1.07 | 1.25 | 1.07 | 0.95 | 0.00 | 0.27 | 0.73 | 0.43 | 0.48 |
| MA | 6 | 1063 | -0.90 | 162 | 0.17 | 1.00 | -0.05 | 0.98 | -0.23 | 0.00 | 0.36 | 1.02 | 0.41 | 0.46 |
| MA | 6 | 570 | 1.85 | 162 | 0.35 | 0.86 | -0.42 | 0.41 | -1.66 | 0.00 | 0.44 | 1.11 | 0.06 | 0.21 |
| MA | 6 | 545 | -0.06 | 162 | 0.19 | 1.00 | -0.01 | 1.04 | 0.32 | 0.00 | 0.33 | 0.99 | 0.25 | 0.40 |
| MA | 6 | 517 | -0.24 | 162 | 0.19 | 0.94 | -0.66 | 0.91 | -0.73 | 0.00 | 0.42 | 1.11 | 0.28 | 0.41 |
| MA | 6 | 466 | 1.03 | 162 | 0.26 | 1.16 | 0.90 | 1.34 | 1.21 | 0.00 | 0.08 | 0.86 | 0.11 | 0.32 |
| MA | 6 | 482 | 2.73 | 162 | 0.51 | 0.95 | 0.03 | 0.56 | -0.59 | 0.00 | 0.26 | 1.05 | 0.02 | 0.15 |
| MA | 6 | 1254 | -1.05 | 162 | 0.17 | 0.98 | -0.34 | 0.98 | -0.20 | 0.00 | 0.37 | 1.07 | 0.44 | 0.46 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 7 | 475 | 0.38 | 162 | 0.24 | 0.95 | -0.26 | 0.95 | -0.20 | 0.00 | 0.29 | 1.04 | 0.14 | 0.33 |
| MA | 7 | 564 | -0.17 | 162 | 0.20 | 1.00 | 0.06 | 1.01 | 0.15 | 0.00 | 0.22 | 0.99 | 0.21 | 0.40 |
| MA | 7 | 505 | -0.82 | 162 | 0.17 | 1.14 | 1.97 | 1.16 | 1.91 | 0.00 | 0.01 | 0.60 | 0.33 | 0.48 |
| MA | 7 | 516 | 0.76 | 162 | 0.27 | 0.90 | -0.45 | 0.79 | -0.82 | 0.00 | 0.39 | 1.08 | 0.10 | 0.28 |
| MA | 7 | 508 | -1.69 | 162 | 0.16 | 1.00 | 0.13 | 1.01 | 0.14 | 0.00 | 0.24 | 0.96 | 0.52 | 0.48 |
| MA | 7 | 525 | -0.85 | 162 | 0.17 | 0.98 | -0.29 | 0.96 | -0.47 | 0.00 | 0.29 | 1.07 | 0.33 | 0.45 |
| MA | 7 | 1134 | -1.30 | 162 | 0.16 | 1.11 | 2.45 | 1.12 | 2.18 | 0.00 | 0.06 | 0.29 | 0.43 | 0.50 |
| MA | 7 | 1066 | 2.04 | 162 | 0.46 | 1.02 | 0.18 | 0.85 | -0.14 | 0.00 | 0.15 | 1.00 | 0.03 | 0.17 |
| MA | 7 | 488 | -0.21 | 162 | 0.20 | 1.05 | 0.45 | 1.05 | 0.43 | 0.00 | 0.16 | 0.94 | 0.22 | 0.41 |
| MA | 7 | 477 | 0.44 | 162 | 0.24 | 1.07 | 0.46 | 1.20 | 1.01 | 0.00 | 0.05 | 0.92 | 0.13 | 0.34 |
| MA | 7 | 494 | -0.70 | 162 | 0.18 | 0.97 | -0.38 | 0.95 | -0.52 | 0.00 | 0.31 | 1.08 | 0.30 | 0.44 |
| MA | 7 | 506 | -0.40 | 162 | 0.19 | 1.12 | 1.25 | 1.17 | 1.49 | 0.00 | 0.02 | 0.78 | 0.25 | 0.44 |
| MA | 7 | 496 | -0.85 | 162 | 0.17 | 0.98 | -0.30 | 0.96 | -0.54 | 0.00 | 0.30 | 1.08 | 0.33 | 0.45 |
| MA | 7 | 479 | 0.17 | 162 | 0.22 | 0.98 | -0.13 | 0.92 | -0.42 | 0.00 | 0.28 | 1.03 | 0.16 | 0.35 |
| MA | 7 | 483 | 0.13 | 162 | 0.22 | 1.12 | 0.87 | 1.15 | 0.92 | 0.00 | 0.02 | 0.88 | 0.17 | 0.38 |
| MA | 7 | 559 | -0.40 | 162 | 0.19 | 1.05 | 0.59 | 1.06 | 0.55 | 0.00 | 0.15 | 0.91 | 0.25 | 0.43 |
| MA | 7 | 486 | -0.54 | 162 | 0.18 | 1.10 | 1.16 | 1.11 | 1.09 | 0.00 | 0.07 | 0.80 | 0.27 | 0.45 |
| MA | 7 | 1234 | -0.47 | 162 | 0.18 | 1.14 | 1.51 | 1.18 | 1.61 | 0.00 | -0.01 | 0.74 | 0.26 | 0.45 |
| MA | 7 | 1247 | 2.04 | 162 | 0.46 | 1.05 | 0.27 | 1.21 | 0.56 | 0.00 | 0.00 | 0.96 | 0.03 | 0.18 |
| MA | 7 | 481 | -0.61 | 162 | 0.12 | 0.90 | -0.87 | 0.81 | -1.29 | 0.00 | 0.49 | 1.10 | 0.44 | 0.62 |
| MA | 7 | 498 | -0.94 | 162 | 0.17 | 0.90 | -1.77 | 0.88 | -1.74 | 0.00 | 0.44 | 1.37 | 0.35 | 0.44 |
| MA | 7 | 485 | -0.21 | 162 | 0.20 | 1.03 | 0.31 | 1.14 | 1.08 | 0.00 | 0.14 | 0.93 | 0.22 | 0.41 |
| MA | 7 | 1237 | 0.56 | 162 | 0.25 | 0.92 | -0.36 | 0.95 | -0.17 | 0.00 | 0.31 | 1.05 | 0.12 | 0.30 |
| MA | 7 | 555 | 3.69 | 162 | 1.01 | 1.00 | 0.33 | 0.46 | -0.26 | 0.00 | 0.14 | 1.02 | 0.01 | 0.08 |
| MA | 7 | 557 | -1.24 | 162 | 0.16 | 1.04 | 0.79 | 1.05 | 0.91 | 0.00 | 0.18 | 0.77 | 0.42 | 0.49 |
| MA | 7 | 552 | 0.91 | 162 | 0.29 | 0.98 | -0.01 | 0.85 | -0.49 | 0.00 | 0.25 | 1.02 | 0.09 | 0.27 |
| MA | 7 | 536 | -1.46 | 162 | 0.16 | 0.91 | -2.42 | 0.89 | -2.28 | 0.00 | 0.41 | 1.75 | 0.47 | 0.46 |
| MA | 7 | 549 | -0.13 | 162 | 0.20 | 1.04 | 0.38 | 1.06 | 0.48 | 0.00 | 0.16 | 0.94 | 0.20 | 0.40 |
| MA | 7 | 541 | -1.35 | 162 | 0.16 | 0.92 | -1.95 | 0.90 | -1.96 | 0.00 | 0.39 | 1.58 | 0.44 | 0.46 |
| MA | 7 | 501 | 2.27 | 162 | 0.51 | 0.94 | 0.03 | 1.23 | 0.57 | 0.00 | 0.13 | 1.00 | 0.02 | 0.15 |
| MA | 7 | 547 | -0.03 | 162 | 0.12 | 0.90 | -0.62 | 0.91 | -0.48 | 0.00 | 0.49 | 1.06 | 0.42 | 0.62 |
| MA | 7 | 513 | 2.57 | 162 | 0.59 | 0.91 | 0.02 | 1.47 | 0.85 | 0.00 | 0.19 | 1.03 | 0.02 | 0.13 |
| MA | 7 | 503 | -0.66 | 162 | 0.18 | 1.05 | 0.63 | 1.09 | 0.96 | 0.00 | 0.15 | 0.87 | 0.30 | 0.45 |
| MA | 7 | 1252 | 2.99 | 162 | 0.72 | 1.01 | 0.25 | 0.99 | 0.26 | 0.00 | 0.07 | 0.99 | 0.01 | 0.11 |
| MA | 7 | 493 | -0.36 | 162 | 0.19 | 1.05 | 0.49 | 1.07 | 0.66 | 0.00 | 0.15 | 0.92 | 0.24 | 0.42 |
| MA | 7 | 561 | -0.25 | 162 | 0.19 | 0.96 | -0.33 | 1.03 | 0.26 | 0.00 | 0.28 | 1.03 | 0.22 | 0.40 |
| MA | 7 | 492 | -0.13 | 162 | 0.20 | 0.92 | -0.65 | 0.90 | -0.73 | 0.00 | 0.37 | 1.10 | 0.20 | 0.38 |
| MA | 7 | 511 | -0.21 | 162 | 0.20 | 1.06 | 0.60 | 1.07 | 0.56 | 0.00 | 0.13 | 0.91 | 0.22 | 0.41 |
| MA | 7 | 616 | -1.44 | 161 | 0.16 | 1.04 | 1.06 | 1.04 | 0.87 | 0.00 | 0.18 | 0.68 | 0.47 | 0.49 |
| MA | 7 | 562 | -0.84 | 161 | 0.12 | 0.98 | -0.23 | 0.96 | -0.36 | 0.00 | 0.39 | 1.07 | 0.65 | 0.65 |
| MA | 7 | 533 | -0.54 | 161 | 0.18 | 0.95 | -0.62 | 0.97 | -0.28 | 0.00 | 0.33 | 1.09 | 0.27 | 0.42 |
| MA | 7 | 467 | 0.55 | 161 | 0.25 | 1.07 | 0.44 | 1.01 | 0.14 | 0.00 | 0.12 | 0.96 | 0.12 | 0.33 |
| MA | 7 | 471 | 1.28 | 161 | 0.33 | 1.02 | 0.16 | 0.87 | -0.29 | 0.00 | 0.19 | 1.01 | 0.06 | 0.24 |
| MA | 7 | 543 | 0.37 | 161 | 0.24 | 1.07 | 0.49 | 1.08 | 0.45 | 0.00 | 0.10 | 0.94 | 0.14 | 0.35 |
| MA | 7 | 474 | 0.32 | 161 | 0.23 | 1.03 | 0.26 | 1.14 | 0.77 | 0.00 | 0.12 | 0.95 | 0.14 | 0.35 |
| MA | 7 | 565 | -0.74 | 161 | 0.18 | 1.02 | 0.32 | 1.03 | 0.37 | 0.00 | 0.21 | 0.94 | 0.31 | 0.45 |
| MA | 7 | 522 | 0.37 | 161 | 0.24 | 0.89 | -0.61 | 0.80 | -1.03 | 0.00 | 0.41 | 1.10 | 0.14 | 0.32 |
| MA | 7 | 489 | -0.83 | 161 | 0.17 | 0.95 | -0.79 | 0.94 | -0.72 | 0.00 | 0.34 | 1.16 | 0.33 | 0.44 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 7 | 540 | -0.48 | 161 | 0.19 | 0.95 | -0.58 | 0.94 | -0.56 | 0.00 | 0.34 | 1.10 | 0.26 | 0.41 |
| MA | 7 | 523 | -1.28 | 161 | 0.16 | 0.89 | -2.65 | 0.88 | -2.42 | 0.00 | 0.45 | 1.72 | 0.43 | 0.45 |
| MA | 7 | 527 | -0.22 | 161 | 0.20 | 0.86 | -1.28 | 0.78 | -1.82 | 0.00 | 0.50 | 1.21 | 0.22 | 0.37 |
| MA | 7 | 1241 | -0.89 | 161 | 0.17 | 0.99 | -0.18 | 1.01 | 0.09 | 0.00 | 0.26 | 1.03 | 0.34 | 0.46 |
| MA | 7 | 1244 | 0.62 | 161 | 0.26 | 1.04 | 0.28 | 1.13 | 0.64 | 0.00 | 0.10 | 0.95 | 0.11 | 0.31 |
| MA | 7 | 1264 | 2.03 | 161 | 0.46 | 1.05 | 0.27 | 1.26 | 0.65 | 0.00 | 0.00 | 0.96 | 0.03 | 0.18 |
| MA | 7 | 1259 | -0.14 | 161 | 0.20 | 1.01 | 0.16 | 1.04 | 0.32 | 0.00 | 0.20 | 0.97 | 0.21 | 0.39 |
| MA | 7 | 1065 | -1.11 | 161 | 0.17 | 0.95 | -0.88 | 0.94 | -0.92 | 0.00 | 0.33 | 1.23 | 0.39 | 0.46 |
| MA | 8 | 602 | 0.09 | 135 | 0.23 | 1.01 | 0.14 | 1.00 | 0.06 | 0.00 | 0.23 | 0.99 | 0.19 | 0.38 |
| MA | 8 | 594 | -0.86 | 135 | 0.19 | 1.08 | 1.12 | 1.09 | 1.14 | 0.00 | 0.15 | 0.73 | 0.36 | 0.48 |
| MA | 8 | 593 | -0.49 | 135 | 0.20 | 1.16 | 1.66 | 1.18 | 1.60 | 0.00 | 0.01 | 0.68 | 0.28 | 0.47 |
| MA | 8 | 583 | 0.37 | 135 | 0.17 | 0.82 | -1.78 | 0.80 | -1.92 | 0.00 | 0.55 | 1.28 | 0.41 | 0.46 |
| MA | 8 | 544 | -0.15 | 135 | 0.21 | 1.14 | 1.19 | 1.19 | 1.31 | 0.00 | 0.02 | 0.80 | 0.22 | 0.43 |
| MA | 8 | 604 | -0.61 | 135 | 0.19 | 1.08 | 0.93 | 1.06 | 0.65 | 0.00 | 0.15 | 0.83 | 0.30 | 0.46 |
| MA | 8 | 597 | -0.93 | 135 | 0.19 | 0.88 | -1.98 | 0.87 | -1.79 | 0.00 | 0.46 | 1.46 | 0.37 | 0.44 |
| MA | 8 | 1236 | -0.06 | 135 | 0.22 | 1.11 | 0.92 | 1.21 | 1.32 | 0.00 | 0.04 | 0.83 | 0.21 | 0.41 |
| MA | 8 | 569 | -0.01 | 135 | 0.22 | 0.93 | -0.49 | 0.93 | -0.43 | 0.00 | 0.35 | 1.08 | 0.20 | 0.37 |
| MA | 8 | 1230 | -0.33 | 135 | 0.21 | 1.04 | 0.39 | 1.05 | 0.39 | 0.00 | 0.20 | 0.94 | 0.25 | 0.43 |
| MA | 8 | 1135 | 0.02 | 135 | 0.17 | 1.02 | 0.14 | 0.65 | -0.93 | 0.00 | 0.40 | 1.02 | 0.19 | 0.51 |
| MA | 8 | 590 | 0.81 | 135 | 0.29 | 0.85 | -0.65 | 0.60 | -1.67 | 0.00 | 0.50 | 1.13 | 0.10 | 0.27 |
| MA | 8 | 573 | -0.20 | 135 | 0.21 | 1.03 | 0.26 | 1.04 | 0.33 | 0.00 | 0.21 | 0.96 | 0.23 | 0.41 |
| MA | 8 | 596 | -1.03 | 135 | 0.18 | 1.02 | 0.43 | 1.04 | 0.56 | 0.00 | 0.23 | 0.88 | 0.39 | 0.48 |
| MA | 8 | 615 | 0.51 | 135 | 0.26 | 1.02 | 0.19 | 1.06 | 0.34 | 0.00 | 0.17 | 0.97 | 0.13 | 0.33 |
| MA | 8 | 531 | 0.20 | 135 | 0.24 | 1.00 | 0.04 | 1.07 | 0.43 | 0.00 | 0.22 | 0.99 | 0.17 | 0.36 |
| MA | 8 | 601 | 0.15 | 135 | 0.23 | 0.99 | -0.05 | 0.92 | -0.42 | 0.00 | 0.28 | 1.03 | 0.18 | 0.37 |
| MA | 8 | 618 | -2.07 | 135 | 0.18 | 0.95 | -0.79 | 0.94 | -0.78 | 0.00 | 0.33 | 1.21 | 0.63 | 0.46 |
| MA | 8 | 1138 | 1.41 | 135 | 0.40 | 1.11 | 0.38 | 0.56 | -0.43 | 0.00 | 0.21 | 1.01 | 0.04 | 0.23 |
| MA | 8 | 620 | 2.91 | 135 | 0.72 | 1.03 | 0.27 | 1.07 | 0.36 | 0.00 | 0.03 | 0.98 | 0.01 | 0.12 |
| MA | 8 | 607 | -0.45 | 135 | 0.20 | 1.09 | 0.93 | 1.20 | 1.66 | 0.00 | 0.09 | 0.79 | 0.27 | 0.45 |
| MA | 8 | 1270 | -0.06 | 135 | 0.22 | 0.94 | -0.41 | 0.95 | -0.29 | 0.00 | 0.33 | 1.07 | 0.21 | 0.38 |
| MA | 8 | 1273 | 0.15 | 135 | 0.23 | 1.00 | 0.07 | 1.04 | 0.27 | 0.00 | 0.22 | 0.99 | 0.18 | 0.37 |
| MA | 8 | 576 | 1.09 | 135 | 0.32 | 1.08 | 0.38 | 1.26 | 0.85 | 0.00 | 0.03 | 0.93 | 0.08 | 0.28 |
| MA | 8 | 1269 | -0.79 | 135 | 0.19 | 0.91 | -1.31 | 0.87 | -1.52 | 0.00 | 0.43 | 1.30 | 0.34 | 0.43 |
| MA | 8 | 582 | 1.16 | 135 | 0.21 | 1.02 | 0.17 | 1.00 | 0.08 | 0.00 | 0.25 | 0.99 | 0.22 | 0.42 |
| MA | 8 | 548 | 1.95 | 135 | 0.46 | 0.94 | 0.00 | 1.08 | 0.32 | 0.00 | 0.18 | 1.01 | 0.04 | 0.18 |
| MA | 8 | 598 | -0.79 | 135 | 0.19 | 1.20 | 2.62 | 1.27 | 2.97 | 0.00 | -0.07 | 0.35 | 0.34 | 0.50 |
| MA | 8 | 617 | -0.06 | 135 | 0.22 | 1.02 | 0.18 | 1.06 | 0.42 | 0.00 | 0.20 | 0.96 | 0.21 | 0.40 |
| MA | 8 | 591 | 1.31 | 135 | 0.35 | 0.98 | 0.03 | 0.86 | -0.28 | 0.00 | 0.25 | 1.03 | 0.07 | 0.24 |
| MA | 8 | 613 | 0.15 | 135 | 0.14 | 0.92 | -0.45 | 0.90 | -0.56 | 0.00 | 0.48 | 1.08 | 0.44 | 0.58 |
| MA | 8 | 592 | -0.45 | 135 | 0.20 | 1.02 | 0.29 | 1.00 | 0.03 | 0.00 | 0.23 | 0.97 | 0.27 | 0.44 |
| MA | 8 | 621 | -1.49 | 135 | 0.18 | 1.03 | 0.64 | 1.07 | 1.28 | 0.00 | 0.21 | 0.75 | 0.50 | 0.49 |
| MA | 8 | 1218 | 2.19 | 135 | 0.51 | 1.02 | 0.19 | 0.73 | -0.32 | 0.00 | 0.16 | 1.01 | 0.03 | 0.17 |
| MA | 8 | 529 | 0.15 | 135 | 0.23 | 0.95 | -0.27 | 0.93 | -0.33 | 0.00 | 0.31 | 1.05 | 0.18 | 0.36 |
| MA | 8 | 1141 | -1.00 | 135 | 0.18 | 0.89 | -1.99 | 0.86 | -2.04 | 0.00 | 0.46 | 1.51 | 0.39 | 0.44 |
| MA | 8 | 584 | -0.45 | 135 | 0.20 | 0.96 | -0.44 | 0.92 | -0.63 | 0.00 | 0.34 | 1.10 | 0.27 | 0.42 |
| MA | 8 | 566 | -0.24 | 135 | 0.21 | 0.92 | -0.68 | 0.84 | -1.18 | 0.00 | 0.40 | 1.14 | 0.24 | 0.39 |
| MA | 8 | 1268 | 1.95 | 135 | 0.46 | 0.97 | 0.07 | 1.07 | 0.30 | 0.00 | 0.20 | 1.02 | 0.04 | 0.18 |
| MA | 8 | 1228 | -0.49 | 135 | 0.20 | 1.00 | 0.05 | 1.02 | 0.25 | 0.00 | 0.25 | 0.98 | 0.28 | 0.43 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MA | 8 | 588 | 1.75 | 135 | 0.42 | 1.01 | 0.15 | 1.11 | 0.39 | 0.00 | 0.12 | 0.99 | 0.04 | 0.20 |
| MA | 8 | 612 | -0.06 | 135 | 0.22 | 0.86 | -1.10 | 0.76 | -1.66 | 0.00 | 0.49 | 1.20 | 0.21 | 0.36 |
| MA | 8 | 542 | 1.75 | 135 | 0.42 | 1.08 | 0.33 | 1.51 | 1.11 | 0.00 | -0.05 | 0.93 | 0.04 | 0.21 |
| MA | 8 | 1274 | -0.20 | 135 | 0.21 | 0.83 | -1.54 | 0.75 | -1.92 | 0.00 | 0.54 | 1.27 | 0.23 | 0.37 |
| MA | 8 | 600 | -1.39 | 135 | 0.18 | 0.96 | -0.99 | 0.94 | -1.00 | 0.00 | 0.35 | 1.33 | 0.47 | 0.47 |
| MA | 8 | 614 | -1.00 | 135 | 0.18 | 0.92 | -1.33 | 0.91 | -1.27 | 0.00 | 0.40 | 1.34 | 0.39 | 0.45 |
| MA | 8 | 586 | -0.53 | 135 | 0.20 | 1.13 | 1.45 | 1.18 | 1.58 | 0.00 | 0.04 | 0.70 | 0.29 | 0.46 |
| MA | 8 | 608 | -1.06 | 135 | 0.18 | 1.05 | 0.81 | 1.06 | 0.92 | 0.00 | 0.19 | 0.77 | 0.40 | 0.48 |
| MA | 8 | 611 | -1.61 | 135 | 0.18 | 0.99 | -0.25 | 0.98 | -0.32 | 0.00 | 0.29 | 1.09 | 0.53 | 0.48 |
| MA | 8 | 556 | 0.51 | 135 | 0.26 | 0.96 | -0.19 | 0.96 | -0.10 | 0.00 | 0.28 | 1.03 | 0.13 | 0.32 |
| MA | 8 | 532 | -0.37 | 135 | 0.20 | 1.06 | 0.66 | 1.08 | 0.68 | 0.00 | 0.16 | 0.88 | 0.26 | 0.44 |
| MA | 8 | 530 | -0.79 | 135 | 0.19 | 1.16 | 2.11 | 1.20 | 2.21 | 0.00 | 0.01 | 0.49 | 0.34 | 0.49 |
| MA | 8 | 603 | -1.39 | 135 | 0.18 | 0.99 | -0.24 | 0.98 | -0.35 | 0.00 | 0.29 | 1.09 | 0.47 | 0.48 |
| MA | 8 | 599 | -0.15 | 135 | 0.21 | 0.99 | -0.04 | 0.93 | -0.47 | 0.00 | 0.29 | 1.03 | 0.22 | 0.40 |
| MA | 8 | 589 | -0.96 | 135 | 0.18 | 1.06 | 0.91 | 1.06 | 0.79 | 0.00 | 0.18 | 0.78 | 0.38 | 0.48 |
| MA | 8 | 1140 | 1.95 | 135 | 0.46 | 0.94 | 0.00 | 0.95 | 0.08 | 0.00 | 0.20 | 1.02 | 0.04 | 0.18 |

## Appendix Table G.3: 2021 Science IRT Item Statistics

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC | 5 | 1369 | 1.15 | 251 | 0.20 | 1.00 | 0.03 | 0.99 | 0.02 | 0.00 | 0.22 | 1.00 | 0.12 | 0.32 |
| SC | 5 | 1327 | -0.11 | 251 | 0.14 | 1.06 | 0.92 | 1.10 | 1.13 | 0.00 | 0.21 | 0.85 | 0.30 | 0.45 |
| SC | 5 | 1365 | 0.56 | 251 | 0.17 | 1.01 | 0.10 | 0.96 | -0.27 | 0.00 | 0.26 | 1.00 | 0.19 | 0.38 |
| SC | 5 | 1320 | 1.41 | 251 | 0.22 | 1.05 | 0.37 | 1.61 | 2.32 | 0.00 | 0.04 | 0.91 | 0.10 | 0.30 |
| SC | 5 | 1372 | 0.50 | 251 | 0.09 | 0.77 | -1.69 | 0.59 | -2.33 | 0.00 | 0.56 | 1.11 | 0.42 | 0.64 |
| SC | 5 | 1344 | -0.50 | 251 | 0.14 | 1.16 | 3.33 | 1.18 | 2.75 | 0.00 | 0.10 | 0.41 | 0.38 | 0.50 |
| SC | 5 | 1373 | -0.74 | 251 | 0.13 | 0.95 | -1.32 | 0.95 | -0.95 | 0.00 | 0.39 | 1.24 | 0.43 | 0.46 |
| SC | 5 | 1324 | 0.50 | 251 | 0.16 | 1.02 | 0.23 | 0.96 | -0.26 | 0.00 | 0.25 | 0.99 | 0.20 | 0.39 |
| SC | 5 | 1334 | 0.36 | 251 | 0.11 | 0.96 | -0.42 | 0.82 | -1.49 | 0.00 | 0.45 | 1.09 | 0.39 | 0.56 |
| SC | 5 | 1366 | 0.25 | 251 | 0.15 | 1.01 | 0.21 | 1.03 | 0.31 | 0.00 | 0.26 | 0.98 | 0.24 | 0.41 |
| SC | 5 | 1358 | -0.67 | 251 | 0.14 | 1.02 | 0.40 | 1.02 | 0.31 | 0.00 | 0.30 | 0.93 | 0.42 | 0.47 |
| SC | 5 | 1349 | 0.67 | 251 | 0.17 | 0.97 | -0.26 | 0.90 | -0.62 | 0.00 | 0.31 | 1.05 | 0.18 | 0.36 |
| SC | 5 | 1359 | -0.09 | 251 | 0.14 | 0.96 | -0.66 | 0.90 | -1.20 | 0.00 | 0.37 | 1.12 | 0.30 | 0.43 |
| SC | 5 | 1328 | -1.72 | 251 | 0.14 | 0.89 | -2.25 | 0.87 | -1.88 | 0.00 | 0.46 | 1.33 | 0.65 | 0.43 |
| SC | 5 | 1370 | -0.42 | 251 | 0.14 | 0.94 | -1.13 | 0.93 | -1.11 | 0.00 | 0.39 | 1.19 | 0.37 | 0.44 |
| SC | 5 | 1361 | -0.37 | 251 | 0.14 | 1.08 | 1.58 | 1.08 | 1.18 | 0.00 | 0.20 | 0.75 | 0.35 | 0.47 |
| SC | 5 | 1331 | 0.07 | 251 | 0.08 | 0.79 | -2.40 | 0.75 | -2.50 | 0.00 | 0.61 | 1.24 | 0.71 | 0.68 |
| SC | 5 | 1348 | 0.96 | 251 | 0.19 | 1.20 | 1.55 | 1.78 | 3.69 | 0.00 | -0.16 | 0.73 | 0.14 | 0.37 |
| SC | 5 | 1326 | -0.13 | 251 | 0.14 | 1.11 | 1.83 | 1.19 | 2.19 | 0.00 | 0.13 | 0.70 | 0.31 | 0.46 |
| SC | 5 | 1325 | -0.70 | 251 | 0.13 | 0.97 | -0.79 | 0.97 | -0.61 | 0.00 | 0.36 | 1.14 | 0.43 | 0.46 |
| SC | 5 | 1332 | -0.74 | 251 | 0.13 | 0.95 | -1.16 | 0.95 | -0.95 | 0.00 | 0.38 | 1.21 | 0.43 | 0.46 |
| SC | 5 | 1353 | 1.80 | 251 | 0.26 | 1.03 | 0.23 | 1.04 | 0.22 | 0.00 | 0.12 | 0.98 | 0.07 | 0.25 |
| SC | 5 | 1368 | 1.11 | 251 | 0.20 | 0.97 | -0.19 | 0.88 | -0.60 | 0.00 | 0.28 | 1.04 | 0.12 | 0.32 |
| SC | 5 | 1347 | -1.29 | 251 | 0.13 | 1.16 | 3.72 | 1.24 | 4.27 | 0.00 | 0.09 | 0.19 | 0.56 | 0.51 |
| SC | 5 | 1340 | 0.96 | 251 | 0.19 | 1.07 | 0.61 | 1.45 | 2.32 | 0.00 | 0.06 | 0.88 | 0.14 | 0.35 |
| SC | 5 | 1362 | -0.99 | 251 | 0.13 | 0.92 | -2.01 | 0.90 | -2.10 | 0.00 | 0.43 | 1.41 | 0.49 | 0.45 |
| SC | 5 | 1319 | 0.15 | 251 | 0.15 | 1.23 | 2.93 | 1.44 | 3.79 | 0.00 | -0.06 | 0.55 | 0.26 | 0.46 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC | 5 | 1318 | 0.56 | 251 | 0.17 | 0.82 | -2.00 | 0.65 | -2.95 | 0.00 | 0.53 | 1.25 | 0.19 | 0.34 |
| SC | 5 | 1354 | 0.32 | 251 | 0.16 | 0.95 | -0.65 | 0.97 | -0.23 | 0.00 | 0.34 | 1.07 | 0.23 | 0.39 |
| SC | 5 | 1341 | -0.40 | 251 | 0.07 | 0.80 | -2.58 | 0.77 | -2.50 | 0.00 | 0.64 | 1.26 | 1.00 | 0.79 |
| SC | 5 | 1321 | -1.84 | 251 | 0.14 | 1.02 | 0.39 | 1.07 | 0.87 | 0.00 | 0.27 | 0.92 | 0.67 | 0.45 |
| SC | 5 | 1330 | -0.33 | 251 | 0.14 | 1.02 | 0.47 | 1.00 | 0.07 | 0.00 | 0.28 | 0.94 | 0.35 | 0.46 |
| SC | 5 | 1356 | -1.44 | 251 | 0.09 | 0.84 | -2.32 | 0.82 | -2.50 | 0.00 | 0.58 | 1.39 | 1.19 | 0.62 |
| SC | 5 | 1371 | -0.79 | 251 | 0.13 | 0.94 | -1.41 | 0.93 | -1.44 | 0.00 | 0.40 | 1.28 | 0.45 | 0.46 |
| SC | 5 | 1374 | 0.11 | 251 | 0.15 | 1.24 | 3.21 | 1.36 | 3.30 | 0.00 | -0.06 | 0.52 | 0.26 | 0.47 |
| SC | 5 | 1329 | -0.54 | 251 | 0.14 | 0.93 | -1.53 | 0.93 | -1.22 | 0.00 | 0.41 | 1.26 | 0.39 | 0.45 |
| SC | 5 | 1350 | 0.46 | 251 | 0.08 | 0.79 | -1.70 | 0.62 | -2.46 | 0.00 | 0.57 | 1.12 | 0.49 | 0.68 |
| SC | 5 | 1322 | -1.90 | 251 | 0.14 | 0.85 | -2.69 | 0.79 | -2.76 | 0.00 | 0.52 | 1.38 | 0.69 | 0.41 |
| SC | 5 | 1363 | 1.32 | 251 | 0.21 | 1.06 | 0.45 | 1.07 | 0.39 | 0.00 | 0.12 | 0.95 | 0.10 | 0.31 |
| SC | 5 | 1367 | -0.67 | 251 | 0.14 | 1.06 | 1.33 | 1.07 | 1.28 | 0.00 | 0.24 | 0.75 | 0.42 | 0.48 |
| SC | 5 | 1336 | -0.54 | 251 | 0.14 | 1.05 | 1.07 | 1.08 | 1.30 | 0.00 | 0.24 | 0.79 | 0.39 | 0.47 |
| SC | 5 | 1323 | -1.15 | 251 | 0.13 | 0.94 | -1.63 | 0.91 | -1.80 | 0.00 | 0.41 | 1.34 | 0.53 | 0.46 |
| SC | 5 | 1364 | 0.70 | 251 | 0.17 | 0.98 | -0.13 | 0.98 | -0.07 | 0.00 | 0.27 | 1.02 | 0.17 | 0.36 |
| SC | 5 | 1357 | 1.51 | 251 | 0.23 | 0.99 | -0.02 | 0.92 | -0.24 | 0.00 | 0.21 | 1.01 | 0.09 | 0.28 |
| SC | 5 | 1360 | 2.18 | 251 | 0.30 | 0.92 | -0.23 | 0.59 | -1.25 | 0.00 | 0.30 | 1.07 | 0.05 | 0.20 |
| SC | 5 | 1346 | 1.15 | 251 | 0.20 | 1.11 | 0.79 | 1.35 | 1.69 | 0.00 | 0.02 | 0.88 | 0.12 | 0.33 |
| SC | 5 | 1315 | 0.60 | 251 | 0.08 | 0.85 | -1.31 | 0.70 | -2.07 | 0.00 | 0.55 | 1.11 | 0.53 | 0.70 |
| SC | 5 | 1317 | -1.11 | 251 | 0.13 | 1.04 | 0.96 | 1.05 | 1.06 | 0.00 | 0.27 | 0.80 | 0.52 | 0.48 |
| SC | 5 | 1333 | -0.17 | 251 | 0.14 | 1.14 | 2.28 | 1.24 | 2.76 | 0.00 | 0.09 | 0.61 | 0.31 | 0.47 |
| SC | 5 | 1351 | -0.17 | 251 | 0.14 | 0.98 | -0.26 | 1.02 | 0.22 | 0.00 | 0.31 | 1.02 | 0.31 | 0.44 |
| SC | 5 | 1337 | -0.02 | 251 | 0.15 | 1.18 | 2.66 | 1.30 | 3.03 | 0.00 | 0.03 | 0.58 | 0.29 | 0.47 |
| SC | 5 | 1338 | 0.06 | 251 | 0.15 | 1.04 | 0.61 | 1.02 | 0.26 | 0.00 | 0.24 | 0.93 | 0.27 | 0.43 |
| SC | 5 | 1339 | 0.15 | 251 | 0.15 | 1.07 | 0.92 | 1.05 | 0.49 | 0.00 | 0.20 | 0.89 | 0.26 | 0.43 |
| SC | 8 | 983 | 1.95 | 138 | 0.46 | 0.98 | 0.09 | 0.66 | -0.52 | 0.00 | 0.21 | 1.03 | 0.04 | 0.18 |
| SC | 8 | 962 | -2.20 | 138 | 0.19 | 0.88 | -1.76 | 0.85 | -1.77 | 0.00 | 0.47 | 1.39 | 0.64 | 0.43 |
| SC | 8 | 952 | -1.18 | 138 | 0.18 | 1.07 | 1.20 | 1.07 | 0.97 | 0.00 | 0.23 | 0.71 | 0.41 | 0.48 |
| SC | 8 | 951 | 1.44 | 138 | 0.37 | 1.00 | 0.12 | 0.91 | -0.09 | 0.00 | 0.16 | 1.00 | 0.06 | 0.23 |
| SC | 8 | 977 | -0.69 | 138 | 0.19 | 0.98 | -0.23 | 0.99 | -0.04 | 0.00 | 0.33 | 1.04 | 0.31 | 0.44 |
| SC | 8 | 1109 | -1.25 | 138 | 0.18 | 1.15 | 2.47 | 1.15 | 2.08 | 0.00 | 0.13 | 0.37 | 0.43 | 0.50 |
| SC | 8 | 956 | -1.11 | 138 | 0.18 | 0.95 | -0.83 | 0.91 | -1.15 | 0.00 | 0.40 | 1.23 | 0.40 | 0.45 |
| SC | 8 | 959 | 2.90 | 138 | 0.72 | 0.98 | 0.20 | 0.54 | -0.35 | 0.00 | 0.17 | 1.03 | 0.01 | 0.12 |
| SC | 8 | 955 | 0.38 | 138 | 0.25 | 0.97 | -0.12 | 0.97 | -0.08 | 0.00 | 0.27 | 1.02 | 0.14 | 0.34 |
| SC | 8 | 1238 | 0.38 | 138 | 0.25 | 1.11 | 0.68 | 1.44 | 1.77 | 0.00 | 0.04 | 0.86 | 0.14 | 0.36 |
| SC | 8 | 1205 | -0.41 | 138 | 0.20 | 1.08 | 0.79 | 1.18 | 1.28 | 0.00 | 0.17 | 0.83 | 0.26 | 0.43 |
| SC | 8 | 1257 | -1.67 | 138 | 0.18 | 1.06 | 1.16 | 1.07 | 1.02 | 0.00 | 0.24 | 0.69 | 0.52 | 0.49 |
| SC | 8 | 932 | -1.11 | 138 | 0.18 | 0.94 | -0.88 | 0.92 | -1.08 | 0.00 | 0.40 | 1.23 | 0.40 | 0.45 |
| SC | 8 | 1111 | 0.26 | 138 | 0.24 | 1.04 | 0.33 | 1.05 | 0.30 | 0.00 | 0.19 | 0.95 | 0.16 | 0.36 |
| SC | 8 | 1260 | 0.32 | 138 | 0.25 | 0.94 | -0.34 | 0.81 | -0.85 | 0.00 | 0.35 | 1.08 | 0.15 | 0.34 |
| SC | 8 | 1265 | -0.53 | 138 | 0.20 | 1.03 | 0.40 | 1.04 | 0.35 | 0.00 | 0.25 | 0.93 | 0.28 | 0.44 |
| SC | 8 | 953 | -0.80 | 138 | 0.19 | 1.12 | 1.52 | 1.17 | 1.62 | 0.00 | 0.15 | 0.67 | 0.33 | 0.47 |
| SC | 8 | 954 | -0.49 | 138 | 0.20 | 0.94 | -0.60 | 0.95 | -0.33 | 0.00 | 0.36 | 1.10 | 0.28 | 0.41 |
| SC | 8 | 942 | -1.47 | 138 | 0.18 | 1.06 | 1.13 | 1.09 | 1.35 | 0.00 | 0.24 | 0.67 | 0.48 | 0.49 |
| SC | 8 | 936 | -0.83 | 138 | 0.19 | 0.86 | -1.96 | 0.84 | -1.76 | 0.00 | 0.50 | 1.39 | 0.34 | 0.42 |
| SC | 8 | 964 | -0.06 | 138 | 0.22 | 0.94 | -0.43 | 0.86 | -0.76 | 0.00 | 0.36 | 1.09 | 0.20 | 0.37 |
| SC | 8 | 937 | -0.91 | 138 | 0.08 | 0.86 | -1.24 | 0.81 | -1.35 | 0.00 | 0.67 | 1.11 | 1.25 | 0.97 |

| subject | grade | item | measure | count | modlse | in_msq | in_zstd | out_msq | out_zstd | displace | ptma | discrim | pvalue | rmsr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC | 8 | 971 | 2.90 | 138 | 0.72 | 1.03 | 0.27 | 2.20 | 1.32 | 0.00 | -0.07 | 0.94 | 0.01 | 0.12 |
| SC | 8 | 972 | -1.21 | 138 | 0.18 | 0.99 | -0.19 | 0.97 | -0.43 | 0.00 | 0.34 | 1.07 | 0.42 | 0.46 |
| SC | 8 | 1258 | 0.90 | 138 | 0.30 | 0.97 | -0.07 | 0.84 | -0.43 | 0.00 | 0.27 | 1.04 | 0.09 | 0.28 |
| SC | 8 | 947 | 1.20 | 138 | 0.33 | 1.05 | 0.27 | 1.76 | 1.81 | 0.00 | -0.01 | 0.91 | 0.07 | 0.26 |
| SC | 8 | 1114 | -1.03 | 137 | 0.10 | 0.79 | -2.09 | 0.74 | -2.23 | 0.00 | 0.68 | 1.34 | 1.06 | 0.78 |
| SC | 8 | 984 | 1.59 | 137 | 0.39 | 1.09 | 0.36 | 1.46 | 1.04 | 0.00 | -0.05 | 0.91 | 0.05 | 0.23 |
| SC | 8 | 948 | -0.65 | 137 | 0.19 | 1.11 | 1.30 | 1.09 | 0.87 | 0.00 | 0.16 | 0.76 | 0.31 | 0.46 |
| SC | 8 | 950 | -0.84 | 137 | 0.19 | 0.99 | -0.09 | 0.97 | -0.30 | 0.00 | 0.33 | 1.04 | 0.34 | 0.45 |
| SC | 8 | 961 | 2.90 | 137 | 0.72 | 1.03 | 0.27 | 1.88 | 1.10 | 0.00 | -0.06 | 0.95 | 0.01 | 0.12 |
| SC | 8 | 987 | 0.65 | 137 | 0.27 | 0.95 | -0.20 | 0.82 | -0.65 | 0.00 | 0.32 | 1.06 | 0.12 | 0.30 |
| SC | 8 | 970 | -0.11 | 137 | 0.22 | 1.22 | 1.73 | 1.56 | 2.94 | 0.00 | -0.09 | 0.63 | 0.21 | 0.43 |
| SC | 8 | 985 | -1.87 | 137 | 0.18 | 0.98 | -0.32 | 0.97 | -0.43 | 0.00 | 0.35 | 1.10 | 0.57 | 0.47 |
| SC | 8 | 949 | -0.61 | 137 | 0.20 | 1.15 | 1.70 | 1.23 | 1.95 | 0.00 | 0.08 | 0.64 | 0.30 | 0.47 |
| SC | 8 | 981 | -0.46 | 137 | 0.20 | 1.05 | 0.53 | 1.11 | 0.84 | 0.00 | 0.21 | 0.89 | 0.27 | 0.43 |
| SC | 8 | 946 | -1.74 | 137 | 0.18 | 0.84 | -3.17 | 0.81 | -3.12 | 0.00 | 0.55 | 1.82 | 0.54 | 0.43 |
| SC | 8 | 944 | 0.26 | 137 | 0.24 | 0.95 | -0.32 | 0.82 | -0.86 | 0.00 | 0.35 | 1.08 | 0.16 | 0.34 |
| SC | 8 | 978 | 1.19 | 137 | 0.33 | 0.95 | -0.11 | 0.80 | -0.48 | 0.00 | 0.28 | 1.05 | 0.07 | 0.25 |
| SC | 8 | 945 | -0.28 | 137 | 0.11 | 1.01 | 0.12 | 0.81 | -0.91 | 0.00 | 0.53 | 1.04 | 0.61 | 0.82 |
| SC | 8 | 1266 | -0.61 | 137 | 0.20 | 1.10 | 1.16 | 1.19 | 1.61 | 0.00 | 0.14 | 0.74 | 0.30 | 0.46 |
| SC | 8 | 986 | 0.73 | 137 | 0.28 | 1.06 | 0.35 | 1.13 | 0.53 | 0.00 | 0.12 | 0.95 | 0.11 | 0.31 |
| SC | 8 | 967 | 0.65 | 137 | 0.27 | 1.07 | 0.42 | 1.21 | 0.84 | 0.00 | 0.09 | 0.93 | 0.12 | 0.32 |
| SC | 8 | 969 | -0.76 | 137 | 0.19 | 0.92 | -0.98 | 0.95 | -0.47 | 0.00 | 0.40 | 1.17 | 0.33 | 0.43 |
| SC | 8 | 980 | 1.59 | 137 | 0.39 | 1.07 | 0.32 | 1.41 | 0.96 | 0.00 | -0.01 | 0.93 | 0.05 | 0.22 |
| SC | 8 | 1267 | -1.01 | 137 | 0.19 | 0.98 | -0.31 | 0.98 | -0.22 | 0.00 | 0.34 | 1.07 | 0.38 | 0.46 |
| SC | 8 | 965 | -1.05 | 137 | 0.19 | 0.82 | -2.87 | 0.81 | -2.46 | 0.00 | 0.55 | 1.62 | 0.39 | 0.42 |
| SC | 8 | 960 | -0.73 | 137 | 0.19 | 1.07 | 0.89 | 1.22 | 2.04 | 0.00 | 0.17 | 0.76 | 0.32 | 0.46 |
| SC | 8 | 958 | 1.95 | 137 | 0.46 | 0.98 | 0.08 | 0.63 | -0.60 | 0.00 | 0.22 | 1.04 | 0.04 | 0.18 |
| SC | 8 | 938 | -0.50 | 137 | 0.20 | 0.95 | -0.47 | 0.87 | -1.03 | 0.00 | 0.38 | 1.12 | 0.28 | 0.42 |
| SC | 8 | 979 | 1.09 | 137 | 0.32 | 0.97 | -0.02 | 0.89 | -0.22 | 0.00 | 0.24 | 1.03 | 0.08 | 0.26 |
| SC | 8 | 939 | -1.12 | 137 | 0.18 | 0.82 | -3.08 | 0.79 | -2.99 | 0.00 | 0.57 | 1.71 | 0.40 | 0.42 |
| SC | 8 | 974 | 0.90 | 137 | 0.30 | 0.96 | -0.13 | 0.76 | -0.75 | 0.00 | 0.30 | 1.05 | 0.09 | 0.28 |
| SC | 8 | 1056 | 0.81 | 137 | 0.29 | 1.12 | 0.60 | 1.53 | 1.67 | 0.00 | -0.03 | 0.87 | 0.10 | 0.31 |
| SC | 8 | 1110 | 1.95 | 137 | 0.46 | 0.96 | 0.05 | 0.95 | 0.08 | 0.00 | 0.18 | 1.02 | 0.04 | 0.18 |
| SC | 8 | 1263 | -0.42 | 137 | 0.20 | 1.05 | 0.51 | 1.03 | 0.28 | 0.00 | 0.23 | 0.92 | 0.26 | 0.43 |
| SC | 8 | 975 | 1.95 | 137 | 0.46 | 1.00 | 0.14 | 0.93 | 0.05 | 0.00 | 0.15 | 1.01 | 0.04 | 0.19 |
| SC | 8 | 1054 | -1.12 | 137 | 0.18 | 1.06 | 0.94 | 1.10 | 1.28 | 0.00 | 0.23 | 0.75 | 0.40 | 0.48 |

# Appendix H: Standard Error Statistics

This appendix contains the details of the Score File from Winsteps.

### Appendix Table H.1: 2021 Grade 3 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 224 | 94 | 0.3 | -1 | 185 | 0 | 0 | 0 | 0 | 0 |
| 1 | 287 | 52 | 0.96 | 123 | 103 | 0 | 0 | 0 | 0 | 0 |
| 2 | 324 | 37 | 1.86 | 197 | 74 | 0 | 0 | 0 | 0 | 0 |
| 3 | 347 | 31 | 2.7 | 241 | 61 | 0 | 0 | 0 | 0 | 0 |
| 4 | 363 | 27 | 3.5 | 274 | 54 | 0 | 0 | 0 | 0 | 0 |
| 5 | 376 | 25 | 4.25 | 300 | 49 | 2 | 0.7 | 2 | 0.7 | 0.4 |
| 6 | 388 | 23 | 4.96 | 322 | 45 | 1 | 0.4 | 3 | 1.1 | 0.9 |
| 7 | 397 | 21 | 5.63 | 341 | 43 | 5 | 1.8 | 8 | 2.9 | 2 |
| 8 | 406 | 20 | 6.28 | 358 | 40 | 3 | 1.1 | 11 | 4 | 3.4 |
| 9 | 414 | 19 | 6.89 | 373 | 38 | 9 | 3.2 | 20 | 7.2 | 5.6 |
| 10 | 421 | 19 | 7.48 | 387 | 37 | 12 | 4.3 | 32 | 11.6 | 9.4 |
| 11 | 427 | 18 | 8.04 | 400 | 36 | 15 | 5.4 | 47 | 17 | 14.3 |
| 12 | 433 | 17 | 8.57 | 412 | 34 | 14 | 5.1 | 61 | 22 | 19.5 |
| 13 | 439 | 17 | 9.08 | 424 | 33 | 14 | 5.1 | 75 | 27.1 | 24.5 |
| 14 | 445 | 16 | 9.56 | 435 | 33 | 12 | 4.3 | 87 | 31.4 | 29.2 |
| 15 | 450 | 16 | 10.01 | 445 | 32 | 11 | 4 | 98 | 35.4 | 33.4 |
| 16 | 455 | 16 | 10.44 | 455 | 31 | 16 | 5.8 | 114 | 41.2 | 38.3 |
| 17 | 460 | 15 | 10.83 | 464 | 31 | 16 | 5.8 | 130 | 46.9 | 44 |
| 18 | 464 | 15 | 11.2 | 474 | 30 | 4 | 1.4 | 134 | 48.4 | 47.7 |
| 19 | 469 | 15 | 11.53 | 482 | 30 | 12 | 4.3 | 146 | 52.7 | 50.5 |
| 20 | 473 | 15 | 11.83 | 491 | 29 | 9 | 3.2 | 155 | 56 | 54.3 |
| 21 | 477 | 15 | 12.11 | 500 | 29 | 2 | 0.7 | 157 | 56.7 | 56.3 |
| 22 | 481 | 14 | 12.35 | 508 | 29 | 4 | 1.4 | 161 | 58.1 | 57.4 |
| 23 | 486 | 14 | 12.57 | 516 | 28 | 10 | 3.6 | 171 | 61.7 | 59.9 |
| 24 | 490 | 14 | 12.76 | 524 | 28 | 14 | 5.1 | 185 | 66.8 | 64.3 |
| 25 | 494 | 14 | 12.92 | 532 | 28 | 3 | 1.1 | 188 | 67.9 | 67.3 |
| 26 | 497 | 14 | 13.06 | 539 | 28 | 3 | 1.1 | 191 | 69 | 68.4 |
| 27 | 501 | 14 | 13.17 | 547 | 28 | 5 | 1.8 | 196 | 70.8 | 69.9 |
| 28 | 505 | 14 | 13.27 | 555 | 28 | 8 | 2.9 | 204 | 73.6 | 72.2 |
| 29 | 509 | 14 | 13.35 | 562 | 28 | 4 | 1.4 | 208 | 75.1 | 74.4 |
| 30 | 513 | 14 | 13.4 | 570 | 28 | 8 | 2.9 | 216 | 78 | 76.5 |
| 31 | 517 | 14 | 13.45 | 577 | 28 | 7 | 2.5 | 223 | 80.5 | 79.2 |
| 32 | 520 | 14 | 13.47 | 585 | 27 | 4 | 1.4 | 227 | 81.9 | 81.2 |
| 33 | 524 | 14 | 13.48 | 592 | 27 | 2 | 0.7 | 229 | 82.7 | 82.3 |
| 34 | 528 | 14 | 13.47 | 600 | 27 | 6 | 2.2 | 235 | 84.8 | 83.8 |
| 35 | 532 | 14 | 13.45 | 607 | 28 | 7 | 2.5 | 242 | 87.4 | 86.1 |
| 36 | 536 | 14 | 13.41 | 615 | 28 | 1 | 0.4 | 243 | 87.7 | 87.5 |
| 37 | 539 | 14 | 13.35 | 622 | 28 | 3 | 1.1 | 246 | 88.8 | 88.3 |
| 38 | 543 | 14 | 13.27 | 630 | 28 | 1 | 0.4 | 247 | 89.2 | 89 |
| 39 | 547 | 14 | 13.17 | 638 | 28 | 2 | 0.7 | 249 | 89.9 | 89.5 |
| 40 | 551 | 14 | 13.05 | 645 | 28 | 2 | 0.7 | 251 | 90.6 | 90.3 |
| 41 | 555 | 14 | 12.9 | 653 | 28 | 2 | 0.7 | 253 | 91.3 | 91 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 559 | 14 | 12.72 | 661 | 28 | 7 | 2.5 | 260 | 93.9 | 92.6 |
| 43 | 563 | 14 | 12.51 | 669 | 29 | 1 | 0.4 | 261 | 94.2 | 94 |
| 44 | 567 | 15 | 12.28 | 677 | 29 | 3 | 1.1 | 264 | 95.3 | 94.8 |
| 45 | 571 | 15 | 12.01 | 685 | 29 | 0 | 0 | 264 | 95.3 | 95.3 |
| 46 | 575 | 15 | 11.7 | 694 | 29 | 1 | 0.4 | 265 | 95.7 | 95.5 |
| 47 | 580 | 15 | 11.37 | 703 | 30 | 1 | 0.4 | 266 | 96 | 95.8 |
| 48 | 584 | 15 | 11 | 712 | 30 | 0 | 0 | 266 | 96 | 96 |
| 49 | 589 | 16 | 10.6 | 721 | 31 | 0 | 0 | 266 | 96 | 96 |
| 50 | 594 | 16 | 10.17 | 731 | 32 | 2 | 0.7 | 268 | 96.8 | 96.4 |
| 51 | 599 | 16 | 9.72 | 741 | 32 | 2 | 0.7 | 270 | 97.5 | 97.1 |
| 52 | 605 | 17 | 9.23 | 752 | 33 | 1 | 0.4 | 271 | 97.8 | 97.7 |
| 53 | 610 | 17 | 8.72 | 763 | 34 | 2 | 0.7 | 273 | 98.6 | 98.2 |
| 54 | 616 | 18 | 8.19 | 775 | 35 | 2 | 0.7 | 275 | 99.3 | 98.9 |
| 55 | 623 | 18 | 7.64 | 788 | 36 | 1 | 0.4 | 276 | 99.6 | 99 |
| 56 | 630 | 19 | 7.08 | 801 | 38 | 0 | 0 | 276 | 99.6 | 99 |
| 57 | 637 | 20 | 6.49 | 816 | 40 | 0 | 0 | 276 | 99.6 | 99 |
| 58 | 645 | 21 | 5.89 | 832 | 42 | 1 | 0.4 | 277 | 100 | 99 |
| 59 | 654 | 22 | 5.27 | 851 | 44 | 0 | 0 | 277 | 100 | 100 |
| 60 | 665 | 24 | 4.63 | 871 | 47 | 0 | 0 | 277 | 100 | 100 |
| 61 | 677 | 26 | 3.97 | 894 | 51 | 0 | 0 | 277 | 100 | 100 |
| 62 | 691 | 28 | 3.28 | 922 | 56 | 0 | 0 | 277 | 100 | 100 |
| 63 | 708 | 32 | 2.55 | 957 | 63 | 0 | 0 | 277 | 100 | 100 |
| 64 | 732 | 38 | 1.78 | 1004 | 76 | 0 | 0 | 277 | 100 | 100 |
| 65 | 771 | 53 | 0.94 | 1080 | 104 | 0 | 0 | 277 | 100 | 100 |
| 66 | 834 | 94 | 0.29 | 1207 | 186 | 0 | 0 | 277 | 100 | 100 |

## Appendix Table H.2: 2021 Grade 4 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 192 | 104 | 0.3 | -129 | 215 | 0 | 0 | 0 | 0 | 0 |
| 1 | 262 | 57 | 0.96 | 15 | 119 | 0 | 0 | 0 | 0 | 0 |
| 2 | 303 | 41 | 1.86 | 100 | 86 | 0 | 0 | 0 | 0 | 0 |
| 3 | 328 | 34 | 2.71 | 152 | 71 | 0 | 0 | 0 | 0 | 0 |
| 4 | 346 | 30 | 3.5 | 190 | 62 | 0 | 0 | 0 | 0 | 0 |
| 5 | 360 | 27 | 4.24 | 220 | 57 | 0 | 0 | 0 | 0 | 0 |
| 6 | 373 | 25 | 4.95 | 245 | 53 | 0 | 0 | 0 | 0 | 0 |
| 7 | 383 | 24 | 5.61 | 267 | 49 | 1 | 0.4 | 1 | 0.4 | 0.2 |
| 8 | 393 | 23 | 6.24 | 287 | 47 | 3 | 1.2 | 4 | 1.6 | 1 |
| 9 | 402 | 22 | 6.84 | 305 | 45 | 4 | 1.6 | 8 | 3.2 | 2.4 |
| 10 | 410 | 21 | 7.41 | 321 | 43 | 4 | 1.6 | 12 | 4.7 | 4 |
| 11 | 417 | 20 | 7.95 | 337 | 41 | 5 | 2 | 17 | 6.7 | 5.7 |
| 12 | 424 | 19 | 8.47 | 351 | 40 | 2 | 0.8 | 19 | 7.5 | 7.1 |
| 13 | 430 | 19 | 8.96 | 364 | 39 | 3 | 1.2 | 22 | 8.7 | 8.1 |
| 14 | 436 | 18 | 9.42 | 377 | 38 | 4 | 1.6 | 26 | 10.3 | 9.5 |
| 15 | 442 | 18 | 9.87 | 389 | 37 | 10 | 4 | 36 | 14.2 | 12.3 |
| 16 | 448 | 18 | 10.29 | 401 | 36 | 10 | 4 | 46 | 18.2 | 16.2 |
| 17 | 453 | 17 | 10.69 | 412 | 36 | 9 | 3.6 | 55 | 21.7 | 20 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 458 | 17 | 11.07 | 423 | 35 | 10 | 4 | 65 | 25.7 | 23.7 |
| 19 | 463 | 17 | 11.43 | 433 | 35 | 5 | 2 | 70 | 27.7 | 26.7 |
| 20 | 468 | 16 | 11.77 | 443 | 34 | 9 | 3.6 | 79 | 31.2 | 29.4 |
| 21 | 473 | 16 | 12.09 | 453 | 34 | 9 | 3.6 | 88 | 34.8 | 33 |
| 22 | 478 | 16 | 12.39 | 462 | 33 | 11 | 4.3 | 99 | 39.1 | 37 |
| 23 | 482 | 16 | 12.67 | 472 | 33 | 4 | 1.6 | 103 | 40.7 | 39.9 |
| 24 | 487 | 16 | 12.93 | 481 | 32 | 11 | 4.3 | 114 | 45.1 | 42.9 |
| 25 | 491 | 16 | 13.17 | 490 | 32 | 8 | 3.2 | 122 | 48.2 | 46.6 |
| 26 | 495 | 15 | 13.38 | 499 | 32 | 3 | 1.2 | 125 | 49.4 | 48.8 |
| 27 | 499 | 15 | 13.57 | 507 | 32 | 10 | 4 | 135 | 53.4 | 51.4 |
| 28 | 503 | 15 | 13.74 | 516 | 32 | 9 | 3.6 | 144 | 56.9 | 55.1 |
| 29 | 508 | 15 | 13.89 | 524 | 31 | 12 | 4.7 | 156 | 61.7 | 59.3 |
| 30 | 512 | 15 | 14.01 | 533 | 31 | 9 | 3.6 | 165 | 65.2 | 63.4 |
| 31 | 516 | 15 | 14.11 | 541 | 31 | 9 | 3.6 | 174 | 68.8 | 67 |
| 32 | 520 | 15 | 14.18 | 549 | 31 | 3 | 1.2 | 177 | 70 | 69.4 |
| 33 | 524 | 15 | 14.23 | 557 | 31 | 4 | 1.6 | 181 | 71.5 | 70.8 |
| 34 | 528 | 15 | 14.25 | 566 | 31 | 8 | 3.2 | 189 | 74.7 | 73.1 |
| 35 | 532 | 15 | 14.25 | 574 | 31 | 9 | 3.6 | 198 | 78.3 | 76.5 |
| 36 | 535 | 15 | 14.22 | 582 | 31 | 7 | 2.8 | 205 | 81 | 79.6 |
| 37 | 539 | 15 | 14.17 | 590 | 31 | 5 | 2 | 210 | 83 | 82 |
| 38 | 543 | 15 | 14.09 | 599 | 31 | 7 | 2.8 | 217 | 85.8 | 84.4 |
| 39 | 547 | 15 | 13.99 | 607 | 31 | 4 | 1.6 | 221 | 87.4 | 86.6 |
| 40 | 552 | 15 | 13.85 | 615 | 31 | 1 | 0.4 | 222 | 87.7 | 87.5 |
| 41 | 556 | 15 | 13.69 | 624 | 32 | 3 | 1.2 | 225 | 88.9 | 88.3 |
| 42 | 560 | 15 | 13.51 | 632 | 32 | 3 | 1.2 | 228 | 90.1 | 89.5 |
| 43 | 564 | 15 | 13.29 | 641 | 32 | 6 | 2.4 | 234 | 92.5 | 91.3 |
| 44 | 568 | 16 | 13.05 | 650 | 32 | 2 | 0.8 | 236 | 93.3 | 92.9 |
| 45 | 573 | 16 | 12.78 | 659 | 33 | 4 | 1.6 | 240 | 94.9 | 94.1 |
| 46 | 577 | 16 | 12.48 | 668 | 33 | 2 | 0.8 | 242 | 95.7 | 95.3 |
| 47 | 582 | 16 | 12.15 | 678 | 34 | 3 | 1.2 | 245 | 96.8 | 96.2 |
| 48 | 586 | 16 | 11.79 | 687 | 34 | 2 | 0.8 | 247 | 97.6 | 97.2 |
| 49 | 591 | 17 | 11.4 | 698 | 35 | 1 | 0.4 | 248 | 98 | 97.8 |
| 50 | 596 | 17 | 10.98 | 708 | 35 | 0 | 0 | 248 | 98 | 98 |
| 51 | 602 | 17 | 10.52 | 719 | 36 | 0 | 0 | 248 | 98 | 98 |
| 52 | 607 | 18 | 10.03 | 730 | 37 | 1 | 0.4 | 249 | 98.4 | 98.2 |
| 53 | 613 | 18 | 9.51 | 742 | 38 | 1 | 0.4 | 250 | 98.8 | 98.6 |
| 54 | 619 | 19 | 8.95 | 755 | 39 | 2 | 0.8 | 252 | 99.6 | 99 |
| 55 | 625 | 20 | 8.36 | 768 | 40 | 0 | 0 | 252 | 99.6 | 99 |
| 56 | 632 | 20 | 7.73 | 783 | 42 | 0 | 0 | 252 | 99.6 | 99 |
| 57 | 640 | 21 | 7.08 | 799 | 44 | 0 | 0 | 252 | 99.6 | 99 |
| 58 | 649 | 22 | 6.38 | 816 | 46 | 1 | 0.4 | 253 | 100 | 99 |
| 59 | 658 | 24 | 5.66 | 835 | 49 | 0 | 0 | 253 | 100 | 100 |
| 60 | 669 | 25 | 4.91 | 858 | 53 | 0 | 0 | 253 | 100 | 100 |
| 61 | 681 | 28 | 4.14 | 883 | 57 | 0 | 0 | 253 | 100 | 100 |
| 62 | 696 | 31 | 3.35 | 915 | 64 | 0 | 0 | 253 | 100 | 100 |
| 63 | 715 | 35 | 2.54 | 955 | 73 | 0 | 0 | 253 | 100 | 100 |
| 64 | 742 | 43 | 1.73 | 1010 | 89 | 0 | 0 | 253 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 65 | 786 | 59 | 0.91 | 1101 | 123 | 0 | 0 | 253 | 100 | 100 |
| 66 | 859 | 105 | 0.29 | 1252 | 217 | 0 | 0 | 253 | 100 | 100 |

## Appendix Table H.3: 2021 Grade 5 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 211 | 97 | 0.3 | -60 | 195 | 0 | 0 | 0 | 0 | 0 |
| 1 | 277 | 54 | 0.95 | 71 | 108 | 0 | 0 | 0 | 0 | 0 |
| 2 | 316 | 39 | 1.82 | 150 | 78 | 0 | 0 | 0 | 0 | 0 |
| 3 | 340 | 32 | 2.65 | 198 | 65 | 0 | 0 | 0 | 0 | 0 |
| 4 | 357 | 28 | 3.43 | 233 | 57 | 0 | 0 | 0 | 0 | 0 |
| 5 | 371 | 26 | 4.18 | 261 | 52 | 3 | 1.2 | 3 | 1.2 | 0.6 |
| 6 | 383 | 24 | 4.9 | 284 | 48 | 0 | 0 | 3 | 1.2 | 1.2 |
| 7 | 393 | 22 | 5.6 | 304 | 45 | 2 | 0.8 | 5 | 2 | 1.6 |
| 8 | 402 | 21 | 6.27 | 322 | 42 | 4 | 1.6 | 9 | 3.6 | 2.8 |
| 9 | 410 | 20 | 6.91 | 338 | 40 | 7 | 2.8 | 16 | 6.3 | 5 |
| 10 | 417 | 19 | 7.53 | 353 | 39 | 5 | 2 | 21 | 8.3 | 7.3 |
| 11 | 424 | 19 | 8.12 | 366 | 37 | 4 | 1.6 | 25 | 9.9 | 9.1 |
| 12 | 430 | 18 | 8.68 | 379 | 36 | 4 | 1.6 | 29 | 11.5 | 10.7 |
| 13 | 436 | 17 | 9.21 | 391 | 35 | 8 | 3.2 | 37 | 14.7 | 13.1 |
| 14 | 441 | 17 | 9.71 | 402 | 34 | 9 | 3.6 | 46 | 18.3 | 16.5 |
| 15 | 447 | 17 | 10.19 | 412 | 33 | 12 | 4.8 | 58 | 23 | 20.6 |
| 16 | 452 | 16 | 10.64 | 422 | 32 | 7 | 2.8 | 65 | 25.8 | 24.4 |
| 17 | 457 | 16 | 11.07 | 432 | 32 | 5 | 2 | 70 | 27.8 | 26.8 |
| 18 | 461 | 16 | 11.48 | 442 | 31 | 9 | 3.6 | 79 | 31.3 | 29.6 |
| 19 | 466 | 15 | 11.86 | 451 | 31 | 4 | 1.6 | 83 | 32.9 | 32.1 |
| 20 | 470 | 15 | 12.23 | 459 | 30 | 8 | 3.2 | 91 | 36.1 | 34.5 |
| 21 | 474 | 15 | 12.58 | 468 | 30 | 8 | 3.2 | 99 | 39.3 | 37.7 |
| 22 | 479 | 15 | 12.9 | 476 | 29 | 8 | 3.2 | 107 | 42.5 | 40.9 |
| 23 | 483 | 15 | 13.21 | 484 | 29 | 10 | 4 | 117 | 46.4 | 44.4 |
| 24 | 487 | 14 | 13.51 | 492 | 29 | 8 | 3.2 | 125 | 49.6 | 48 |
| 25 | 490 | 14 | 13.78 | 500 | 28 | 4 | 1.6 | 129 | 51.2 | 50.4 |
| 26 | 494 | 14 | 14.03 | 508 | 28 | 9 | 3.6 | 138 | 54.8 | 53 |
| 27 | 498 | 14 | 14.27 | 515 | 28 | 8 | 3.2 | 146 | 57.9 | 56.3 |
| 28 | 502 | 14 | 14.48 | 522 | 28 | 8 | 3.2 | 154 | 61.1 | 59.5 |
| 29 | 505 | 14 | 14.67 | 530 | 28 | 4 | 1.6 | 158 | 62.7 | 61.9 |
| 30 | 509 | 14 | 14.83 | 537 | 27 | 12 | 4.8 | 170 | 67.5 | 65.1 |
| 31 | 512 | 14 | 14.96 | 544 | 27 | 6 | 2.4 | 176 | 69.8 | 68.7 |
| 32 | 516 | 14 | 15.07 | 551 | 27 | 6 | 2.4 | 182 | 72.2 | 71 |
| 33 | 519 | 14 | 15.14 | 558 | 27 | 5 | 2 | 187 | 74.2 | 73.2 |
| 34 | 523 | 14 | 15.18 | 565 | 27 | 5 | 2 | 192 | 76.2 | 75.2 |
| 35 | 526 | 14 | 15.19 | 572 | 27 | 4 | 1.6 | 196 | 77.8 | 77 |
| 36 | 530 | 14 | 15.15 | 579 | 27 | 5 | 2 | 201 | 79.8 | 78.8 |
| 37 | 533 | 14 | 15.09 | 586 | 27 | 3 | 1.2 | 204 | 81 | 80.4 |
| 38 | 537 | 14 | 14.98 | 593 | 27 | 3 | 1.2 | 207 | 82.1 | 81.5 |
| 39 | 540 | 14 | 14.84 | 600 | 27 | 4 | 1.6 | 211 | 83.7 | 82.9 |
| 40 | 544 | 14 | 14.66 | 607 | 28 | 6 | 2.4 | 217 | 86.1 | 84.9 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 41 | 547 | 14 | 14.45 | 614 | 28 | 3 | 1.2 | 220 | 87.3 | 86.7 |
| 42 | 551 | 14 | 14.21 | 622 | 28 | 3 | 1.2 | 223 | 88.5 | 87.9 |
| 43 | 555 | 14 | 13.93 | 629 | 28 | 2 | 0.8 | 225 | 89.3 | 88.9 |
| 44 | 559 | 14 | 13.63 | 637 | 29 | 2 | 0.8 | 227 | 90.1 | 89.7 |
| 45 | 563 | 14 | 13.31 | 645 | 29 | 0 | 0 | 227 | 90.1 | 90.1 |
| 46 | 567 | 15 | 12.96 | 653 | 29 | 7 | 2.8 | 234 | 92.9 | 91.5 |
| 47 | 571 | 15 | 12.59 | 661 | 30 | 3 | 1.2 | 237 | 94 | 93.5 |
| 48 | 575 | 15 | 12.21 | 670 | 30 | 7 | 2.8 | 244 | 96.8 | 95.4 |
| 49 | 579 | 15 | 11.8 | 678 | 31 | 1 | 0.4 | 245 | 97.2 | 97 |
| 50 | 584 | 16 | 11.39 | 688 | 31 | 1 | 0.4 | 246 | 97.6 | 97.4 |
| 51 | 589 | 16 | 10.95 | 697 | 32 | 2 | 0.8 | 248 | 98.4 | 98 |
| 52 | 594 | 16 | 10.5 | 707 | 33 | 0 | 0 | 248 | 98.4 | 98.4 |
| 53 | 599 | 17 | 10.04 | 717 | 33 | 1 | 0.4 | 249 | 98.8 | 98.6 |
| 54 | 604 | 17 | 9.55 | 728 | 34 | 1 | 0.4 | 250 | 99.2 | 99 |
| 55 | 610 | 18 | 9.05 | 739 | 35 | 0 | 0 | 250 | 99.2 | 99 |
| 56 | 616 | 18 | 8.53 | 751 | 36 | 1 | 0.4 | 251 | 99.6 | 99 |
| 57 | 622 | 19 | 7.99 | 764 | 37 | 0 | 0 | 251 | 99.6 | 99 |
| 58 | 629 | 19 | 7.42 | 778 | 39 | 0 | 0 | 251 | 99.6 | 99 |
| 59 | 636 | 20 | 6.83 | 793 | 40 | 0 | 0 | 251 | 99.6 | 99 |
| 60 | 645 | 21 | 6.21 | 809 | 42 | 0 | 0 | 251 | 99.6 | 99 |
| 61 | 654 | 22 | 5.56 | 827 | 45 | 1 | 0.4 | 252 | 100 | 99 |
| 62 | 664 | 24 | 4.88 | 847 | 48 | 0 | 0 | 252 | 100 | 100 |
| 63 | 675 | 26 | 4.17 | 871 | 52 | 0 | 0 | 252 | 100 | 100 |
| 64 | 689 | 29 | 3.42 | 898 | 57 | 0 | 0 | 252 | 100 | 100 |
| 65 | 707 | 32 | 2.64 | 933 | 65 | 0 | 0 | 252 | 100 | 100 |
| 66 | 731 | 39 | 1.82 | 981 | 78 | 0 | 0 | 252 | 100 | 100 |
| 67 | 770 | 54 | 0.95 | 1060 | 109 | 0 | 0 | 252 | 100 | 100 |
| 68 | 836 | 97 | 0.29 | 1192 | 195 | 0 | 0 | 252 | 100 | 100 |

## Appendix Table H.4: 2021 Grade 6 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 195 | 103 | 0.3 | -8 | 185 | 0 | 0 | 0 | 0 | 0 |
| 1 | 264 | 57 | 0.97 | 116 | 103 | 0 | 0 | 0 | 0 | 0 |
| 2 | 305 | 41 | 1.87 | 189 | 74 | 0 | 0 | 0 | 0 | 0 |
| 3 | 329 | 34 | 2.73 | 233 | 61 | 1 | 0.6 | 1 | 0.6 | 0.3 |
| 4 | 347 | 30 | 3.55 | 266 | 54 | 0 | 0 | 1 | 0.6 | 0.6 |
| 5 | 361 | 27 | 4.33 | 291 | 48 | 0 | 0 | 1 | 0.6 | 0.6 |
| 6 | 373 | 25 | 5.08 | 313 | 45 | 4 | 2.4 | 5 | 3 | 1.8 |
| 7 | 384 | 23 | 5.8 | 331 | 42 | 3 | 1.8 | 8 | 4.8 | 3.9 |
| 8 | 393 | 22 | 6.5 | 348 | 40 | 2 | 1.2 | 10 | 6.1 | 5.5 |
| 9 | 401 | 21 | 7.18 | 362 | 38 | 4 | 2.4 | 14 | 8.5 | 7.3 |
| 10 | 408 | 20 | 7.84 | 376 | 36 | 8 | 4.8 | 22 | 13.3 | 10.9 |
| 11 | 415 | 19 | 8.47 | 388 | 35 | 7 | 4.2 | 29 | 17.6 | 15.5 |
| 12 | 422 | 19 | 9.08 | 400 | 33 | 4 | 2.4 | 33 | 20 | 18.8 |
| 13 | 428 | 18 | 9.67 | 411 | 32 | 3 | 1.8 | 36 | 21.8 | 20.9 |
| 14 | 433 | 18 | 10.24 | 421 | 32 | 9 | 5.5 | 45 | 27.3 | 24.5 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 439 | 17 | 10.78 | 430 | 31 | 4 | 2.4 | 49 | 29.7 | 28.5 |
| 16 | 444 | 17 | 11.3 | 439 | 30 | 4 | 2.4 | 53 | 32.1 | 30.9 |
| 17 | 449 | 16 | 11.8 | 448 | 29 | 2 | 1.2 | 55 | 33.3 | 32.7 |
| 18 | 453 | 16 | 12.28 | 456 | 29 | 6 | 3.6 | 61 | 37 | 35.2 |
| 19 | 458 | 16 | 12.73 | 465 | 28 | 3 | 1.8 | 64 | 38.8 | 37.9 |
| 20 | 462 | 15 | 13.16 | 472 | 28 | 6 | 3.6 | 70 | 42.4 | 40.6 |
| 21 | 466 | 15 | 13.56 | 480 | 27 | 5 | 3 | 75 | 45.5 | 43.9 |
| 22 | 470 | 15 | 13.93 | 487 | 27 | 5 | 3 | 80 | 48.5 | 47 |
| 23 | 474 | 15 | 14.28 | 494 | 27 | 1 | 0.6 | 81 | 49.1 | 48.8 |
| 24 | 478 | 15 | 14.61 | 501 | 26 | 4 | 2.4 | 85 | 51.5 | 50.3 |
| 25 | 482 | 15 | 14.9 | 508 | 26 | 5 | 3 | 90 | 54.5 | 53 |
| 26 | 486 | 14 | 15.17 | 515 | 26 | 5 | 3 | 95 | 57.6 | 56.1 |
| 27 | 489 | 14 | 15.4 | 521 | 26 | 3 | 1.8 | 98 | 59.4 | 58.5 |
| 28 | 493 | 14 | 15.61 | 528 | 26 | 5 | 3 | 103 | 62.4 | 60.9 |
| 29 | 497 | 14 | 15.79 | 534 | 25 | 2 | 1.2 | 105 | 63.6 | 63 |
| 30 | 500 | 14 | 15.94 | 541 | 25 | 6 | 3.6 | 111 | 67.3 | 65.5 |
| 31 | 504 | 14 | 16.07 | 547 | 25 | 2 | 1.2 | 113 | 68.5 | 67.9 |
| 32 | 507 | 14 | 16.16 | 553 | 25 | 3 | 1.8 | 116 | 70.3 | 69.4 |
| 33 | 511 | 14 | 16.23 | 560 | 25 | 2 | 1.2 | 118 | 71.5 | 70.9 |
| 34 | 514 | 14 | 16.27 | 566 | 25 | 0 | 0 | 118 | 71.5 | 71.5 |
| 35 | 518 | 14 | 16.28 | 572 | 25 | 2 | 1.2 | 120 | 72.7 | 72.1 |
| 36 | 521 | 14 | 16.27 | 578 | 25 | 4 | 2.4 | 124 | 75.2 | 73.9 |
| 37 | 524 | 14 | 16.23 | 584 | 25 | 1 | 0.6 | 125 | 75.8 | 75.5 |
| 38 | 528 | 14 | 16.17 | 591 | 25 | 6 | 3.6 | 131 | 79.4 | 77.6 |
| 39 | 531 | 14 | 16.08 | 597 | 25 | 3 | 1.8 | 134 | 81.2 | 80.3 |
| 40 | 535 | 14 | 15.96 | 603 | 25 | 1 | 0.6 | 135 | 81.8 | 81.5 |
| 41 | 538 | 14 | 15.82 | 609 | 25 | 3 | 1.8 | 138 | 83.6 | 82.7 |
| 42 | 542 | 14 | 15.65 | 616 | 25 | 4 | 2.4 | 142 | 86.1 | 84.8 |
| 43 | 546 | 14 | 15.46 | 622 | 26 | 3 | 1.8 | 145 | 87.9 | 87 |
| 44 | 549 | 14 | 15.25 | 629 | 26 | 2 | 1.2 | 147 | 89.1 | 88.5 |
| 45 | 553 | 14 | 15 | 636 | 26 | 3 | 1.8 | 150 | 90.9 | 90 |
| 46 | 557 | 15 | 14.74 | 642 | 26 | 3 | 1.8 | 153 | 92.7 | 91.8 |
| 47 | 561 | 15 | 14.45 | 649 | 27 | 2 | 1.2 | 155 | 93.9 | 93.3 |
| 48 | 564 | 15 | 14.14 | 656 | 27 | 1 | 0.6 | 156 | 94.5 | 94.2 |
| 49 | 568 | 15 | 13.81 | 663 | 27 | 1 | 0.6 | 157 | 95.2 | 94.8 |
| 50 | 573 | 15 | 13.46 | 671 | 27 | 2 | 1.2 | 159 | 96.4 | 95.8 |
| 51 | 577 | 16 | 13.08 | 678 | 28 | 3 | 1.8 | 162 | 98.2 | 97.3 |
| 52 | 581 | 16 | 12.69 | 686 | 28 | 2 | 1.2 | 164 | 99.4 | 98.8 |
| 53 | 586 | 16 | 12.29 | 694 | 29 | 0 | 0 | 164 | 99.4 | 99 |
| 54 | 590 | 16 | 11.87 | 703 | 29 | 0 | 0 | 164 | 99.4 | 99 |
| 55 | 595 | 17 | 11.44 | 711 | 30 | 0 | 0 | 164 | 99.4 | 99 |
| 56 | 600 | 17 | 11 | 720 | 30 | 0 | 0 | 164 | 99.4 | 99 |
| 57 | 605 | 17 | 10.54 | 730 | 31 | 0 | 0 | 164 | 99.4 | 99 |
| 58 | 611 | 18 | 10.08 | 740 | 32 | 0 | 0 | 164 | 99.4 | 99 |
| 59 | 616 | 18 | 9.61 | 750 | 33 | 1 | 0.6 | 165 | 100 | 99 |
| 60 | 622 | 19 | 9.13 | 761 | 33 | 0 | 0 | 165 | 100 | 100 |
| 61 | 629 | 19 | 8.65 | 772 | 34 | 0 | 0 | 165 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 62 | 635 | 20 | 8.16 | 784 | 35 | 0 | 0 | 165 | 100 | 100 |
| 63 | 643 | 20 | 7.66 | 797 | 36 | 0 | 0 | 165 | 100 | 100 |
| 64 | 650 | 21 | 7.16 | 810 | 38 | 0 | 0 | 165 | 100 | 100 |
| 65 | 658 | 22 | 6.65 | 825 | 39 | 0 | 0 | 165 | 100 | 100 |
| 66 | 667 | 23 | 6.13 | 841 | 41 | 0 | 0 | 165 | 100 | 100 |
| 67 | 677 | 24 | 5.59 | 858 | 43 | 0 | 0 | 165 | 100 | 100 |
| 68 | 687 | 25 | 5.04 | 877 | 45 | 0 | 0 | 165 | 100 | 100 |
| 69 | 699 | 27 | 4.46 | 898 | 48 | 0 | 0 | 165 | 100 | 100 |
| 70 | 712 | 29 | 3.86 | 922 | 51 | 0 | 0 | 165 | 100 | 100 |
| 71 | 728 | 31 | 3.22 | 951 | 56 | 0 | 0 | 165 | 100 | 100 |
| 72 | 748 | 35 | 2.53 | 986 | 63 | 0 | 0 | 165 | 100 | 100 |
| 73 | 774 | 42 | 1.77 | 1033 | 76 | 0 | 0 | 165 | 100 | 100 |
| 74 | 817 | 58 | 0.94 | 1110 | 104 | 0 | 0 | 165 | 100 | 100 |
| 75 | 887 | 103 | 0.29 | 1236 | 186 | 0 | 0 | 165 | 100 | 100 |

## Appendix Table H.5: 2021 Grade 7 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 196 | 111 | 0.3 | -52 | 198 | 0 | 0 | 0 | 0 | 0 |
| 1 | 271 | 62 | 0.96 | 81 | 110 | 0 | 0 | 0 | 0 | 0 |
| 2 | 315 | 44 | 1.87 | 160 | 79 | 0 | 0 | 0 | 0 | 0 |
| 3 | 341 | 37 | 2.73 | 207 | 65 | 0 | 0 | 0 | 0 | 0 |
| 4 | 361 | 32 | 3.56 | 242 | 57 | 2 | 1.2 | 2 | 1.2 | 0.6 |
| 5 | 376 | 29 | 4.36 | 269 | 52 | 1 | 0.6 | 3 | 1.8 | 1.5 |
| 6 | 389 | 27 | 5.13 | 292 | 48 | 2 | 1.2 | 5 | 3.1 | 2.5 |
| 7 | 400 | 25 | 5.86 | 312 | 45 | 2 | 1.2 | 7 | 4.3 | 3.7 |
| 8 | 410 | 24 | 6.55 | 329 | 42 | 4 | 2.5 | 11 | 6.7 | 5.5 |
| 9 | 418 | 23 | 7.2 | 345 | 40 | 7 | 4.3 | 18 | 11 | 8.9 |
| 10 | 426 | 22 | 7.81 | 359 | 39 | 1 | 0.6 | 19 | 11.7 | 11.3 |
| 11 | 434 | 21 | 8.37 | 372 | 37 | 2 | 1.2 | 21 | 12.9 | 12.3 |
| 12 | 441 | 20 | 8.91 | 385 | 36 | 3 | 1.8 | 24 | 14.7 | 13.8 |
| 13 | 448 | 20 | 9.41 | 397 | 35 | 3 | 1.8 | 27 | 16.6 | 15.6 |
| 14 | 454 | 19 | 9.89 | 408 | 34 | 2 | 1.2 | 29 | 17.8 | 17.2 |
| 15 | 460 | 19 | 10.35 | 419 | 34 | 3 | 1.8 | 32 | 19.6 | 18.7 |
| 16 | 466 | 18 | 10.79 | 429 | 33 | 3 | 1.8 | 35 | 21.5 | 20.6 |
| 17 | 471 | 18 | 11.22 | 439 | 32 | 7 | 4.3 | 42 | 25.8 | 23.6 |
| 18 | 476 | 18 | 11.63 | 448 | 32 | 3 | 1.8 | 45 | 27.6 | 26.7 |
| 19 | 481 | 17 | 12.02 | 457 | 31 | 5 | 3.1 | 50 | 30.7 | 29.1 |
| 20 | 486 | 17 | 12.4 | 466 | 31 | 4 | 2.5 | 54 | 33.1 | 31.9 |
| 21 | 491 | 17 | 12.77 | 475 | 30 | 7 | 4.3 | 61 | 37.4 | 35.3 |
| 22 | 496 | 17 | 13.12 | 483 | 30 | 7 | 4.3 | 68 | 41.7 | 39.6 |
| 23 | 500 | 17 | 13.46 | 491 | 29 | 11 | 6.7 | 79 | 48.5 | 45.1 |
| 24 | 505 | 16 | 13.77 | 499 | 29 | 5 | 3.1 | 84 | 51.5 | 50 |
| 25 | 509 | 16 | 14.07 | 507 | 29 | 2 | 1.2 | 86 | 52.8 | 52.1 |
| 26 | 514 | 16 | 14.35 | 514 | 28 | 5 | 3.1 | 91 | 55.8 | 54.3 |
| 27 | 518 | 16 | 14.61 | 522 | 28 | 6 | 3.7 | 97 | 59.5 | 57.7 |
| 28 | 522 | 16 | 14.86 | 529 | 28 | 0 | 0 | 97 | 59.5 | 59.5 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 526 | 16 | 15.08 | 536 | 28 | 7 | 4.3 | 104 | 63.8 | 61.7 |
| 30 | 530 | 15 | 15.28 | 543 | 28 | 3 | 1.8 | 107 | 65.6 | 64.7 |
| 31 | 534 | 15 | 15.47 | 550 | 27 | 8 | 4.9 | 115 | 70.6 | 68.1 |
| 32 | 538 | 15 | 15.64 | 557 | 27 | 4 | 2.5 | 119 | 73 | 71.8 |
| 33 | 542 | 15 | 15.79 | 564 | 27 | 5 | 3.1 | 124 | 76.1 | 74.5 |
| 34 | 545 | 15 | 15.92 | 571 | 27 | 4 | 2.5 | 128 | 78.5 | 77.3 |
| 35 | 549 | 15 | 16.04 | 578 | 27 | 3 | 1.8 | 131 | 80.4 | 79.4 |
| 36 | 553 | 15 | 16.14 | 584 | 27 | 2 | 1.2 | 133 | 81.6 | 81 |
| 37 | 557 | 15 | 16.22 | 591 | 27 | 6 | 3.7 | 139 | 85.3 | 83.4 |
| 38 | 560 | 15 | 16.29 | 598 | 27 | 4 | 2.5 | 143 | 87.7 | 86.5 |
| 39 | 564 | 15 | 16.35 | 604 | 27 | 1 | 0.6 | 144 | 88.3 | 88 |
| 40 | 568 | 15 | 16.39 | 611 | 27 | 1 | 0.6 | 145 | 89 | 88.7 |
| 41 | 571 | 15 | 16.42 | 617 | 27 | 1 | 0.6 | 146 | 89.6 | 89.3 |
| 42 | 575 | 15 | 16.44 | 624 | 27 | 1 | 0.6 | 147 | 90.2 | 89.9 |
| 43 | 579 | 15 | 16.44 | 631 | 27 | 2 | 1.2 | 149 | 91.4 | 90.8 |
| 44 | 583 | 15 | 16.44 | 637 | 27 | 3 | 1.8 | 152 | 93.3 | 92.3 |
| 45 | 586 | 15 | 16.42 | 644 | 27 | 2 | 1.2 | 154 | 94.5 | 93.9 |
| 46 | 590 | 15 | 16.39 | 650 | 27 | 0 | 0 | 154 | 94.5 | 94.5 |
| 47 | 594 | 15 | 16.34 | 657 | 27 | 3 | 1.8 | 157 | 96.3 | 95.4 |
| 48 | 597 | 15 | 16.27 | 664 | 27 | 1 | 0.6 | 158 | 96.9 | 96.6 |
| 49 | 601 | 15 | 16.19 | 670 | 27 | 0 | 0 | 158 | 96.9 | 96.9 |
| 50 | 605 | 15 | 16.08 | 677 | 27 | 1 | 0.6 | 159 | 97.5 | 97.2 |
| 51 | 609 | 15 | 15.94 | 684 | 27 | 0 | 0 | 159 | 97.5 | 97.5 |
| 52 | 612 | 15 | 15.77 | 690 | 27 | 0 | 0 | 159 | 97.5 | 97.5 |
| 53 | 616 | 15 | 15.55 | 697 | 27 | 0 | 0 | 159 | 97.5 | 97.5 |
| 54 | 620 | 15 | 15.29 | 704 | 28 | 1 | 0.6 | 160 | 98.2 | 97.9 |
| 55 | 624 | 16 | 14.97 | 711 | 28 | 1 | 0.6 | 161 | 98.8 | 98.5 |
| 56 | 628 | 16 | 14.59 | 719 | 28 | 0 | 0 | 161 | 98.8 | 98.8 |
| 57 | 632 | 16 | 14.15 | 726 | 29 | 1 | 0.6 | 162 | 99.4 | 99 |
| 58 | 637 | 16 | 13.65 | 734 | 29 | 0 | 0 | 162 | 99.4 | 99 |
| 59 | 641 | 17 | 13.09 | 742 | 30 | 0 | 0 | 162 | 99.4 | 99 |
| 60 | 646 | 17 | 12.47 | 750 | 31 | 0 | 0 | 162 | 99.4 | 99 |
| 61 | 651 | 18 | 11.82 | 759 | 31 | 0 | 0 | 162 | 99.4 | 99 |
| 62 | 656 | 18 | 11.13 | 769 | 32 | 0 | 0 | 162 | 99.4 | 99 |
| 63 | 662 | 19 | 10.42 | 779 | 33 | 0 | 0 | 162 | 99.4 | 99 |
| 64 | 668 | 19 | 9.7 | 789 | 35 | 0 | 0 | 162 | 99.4 | 99 |
| 65 | 674 | 20 | 8.98 | 801 | 36 | 0 | 0 | 162 | 99.4 | 99 |
| 66 | 681 | 21 | 8.27 | 814 | 38 | 1 | 0.6 | 163 | 100 | 99 |
| 67 | 689 | 22 | 7.57 | 827 | 39 | 0 | 0 | 163 | 100 | 100 |
| 68 | 698 | 23 | 6.88 | 842 | 41 | 0 | 0 | 163 | 100 | 100 |
| 69 | 707 | 24 | 6.19 | 859 | 43 | 0 | 0 | 163 | 100 | 100 |
| 70 | 717 | 26 | 5.51 | 877 | 46 | 0 | 0 | 163 | 100 | 100 |
| 71 | 729 | 28 | 4.81 | 898 | 49 | 0 | 0 | 163 | 100 | 100 |
| 72 | 743 | 30 | 4.11 | 922 | 53 | 0 | 0 | 163 | 100 | 100 |
| 73 | 759 | 33 | 3.38 | 951 | 59 | 0 | 0 | 163 | 100 | 100 |
| 74 | 779 | 37 | 2.62 | 987 | 67 | 0 | 0 | 163 | 100 | 100 |
| 75 | 807 | 45 | 1.81 | 1036 | 80 | 0 | 0 | 163 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 852 | 62 | 0.95 | 1117 | 111 | 0 | 0 | 163 | 100 | 100 |
| 77 | 927 | 111 | 0.29 | 1251 | 199 | 0 | 0 | 163 | 100 | 100 |

## Appendix Table H.6: 2021 Grade 8 HLA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 199 | 98 | 0.29 | -69 | 184 | 0 | 0 | 0 | 0 | 0 |
| 1 | 267 | 56 | 0.89 | 59 | 105 | 0 | 0 | 0 | 0 | 0 |
| 2 | 310 | 41 | 1.65 | 139 | 77 | 0 | 0 | 0 | 0 | 0 |
| 3 | 336 | 34 | 2.36 | 189 | 64 | 0 | 0 | 0 | 0 | 0 |
| 4 | 356 | 30 | 3.03 | 226 | 57 | 0 | 0 | 0 | 0 | 0 |
| 5 | 371 | 27 | 3.69 | 255 | 52 | 0 | 0 | 0 | 0 | 0 |
| 6 | 384 | 25 | 4.33 | 280 | 48 | 3 | 2.2 | 3 | 2.2 | 1.1 |
| 7 | 396 | 24 | 4.96 | 301 | 44 | 3 | 2.2 | 6 | 4.3 | 3.3 |
| 8 | 406 | 22 | 5.59 | 320 | 42 | 3 | 2.2 | 9 | 6.5 | 5.4 |
| 9 | 414 | 21 | 6.21 | 337 | 40 | 2 | 1.4 | 11 | 8 | 7.2 |
| 10 | 423 | 20 | 6.82 | 352 | 38 | 3 | 2.2 | 14 | 10.1 | 9.1 |
| 11 | 430 | 19 | 7.42 | 366 | 36 | 0 | 0 | 14 | 10.1 | 10.1 |
| 12 | 437 | 19 | 8 | 379 | 35 | 5 | 3.6 | 19 | 13.8 | 12 |
| 13 | 443 | 18 | 8.58 | 391 | 34 | 2 | 1.4 | 21 | 15.2 | 14.5 |
| 14 | 449 | 17 | 9.13 | 402 | 33 | 3 | 2.2 | 24 | 17.4 | 16.3 |
| 15 | 455 | 17 | 9.67 | 413 | 32 | 4 | 2.9 | 28 | 20.3 | 18.8 |
| 16 | 460 | 16 | 10.18 | 423 | 31 | 4 | 2.9 | 32 | 23.2 | 21.7 |
| 17 | 465 | 16 | 10.67 | 432 | 30 | 1 | 0.7 | 33 | 23.9 | 23.6 |
| 18 | 470 | 16 | 11.14 | 441 | 30 | 4 | 2.9 | 37 | 26.8 | 25.4 |
| 19 | 474 | 15 | 11.58 | 450 | 29 | 5 | 3.6 | 42 | 30.4 | 28.6 |
| 20 | 479 | 15 | 12.01 | 458 | 29 | 5 | 3.6 | 47 | 34.1 | 32.2 |
| 21 | 483 | 15 | 12.41 | 466 | 28 | 2 | 1.4 | 49 | 35.5 | 34.8 |
| 22 | 487 | 15 | 12.78 | 474 | 28 | 4 | 2.9 | 53 | 38.4 | 37 |
| 23 | 491 | 14 | 13.14 | 482 | 27 | 9 | 6.5 | 62 | 44.9 | 41.7 |
| 24 | 495 | 14 | 13.48 | 489 | 27 | 5 | 3.6 | 67 | 48.6 | 46.7 |
| 25 | 499 | 14 | 13.8 | 496 | 27 | 1 | 0.7 | 68 | 49.3 | 48.9 |
| 26 | 503 | 14 | 14.11 | 504 | 26 | 3 | 2.2 | 71 | 51.4 | 50.4 |
| 27 | 506 | 14 | 14.39 | 510 | 26 | 4 | 2.9 | 75 | 54.3 | 52.9 |
| 28 | 510 | 14 | 14.67 | 517 | 26 | 5 | 3.6 | 80 | 58 | 56.2 |
| 29 | 514 | 14 | 14.93 | 524 | 26 | 5 | 3.6 | 85 | 61.6 | 59.8 |
| 30 | 517 | 13 | 15.17 | 531 | 25 | 3 | 2.2 | 88 | 63.8 | 62.7 |
| 31 | 521 | 13 | 15.4 | 537 | 25 | 6 | 4.3 | 94 | 68.1 | 65.9 |
| 32 | 524 | 13 | 15.62 | 543 | 25 | 1 | 0.7 | 95 | 68.8 | 68.5 |
| 33 | 527 | 13 | 15.82 | 550 | 25 | 1 | 0.7 | 96 | 69.6 | 69.2 |
| 34 | 531 | 13 | 16.01 | 556 | 25 | 3 | 2.2 | 99 | 71.7 | 70.7 |
| 35 | 534 | 13 | 16.17 | 562 | 25 | 2 | 1.4 | 101 | 73.2 | 72.5 |
| 36 | 537 | 13 | 16.31 | 568 | 25 | 4 | 2.9 | 105 | 76.1 | 74.6 |
| 37 | 540 | 13 | 16.42 | 574 | 24 | 0 | 0 | 105 | 76.1 | 76.1 |
| 38 | 543 | 13 | 16.5 | 580 | 24 | 5 | 3.6 | 110 | 79.7 | 77.9 |
| 39 | 547 | 13 | 16.53 | 586 | 24 | 0 | 0 | 110 | 79.7 | 79.7 |
| 40 | 550 | 13 | 16.52 | 592 | 24 | 2 | 1.4 | 112 | 81.2 | 80.4 |
| 41 | 553 | 13 | 16.47 | 598 | 24 | 3 | 2.2 | 115 | 83.3 | 82.2 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 556 | 13 | 16.36 | 604 | 24 | 3 | 2.2 | 118 | 85.5 | 84.4 |
| 43 | 559 | 13 | 16.19 | 610 | 25 | 0 | 0 | 118 | 85.5 | 85.5 |
| 44 | 563 | 13 | 15.97 | 616 | 25 | 4 | 2.9 | 122 | 88.4 | 87 |
| 45 | 566 | 13 | 15.7 | 623 | 25 | 3 | 2.2 | 125 | 90.6 | 89.5 |
| 46 | 569 | 13 | 15.38 | 629 | 25 | 2 | 1.4 | 127 | 92 | 91.3 |
| 47 | 573 | 14 | 15.01 | 636 | 26 | 1 | 0.7 | 128 | 92.8 | 92.4 |
| 48 | 576 | 14 | 14.59 | 642 | 26 | 1 | 0.7 | 129 | 93.5 | 93.1 |
| 49 | 580 | 14 | 14.15 | 649 | 26 | 1 | 0.7 | 130 | 94.2 | 93.8 |
| 50 | 584 | 14 | 13.67 | 656 | 27 | 1 | 0.7 | 131 | 94.9 | 94.6 |
| 51 | 588 | 14 | 13.18 | 664 | 27 | 1 | 0.7 | 132 | 95.7 | 95.3 |
| 52 | 592 | 15 | 12.67 | 671 | 28 | 1 | 0.7 | 133 | 96.4 | 96 |
| 53 | 596 | 15 | 12.14 | 679 | 28 | 0 | 0 | 133 | 96.4 | 96.4 |
| 54 | 600 | 15 | 11.61 | 688 | 29 | 1 | 0.7 | 134 | 97.1 | 96.7 |
| 55 | 605 | 16 | 11.08 | 696 | 30 | 0 | 0 | 134 | 97.1 | 97.1 |
| 56 | 610 | 16 | 10.54 | 705 | 30 | 1 | 0.7 | 135 | 97.8 | 97.5 |
| 57 | 615 | 17 | 10 | 715 | 31 | 1 | 0.7 | 136 | 98.6 | 98.2 |
| 58 | 620 | 17 | 9.45 | 725 | 32 | 1 | 0.7 | 137 | 99.3 | 98.9 |
| 59 | 626 | 18 | 8.9 | 736 | 33 | 1 | 0.7 | 138 | 100 | 99 |
| 60 | 632 | 18 | 8.35 | 748 | 34 | 0 | 0 | 138 | 100 | 100 |
| 61 | 639 | 19 | 7.78 | 760 | 35 | 0 | 0 | 138 | 100 | 100 |
| 62 | 646 | 20 | 7.21 | 773 | 37 | 0 | 0 | 138 | 100 | 100 |
| 63 | 653 | 20 | 6.63 | 787 | 38 | 0 | 0 | 138 | 100 | 100 |
| 64 | 661 | 21 | 6.04 | 803 | 40 | 0 | 0 | 138 | 100 | 100 |
| 65 | 671 | 22 | 5.44 | 820 | 42 | 0 | 0 | 138 | 100 | 100 |
| 66 | 681 | 24 | 4.84 | 839 | 45 | 0 | 0 | 138 | 100 | 100 |
| 67 | 692 | 25 | 4.24 | 861 | 48 | 0 | 0 | 138 | 100 | 100 |
| 68 | 706 | 28 | 3.62 | 887 | 52 | 0 | 0 | 138 | 100 | 100 |
| 69 | 722 | 30 | 3 | 916 | 57 | 0 | 0 | 138 | 100 | 100 |
| 70 | 741 | 34 | 2.36 | 954 | 64 | 0 | 0 | 138 | 100 | 100 |
| 71 | 767 | 41 | 1.67 | 1003 | 77 | 0 | 0 | 138 | 100 | 100 |
| 72 | 809 | 55 | 0.9 | 1082 | 104 | 0 | 0 | 138 | 100 | 100 |
| 73 | 876 | 97 | 0.29 | 1209 | 184 | 0 | 0 | 138 | 100 | 100 |

## Appendix Table H.7: 2021 Grade 3 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 275 | 73 | 0.29 | -121 | 215 | 0 | 0 | 0 | 0 | 0 |
| 1 | 325 | 41 | 0.91 | 26 | 121 | 0 | 0 | 0 | 0 | 0 |
| 2 | 356 | 30 | 1.7 | 117 | 89 | 0 | 0 | 0 | 0 | 0 |
| 3 | 376 | 25 | 2.41 | 174 | 75 | 0 | 0 | 0 | 0 | 0 |
| 4 | 390 | 23 | 3.06 | 216 | 66 | 0 | 0 | 0 | 0 | 0 |
| 5 | 402 | 21 | 3.67 | 251 | 61 | 0 | 0 | 0 | 0 | 0 |
| 6 | 412 | 19 | 4.24 | 280 | 56 | 0 | 0 | 0 | 0 | 0 |
| 7 | 421 | 18 | 4.77 | 306 | 53 | 1 | 0.4 | 1 | 0.4 | 0.2 |
| 8 | 428 | 17 | 5.27 | 329 | 50 | 4 | 1.5 | 5 | 1.8 | 1.1 |
| 9 | 436 | 16 | 5.74 | 350 | 48 | 7 | 2.5 | 12 | 4.4 | 3.1 |
| 10 | 442 | 16 | 6.19 | 370 | 47 | 4 | 1.5 | 16 | 5.8 | 5.1 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 448 | 15 | 6.61 | 388 | 45 | 11 | 4 | 27 | 9.8 | 7.8 |
| 12 | 454 | 15 | 7 | 405 | 44 | 19 | 6.9 | 46 | 16.7 | 13.3 |
| 13 | 460 | 15 | 7.37 | 421 | 43 | 18 | 6.5 | 64 | 23.3 | 20 |
| 14 | 465 | 14 | 7.72 | 436 | 42 | 21 | 7.6 | 85 | 30.9 | 27.1 |
| 15 | 470 | 14 | 8.05 | 451 | 41 | 25 | 9.1 | 110 | 40 | 35.5 |
| 16 | 475 | 14 | 8.35 | 465 | 40 | 22 | 8 | 132 | 48 | 44 |
| 17 | 479 | 13 | 8.62 | 479 | 39 | 15 | 5.5 | 147 | 53.5 | 50.7 |
| 18 | 484 | 13 | 8.88 | 492 | 39 | 10 | 3.6 | 157 | 57.1 | 55.3 |
| 19 | 488 | 13 | 9.11 | 505 | 38 | 14 | 5.1 | 171 | 62.2 | 59.6 |
| 20 | 492 | 13 | 9.33 | 517 | 38 | 11 | 4 | 182 | 66.2 | 64.2 |
| 21 | 497 | 13 | 9.51 | 530 | 38 | 10 | 3.6 | 192 | 69.8 | 68 |
| 22 | 501 | 13 | 9.68 | 542 | 37 | 7 | 2.5 | 199 | 72.4 | 71.1 |
| 23 | 505 | 13 | 9.83 | 554 | 37 | 12 | 4.4 | 211 | 76.7 | 74.5 |
| 24 | 509 | 13 | 9.95 | 565 | 37 | 6 | 2.2 | 217 | 78.9 | 77.8 |
| 25 | 513 | 12 | 10.05 | 577 | 37 | 10 | 3.6 | 227 | 82.5 | 80.7 |
| 26 | 517 | 12 | 10.13 | 588 | 36 | 4 | 1.5 | 231 | 84 | 83.3 |
| 27 | 520 | 12 | 10.18 | 600 | 36 | 8 | 2.9 | 239 | 86.9 | 85.5 |
| 28 | 524 | 12 | 10.22 | 611 | 36 | 2 | 0.7 | 241 | 87.6 | 87.3 |
| 29 | 528 | 12 | 10.23 | 623 | 36 | 3 | 1.1 | 244 | 88.7 | 88.2 |
| 30 | 532 | 12 | 10.23 | 634 | 36 | 3 | 1.1 | 247 | 89.8 | 89.3 |
| 31 | 536 | 12 | 10.21 | 645 | 36 | 2 | 0.7 | 249 | 90.5 | 90.2 |
| 32 | 540 | 12 | 10.16 | 657 | 36 | 5 | 1.8 | 254 | 92.4 | 91.5 |
| 33 | 544 | 12 | 10.1 | 668 | 36 | 4 | 1.5 | 258 | 93.8 | 93.1 |
| 34 | 548 | 12 | 10.02 | 680 | 37 | 3 | 1.1 | 261 | 94.9 | 94.4 |
| 35 | 552 | 13 | 9.93 | 691 | 37 | 3 | 1.1 | 264 | 96 | 95.5 |
| 36 | 556 | 13 | 9.82 | 703 | 37 | 2 | 0.7 | 266 | 96.7 | 96.4 |
| 37 | 560 | 13 | 9.7 | 715 | 37 | 0 | 0 | 266 | 96.7 | 96.7 |
| 38 | 564 | 13 | 9.57 | 727 | 37 | 2 | 0.7 | 268 | 97.5 | 97.1 |
| 39 | 568 | 13 | 9.43 | 739 | 38 | 1 | 0.4 | 269 | 97.8 | 97.6 |
| 40 | 572 | 13 | 9.27 | 751 | 38 | 1 | 0.4 | 270 | 98.2 | 98 |
| 41 | 576 | 13 | 9.1 | 764 | 38 | 0 | 0 | 270 | 98.2 | 98.2 |
| 42 | 581 | 13 | 8.91 | 777 | 39 | 1 | 0.4 | 271 | 98.5 | 98.4 |
| 43 | 585 | 13 | 8.7 | 790 | 39 | 0 | 0 | 271 | 98.5 | 98.5 |
| 44 | 590 | 14 | 8.47 | 804 | 40 | 1 | 0.4 | 272 | 98.9 | 98.7 |
| 45 | 594 | 14 | 8.22 | 817 | 40 | 0 | 0 | 272 | 98.9 | 98.9 |
| 46 | 599 | 14 | 7.93 | 832 | 41 | 1 | 0.4 | 273 | 99.3 | 99 |
| 47 | 604 | 14 | 7.6 | 847 | 42 | 0 | 0 | 273 | 99.3 | 99 |
| 48 | 610 | 15 | 7.23 | 862 | 43 | 0 | 0 | 273 | 99.3 | 99 |
| 49 | 615 | 15 | 6.81 | 879 | 44 | 1 | 0.4 | 274 | 99.6 | 99 |
| 50 | 621 | 16 | 6.33 | 896 | 46 | 0 | 0 | 274 | 99.6 | 99 |
| 51 | 628 | 16 | 5.79 | 916 | 48 | 1 | 0.4 | 275 | 100 | 99 |
| 52 | 635 | 17 | 5.17 | 937 | 51 | 0 | 0 | 275 | 100 | 100 |
| 53 | 643 | 19 | 4.47 | 961 | 55 | 0 | 0 | 275 | 100 | 100 |
| 54 | 653 | 21 | 3.69 | 989 | 60 | 0 | 0 | 275 | 100 | 100 |
| 55 | 665 | 23 | 2.83 | 1025 | 69 | 0 | 0 | 275 | 100 | 100 |
| 56 | 682 | 28 | 1.92 | 1074 | 84 | 0 | 0 | 275 | 100 | 100 |
| 57 | 710 | 40 | 0.97 | 1157 | 118 | 0 | 0 | 275 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 58 | 759 | 72 | 0.3 | 1300 | 213 | 0 | 0 | 275 | 100 | 100 |

## Appendix Table H.8: 2021 Grade 4 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 159 | 125 | 0.3 | -203 | 265 | 0 | 0 | 0 | 0 | 0 |
| 1 | 244 | 70 | 0.96 | -25 | 147 | 0 | 0 | 0 | 0 | 0 |
| 2 | 294 | 50 | 1.85 | 81 | 106 | 0 | 0 | 0 | 0 | 0 |
| 3 | 324 | 42 | 2.69 | 146 | 88 | 0 | 0 | 0 | 0 | 0 |
| 4 | 346 | 36 | 3.49 | 193 | 77 | 0 | 0 | 0 | 0 | 0 |
| 5 | 364 | 33 | 4.25 | 230 | 70 | 0 | 0 | 0 | 0 | 0 |
| 6 | 378 | 30 | 4.98 | 261 | 65 | 0 | 0 | 0 | 0 | 0 |
| 7 | 391 | 29 | 5.68 | 288 | 60 | 3 | 1.2 | 3 | 1.2 | 0.6 |
| 8 | 403 | 27 | 6.35 | 312 | 57 | 1 | 0.4 | 4 | 1.6 | 1.4 |
| 9 | 413 | 26 | 6.98 | 334 | 55 | 2 | 0.8 | 6 | 2.4 | 2 |
| 10 | 422 | 25 | 7.58 | 354 | 52 | 5 | 2 | 11 | 4.4 | 3.4 |
| 11 | 431 | 24 | 8.14 | 372 | 51 | 9 | 3.6 | 20 | 7.9 | 6.2 |
| 12 | 439 | 23 | 8.67 | 389 | 49 | 11 | 4.4 | 31 | 12.3 | 10.1 |
| 13 | 447 | 22 | 9.17 | 405 | 48 | 8 | 3.2 | 39 | 15.5 | 13.9 |
| 14 | 454 | 22 | 9.62 | 421 | 46 | 21 | 8.3 | 60 | 23.8 | 19.6 |
| 15 | 461 | 21 | 10.04 | 435 | 45 | 17 | 6.7 | 77 | 30.6 | 27.2 |
| 16 | 467 | 21 | 10.42 | 449 | 45 | 17 | 6.7 | 94 | 37.3 | 33.9 |
| 17 | 474 | 21 | 10.76 | 463 | 44 | 15 | 6 | 109 | 43.3 | 40.3 |
| 18 | 480 | 20 | 11.07 | 476 | 43 | 14 | 5.6 | 123 | 48.8 | 46 |
| 19 | 486 | 20 | 11.34 | 489 | 43 | 23 | 9.1 | 146 | 57.9 | 53.4 |
| 20 | 492 | 20 | 11.57 | 502 | 42 | 11 | 4.4 | 157 | 62.3 | 60.1 |
| 21 | 498 | 20 | 11.76 | 514 | 42 | 13 | 5.2 | 170 | 67.5 | 64.9 |
| 22 | 504 | 20 | 11.92 | 526 | 42 | 8 | 3.2 | 178 | 70.6 | 69 |
| 23 | 509 | 20 | 12.05 | 538 | 42 | 9 | 3.6 | 187 | 74.2 | 72.4 |
| 24 | 515 | 20 | 12.14 | 550 | 41 | 3 | 1.2 | 190 | 75.4 | 74.8 |
| 25 | 520 | 19 | 12.2 | 562 | 41 | 8 | 3.2 | 198 | 78.6 | 77 |
| 26 | 526 | 19 | 12.23 | 574 | 41 | 5 | 2 | 203 | 80.6 | 79.6 |
| 27 | 532 | 19 | 12.23 | 585 | 41 | 3 | 1.2 | 206 | 81.7 | 81.2 |
| 28 | 537 | 19 | 12.19 | 597 | 41 | 6 | 2.4 | 212 | 84.1 | 82.9 |
| 29 | 543 | 20 | 12.13 | 609 | 41 | 3 | 1.2 | 215 | 85.3 | 84.7 |
| 30 | 548 | 20 | 12.04 | 621 | 42 | 4 | 1.6 | 219 | 86.9 | 86.1 |
| 31 | 554 | 20 | 11.92 | 633 | 42 | 4 | 1.6 | 223 | 88.5 | 87.7 |
| 32 | 560 | 20 | 11.77 | 645 | 42 | 6 | 2.4 | 229 | 90.9 | 89.7 |
| 33 | 566 | 20 | 11.6 | 658 | 42 | 4 | 1.6 | 233 | 92.5 | 91.7 |
| 34 | 572 | 20 | 11.39 | 670 | 43 | 1 | 0.4 | 234 | 92.9 | 92.7 |
| 35 | 578 | 20 | 11.16 | 683 | 43 | 4 | 1.6 | 238 | 94.4 | 93.7 |
| 36 | 584 | 21 | 10.9 | 696 | 44 | 3 | 1.2 | 241 | 95.6 | 95 |
| 37 | 590 | 21 | 10.61 | 709 | 44 | 1 | 0.4 | 242 | 96 | 95.8 |
| 38 | 597 | 21 | 10.29 | 723 | 45 | 3 | 1.2 | 245 | 97.2 | 96.6 |
| 39 | 603 | 22 | 9.95 | 737 | 46 | 1 | 0.4 | 246 | 97.6 | 97.4 |
| 40 | 610 | 22 | 9.57 | 752 | 47 | 1 | 0.4 | 247 | 98 | 97.8 |
| 41 | 618 | 22 | 9.17 | 767 | 48 | 2 | 0.8 | 249 | 98.8 | 98.4 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 625 | 23 | 8.75 | 784 | 49 | 2 | 0.8 | 251 | 99.6 | 99 |
| 43 | 633 | 24 | 8.3 | 800 | 50 | 0 | 0 | 251 | 99.6 | 99 |
| 44 | 642 | 24 | 7.83 | 818 | 52 | 1 | 0.4 | 252 | 100 | 99 |
| 45 | 651 | 25 | 7.33 | 837 | 53 | 0 | 0 | 252 | 100 | 100 |
| 46 | 660 | 26 | 6.82 | 858 | 55 | 0 | 0 | 252 | 100 | 100 |
| 47 | 671 | 27 | 6.29 | 880 | 57 | 0 | 0 | 252 | 100 | 100 |
| 48 | 682 | 28 | 5.74 | 904 | 60 | 0 | 0 | 252 | 100 | 100 |
| 49 | 694 | 30 | 5.18 | 930 | 63 | 0 | 0 | 252 | 100 | 100 |
| 50 | 708 | 32 | 4.62 | 960 | 67 | 0 | 0 | 252 | 100 | 100 |
| 51 | 724 | 34 | 4.05 | 993 | 72 | 0 | 0 | 252 | 100 | 100 |
| 52 | 742 | 37 | 3.47 | 1031 | 77 | 0 | 0 | 252 | 100 | 100 |
| 53 | 764 | 40 | 2.89 | 1077 | 85 | 0 | 0 | 252 | 100 | 100 |
| 54 | 790 | 45 | 2.28 | 1133 | 95 | 0 | 0 | 252 | 100 | 100 |
| 55 | 825 | 53 | 1.63 | 1207 | 113 | 0 | 0 | 252 | 100 | 100 |
| 56 | 880 | 72 | 0.89 | 1323 | 152 | 0 | 0 | 252 | 100 | 100 |
| 57 | 968 | 126 | 0.29 | 1509 | 268 | 0 | 0 | 252 | 100 | 100 |

## Appendix Table H.9: 2021 Grade 5 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 145 | 137 | 0.3 | -226 | 280 | 0 | 0 | 0 | 0 | 0 |
| 1 | 237 | 76 | 0.97 | -39 | 155 | 0 | 0 | 0 | 0 | 0 |
| 2 | 292 | 55 | 1.87 | 73 | 112 | 0 | 0 | 0 | 0 | 0 |
| 3 | 325 | 45 | 2.72 | 140 | 93 | 0 | 0 | 0 | 0 | 0 |
| 4 | 349 | 40 | 3.53 | 189 | 81 | 0 | 0 | 0 | 0 | 0 |
| 5 | 368 | 36 | 4.3 | 228 | 74 | 0 | 0 | 0 | 0 | 0 |
| 6 | 384 | 33 | 5.03 | 261 | 68 | 0 | 0 | 0 | 0 | 0 |
| 7 | 398 | 31 | 5.73 | 289 | 64 | 0 | 0 | 0 | 0 | 0 |
| 8 | 411 | 30 | 6.4 | 314 | 60 | 4 | 1.6 | 4 | 1.6 | 0.8 |
| 9 | 422 | 28 | 7.04 | 337 | 58 | 8 | 3.2 | 12 | 4.8 | 3.2 |
| 10 | 432 | 27 | 7.66 | 358 | 55 | 8 | 3.2 | 20 | 8 | 6.4 |
| 11 | 441 | 26 | 8.26 | 377 | 53 | 10 | 4 | 30 | 12 | 10 |
| 12 | 450 | 25 | 8.84 | 395 | 51 | 15 | 6 | 45 | 18.1 | 15.1 |
| 13 | 458 | 24 | 9.41 | 412 | 50 | 9 | 3.6 | 54 | 21.7 | 19.9 |
| 14 | 466 | 24 | 9.97 | 427 | 48 | 10 | 4 | 64 | 25.7 | 23.7 |
| 15 | 473 | 23 | 10.51 | 442 | 47 | 14 | 5.6 | 78 | 31.3 | 28.5 |
| 16 | 480 | 23 | 11.03 | 457 | 46 | 17 | 6.8 | 95 | 38.2 | 34.7 |
| 17 | 487 | 22 | 11.55 | 470 | 45 | 11 | 4.4 | 106 | 42.6 | 40.4 |
| 18 | 493 | 22 | 12.05 | 483 | 44 | 15 | 6 | 121 | 48.6 | 45.6 |
| 19 | 499 | 21 | 12.54 | 495 | 43 | 16 | 6.4 | 137 | 55 | 51.8 |
| 20 | 505 | 21 | 13.01 | 507 | 42 | 11 | 4.4 | 148 | 59.4 | 57.2 |
| 21 | 511 | 20 | 13.45 | 519 | 42 | 11 | 4.4 | 159 | 63.9 | 61.6 |
| 22 | 516 | 20 | 13.87 | 530 | 41 | 7 | 2.8 | 166 | 66.7 | 65.3 |
| 23 | 522 | 20 | 14.25 | 541 | 40 | 12 | 4.8 | 178 | 71.5 | 69.1 |
| 24 | 527 | 20 | 14.6 | 552 | 40 | 12 | 4.8 | 190 | 76.3 | 73.9 |
| 25 | 532 | 19 | 14.9 | 562 | 40 | 7 | 2.8 | 197 | 79.1 | 77.7 |
| 26 | 537 | 19 | 15.16 | 572 | 39 | 6 | 2.4 | 203 | 81.5 | 80.3 |
| 27 | 542 | 19 | 15.36 | 582 | 39 | 2 | 0.8 | 205 | 82.3 | 81.9 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 28 | 547 | 19 | 15.52 | 592 | 39 | 9 | 3.6 | 214 | 85.9 | 84.1 |
| 29 | 552 | 19 | 15.63 | 602 | 39 | 1 | 0.4 | 215 | 86.3 | 86.1 |
| 30 | 556 | 19 | 15.69 | 612 | 39 | 4 | 1.6 | 219 | 88 | 87.1 |
| 31 | 561 | 19 | 15.7 | 621 | 39 | 1 | 0.4 | 220 | 88.4 | 88.2 |
| 32 | 566 | 19 | 15.67 | 631 | 39 | 2 | 0.8 | 222 | 89.2 | 88.8 |
| 33 | 571 | 19 | 15.61 | 641 | 39 | 2 | 0.8 | 224 | 90 | 89.6 |
| 34 | 576 | 19 | 15.51 | 651 | 39 | 2 | 0.8 | 226 | 90.8 | 90.4 |
| 35 | 580 | 19 | 15.37 | 660 | 39 | 5 | 2 | 231 | 92.8 | 91.8 |
| 36 | 585 | 19 | 15.22 | 670 | 39 | 5 | 2 | 236 | 94.8 | 93.8 |
| 37 | 590 | 19 | 15.04 | 681 | 39 | 1 | 0.4 | 237 | 95.2 | 95 |
| 38 | 595 | 19 | 14.84 | 691 | 40 | 1 | 0.4 | 238 | 95.6 | 95.4 |
| 39 | 600 | 20 | 14.63 | 701 | 40 | 3 | 1.2 | 241 | 96.8 | 96.2 |
| 40 | 605 | 20 | 14.41 | 712 | 40 | 2 | 0.8 | 243 | 97.6 | 97.2 |
| 41 | 611 | 20 | 14.17 | 722 | 41 | 0 | 0 | 243 | 97.6 | 97.6 |
| 42 | 616 | 20 | 13.92 | 733 | 41 | 1 | 0.4 | 244 | 98 | 97.8 |
| 43 | 621 | 20 | 13.66 | 744 | 41 | 0 | 0 | 244 | 98 | 98 |
| 44 | 627 | 20 | 13.39 | 756 | 42 | 2 | 0.8 | 246 | 98.8 | 98.4 |
| 45 | 633 | 21 | 13.1 | 767 | 42 | 0 | 0 | 246 | 98.8 | 98.8 |
| 46 | 638 | 21 | 12.79 | 779 | 43 | 1 | 0.4 | 247 | 99.2 | 99 |
| 47 | 644 | 21 | 12.46 | 791 | 43 | 1 | 0.4 | 248 | 99.6 | 99 |
| 48 | 650 | 22 | 12.11 | 803 | 44 | 0 | 0 | 248 | 99.6 | 99 |
| 49 | 657 | 22 | 11.74 | 816 | 45 | 0 | 0 | 248 | 99.6 | 99 |
| 50 | 663 | 22 | 11.33 | 829 | 45 | 0 | 0 | 248 | 99.6 | 99 |
| 51 | 670 | 23 | 10.89 | 843 | 46 | 0 | 0 | 248 | 99.6 | 99 |
| 52 | 677 | 23 | 10.42 | 858 | 47 | 0 | 0 | 248 | 99.6 | 99 |
| 53 | 684 | 24 | 9.91 | 873 | 49 | 1 | 0.4 | 249 | 100 | 99 |
| 54 | 692 | 24 | 9.36 | 888 | 50 | 0 | 0 | 249 | 100 | 100 |
| 55 | 700 | 25 | 8.77 | 905 | 52 | 0 | 0 | 249 | 100 | 100 |
| 56 | 709 | 26 | 8.15 | 923 | 54 | 0 | 0 | 249 | 100 | 100 |
| 57 | 719 | 27 | 7.49 | 943 | 56 | 0 | 0 | 249 | 100 | 100 |
| 58 | 729 | 29 | 6.79 | 964 | 59 | 0 | 0 | 249 | 100 | 100 |
| 59 | 741 | 30 | 6.05 | 988 | 62 | 0 | 0 | 249 | 100 | 100 |
| 60 | 754 | 33 | 5.29 | 1015 | 66 | 0 | 0 | 249 | 100 | 100 |
| 61 | 770 | 35 | 4.49 | 1046 | 72 | 0 | 0 | 249 | 100 | 100 |
| 62 | 788 | 39 | 3.66 | 1084 | 80 | 0 | 0 | 249 | 100 | 100 |
| 63 | 811 | 45 | 2.8 | 1132 | 91 | 0 | 0 | 249 | 100 | 100 |
| 64 | 844 | 54 | 1.91 | 1197 | 111 | 0 | 0 | 249 | 100 | 100 |
| 65 | 897 | 76 | 0.97 | 1307 | 155 | 0 | 0 | 249 | 100 | 100 |
| 66 | 989 | 137 | 0.3 | 1494 | 280 | 0 | 0 | 249 | 100 | 100 |

## Appendix Table H.10: 2021 Grade 6 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 174 | 132 | 0.3 | -55 | 235 | 0 | 0 | 0 | 0 | 0 |
| 1 | 263 | 73 | 0.97 | 102 | 130 | 0 | 0 | 0 | 0 | 0 |
| 2 | 315 | 53 | 1.89 | 194 | 93 | 2 | 1.2 | 2 | 1.2 | 0.6 |
| 3 | 346 | 43 | 2.76 | 250 | 77 | 0 | 0 | 2 | 1.2 | 1.2 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 369 | 38 | 3.6 | 290 | 67 | 0 | 0 | 2 | 1.2 | 1.2 |
| 5 | 387 | 34 | 4.4 | 323 | 61 | 1 | 0.6 | 3 | 1.9 | 1.5 |
| 6 | 402 | 32 | 5.18 | 349 | 56 | 1 | 0.6 | 4 | 2.5 | 2.2 |
| 7 | 415 | 30 | 5.93 | 372 | 53 | 8 | 4.9 | 12 | 7.4 | 4.9 |
| 8 | 427 | 28 | 6.65 | 393 | 50 | 7 | 4.3 | 19 | 11.7 | 9.6 |
| 9 | 437 | 27 | 7.36 | 411 | 47 | 11 | 6.8 | 30 | 18.5 | 15.1 |
| 10 | 446 | 25 | 8.04 | 428 | 45 | 15 | 9.3 | 45 | 27.8 | 23.1 |
| 11 | 455 | 24 | 8.71 | 443 | 43 | 10 | 6.2 | 55 | 34 | 30.9 |
| 12 | 463 | 24 | 9.36 | 457 | 42 | 9 | 5.6 | 64 | 39.5 | 36.7 |
| 13 | 471 | 23 | 9.99 | 470 | 40 | 7 | 4.3 | 71 | 43.8 | 41.7 |
| 14 | 478 | 22 | 10.61 | 483 | 39 | 14 | 8.6 | 85 | 52.5 | 48.1 |
| 15 | 484 | 22 | 11.2 | 495 | 38 | 5 | 3.1 | 90 | 55.6 | 54 |
| 16 | 490 | 21 | 11.78 | 506 | 37 | 9 | 5.6 | 99 | 61.1 | 58.3 |
| 17 | 496 | 21 | 12.33 | 516 | 36 | 10 | 6.2 | 109 | 67.3 | 64.2 |
| 18 | 502 | 20 | 12.87 | 526 | 36 | 1 | 0.6 | 110 | 67.9 | 67.6 |
| 19 | 508 | 20 | 13.37 | 536 | 35 | 3 | 1.9 | 113 | 69.8 | 68.8 |
| 20 | 513 | 19 | 13.86 | 546 | 34 | 7 | 4.3 | 120 | 74.1 | 71.9 |
| 21 | 518 | 19 | 14.31 | 555 | 34 | 5 | 3.1 | 125 | 77.2 | 75.6 |
| 22 | 523 | 19 | 14.73 | 564 | 33 | 2 | 1.2 | 127 | 78.4 | 77.8 |
| 23 | 528 | 19 | 15.12 | 572 | 33 | 5 | 3.1 | 132 | 81.5 | 79.9 |
| 24 | 533 | 18 | 15.48 | 580 | 33 | 2 | 1.2 | 134 | 82.7 | 82.1 |
| 25 | 537 | 18 | 15.8 | 589 | 32 | 1 | 0.6 | 135 | 83.3 | 83 |
| 26 | 542 | 18 | 16.09 | 597 | 32 | 2 | 1.2 | 137 | 84.6 | 84 |
| 27 | 546 | 18 | 16.34 | 605 | 32 | 3 | 1.9 | 140 | 86.4 | 85.5 |
| 28 | 551 | 18 | 16.55 | 612 | 31 | 3 | 1.9 | 143 | 88.3 | 87.3 |
| 29 | 555 | 18 | 16.74 | 620 | 31 | 1 | 0.6 | 144 | 88.9 | 88.6 |
| 30 | 559 | 18 | 16.89 | 628 | 31 | 2 | 1.2 | 146 | 90.1 | 89.5 |
| 31 | 563 | 18 | 17 | 635 | 31 | 0 | 0 | 146 | 90.1 | 90.1 |
| 32 | 568 | 17 | 17.09 | 643 | 31 | 1 | 0.6 | 147 | 90.7 | 90.4 |
| 33 | 572 | 17 | 17.15 | 650 | 31 | 0 | 0 | 147 | 90.7 | 90.7 |
| 34 | 576 | 17 | 17.19 | 658 | 31 | 2 | 1.2 | 149 | 92 | 91.4 |
| 35 | 580 | 17 | 17.2 | 665 | 31 | 0 | 0 | 149 | 92 | 92 |
| 36 | 584 | 17 | 17.18 | 673 | 31 | 2 | 1.2 | 151 | 93.2 | 92.6 |
| 37 | 589 | 17 | 17.15 | 680 | 31 | 1 | 0.6 | 152 | 93.8 | 93.5 |
| 38 | 593 | 17 | 17.09 | 687 | 31 | 1 | 0.6 | 153 | 94.4 | 94.1 |
| 39 | 597 | 17 | 17.01 | 695 | 31 | 1 | 0.6 | 154 | 95.1 | 94.8 |
| 40 | 601 | 18 | 16.9 | 703 | 31 | 1 | 0.6 | 155 | 95.7 | 95.4 |
| 41 | 606 | 18 | 16.77 | 710 | 31 | 1 | 0.6 | 156 | 96.3 | 96 |
| 42 | 610 | 18 | 16.61 | 718 | 31 | 1 | 0.6 | 157 | 96.9 | 96.6 |
| 43 | 614 | 18 | 16.42 | 726 | 32 | 0 | 0 | 157 | 96.9 | 96.9 |
| 44 | 619 | 18 | 16.2 | 733 | 32 | 2 | 1.2 | 159 | 98.1 | 97.5 |
| 45 | 623 | 18 | 15.95 | 741 | 32 | 0 | 0 | 159 | 98.1 | 98.1 |
| 46 | 628 | 18 | 15.65 | 749 | 32 | 0 | 0 | 159 | 98.1 | 98.1 |
| 47 | 633 | 18 | 15.32 | 758 | 33 | 1 | 0.6 | 160 | 98.8 | 98.5 |
| 48 | 637 | 19 | 14.95 | 766 | 33 | 0 | 0 | 160 | 98.8 | 98.8 |
| 49 | 642 | 19 | 14.53 | 775 | 34 | 0 | 0 | 160 | 98.8 | 98.8 |
| 50 | 647 | 19 | 14.07 | 784 | 34 | 1 | 0.6 | 161 | 99.4 | 99 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 51 | 652 | 20 | 13.57 | 793 | 35 | 0 | 0 | 161 | 99.4 | 99 |
| 52 | 658 | 20 | 13.03 | 803 | 35 | 1 | 0.6 | 162 | 100 | 99 |
| 53 | 664 | 20 | 12.46 | 813 | 36 | 0 | 0 | 162 | 100 | 100 |
| 54 | 669 | 21 | 11.86 | 823 | 37 | 0 | 0 | 162 | 100 | 100 |
| 55 | 676 | 22 | 11.24 | 834 | 38 | 0 | 0 | 162 | 100 | 100 |
| 56 | 682 | 22 | 10.6 | 846 | 39 | 0 | 0 | 162 | 100 | 100 |
| 57 | 689 | 23 | 9.94 | 858 | 41 | 0 | 0 | 162 | 100 | 100 |
| 58 | 697 | 24 | 9.28 | 872 | 42 | 0 | 0 | 162 | 100 | 100 |
| 59 | 705 | 25 | 8.6 | 886 | 44 | 0 | 0 | 162 | 100 | 100 |
| 60 | 714 | 26 | 7.92 | 902 | 45 | 0 | 0 | 162 | 100 | 100 |
| 61 | 723 | 27 | 7.23 | 919 | 48 | 0 | 0 | 162 | 100 | 100 |
| 62 | 734 | 28 | 6.53 | 937 | 50 | 0 | 0 | 162 | 100 | 100 |
| 63 | 745 | 30 | 5.82 | 958 | 53 | 0 | 0 | 162 | 100 | 100 |
| 64 | 759 | 32 | 5.08 | 981 | 57 | 0 | 0 | 162 | 100 | 100 |
| 65 | 774 | 35 | 4.33 | 1009 | 61 | 0 | 0 | 162 | 100 | 100 |
| 66 | 792 | 38 | 3.55 | 1041 | 68 | 0 | 0 | 162 | 100 | 100 |
| 67 | 815 | 44 | 2.73 | 1082 | 77 | 0 | 0 | 162 | 100 | 100 |
| 68 | 847 | 53 | 1.88 | 1138 | 93 | 0 | 0 | 162 | 100 | 100 |
| 69 | 900 | 73 | 0.97 | 1231 | 130 | 0 | 0 | 162 | 100 | 100 |
| 70 | 988 | 132 | 0.3 | 1388 | 235 | 0 | 0 | 162 | 100 | 100 |

## Appendix Table H.11: 2021 Grade 7 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 154 | 155 | 0.3 | -241 | 329 | 0 | 0 | 0 | 0 | 0 |
| 1 | 258 | 86 | 0.97 | -21 | 182 | 0 | 0 | 0 | 0 | 0 |
| 2 | 319 | 61 | 1.89 | 108 | 131 | 0 | 0 | 0 | 0 | 0 |
| 3 | 355 | 51 | 2.77 | 186 | 108 | 0 | 0 | 0 | 0 | 0 |
| 4 | 382 | 45 | 3.59 | 243 | 95 | 1 | 0.6 | 1 | 0.6 | 0.3 |
| 5 | 403 | 40 | 4.38 | 288 | 86 | 1 | 0.6 | 2 | 1.2 | 0.9 |
| 6 | 421 | 37 | 5.12 | 326 | 79 | 4 | 2.5 | 6 | 3.7 | 2.5 |
| 7 | 437 | 35 | 5.82 | 359 | 74 | 5 | 3.1 | 11 | 6.8 | 5.2 |
| 8 | 450 | 33 | 6.49 | 388 | 71 | 9 | 5.6 | 20 | 12.3 | 9.6 |
| 9 | 463 | 32 | 7.11 | 414 | 67 | 14 | 8.6 | 34 | 21 | 16.7 |
| 10 | 474 | 30 | 7.71 | 439 | 65 | 18 | 11.1 | 52 | 32.1 | 26.5 |
| 11 | 485 | 29 | 8.26 | 461 | 62 | 19 | 11.7 | 71 | 43.8 | 38 |
| 12 | 495 | 29 | 8.78 | 482 | 61 | 13 | 8 | 84 | 51.9 | 47.8 |
| 13 | 504 | 28 | 9.27 | 502 | 59 | 14 | 8.6 | 98 | 60.5 | 56.2 |
| 14 | 513 | 27 | 9.72 | 521 | 58 | 9 | 5.6 | 107 | 66 | 63.3 |
| 15 | 521 | 27 | 10.14 | 539 | 56 | 8 | 4.9 | 115 | 71 | 68.5 |
| 16 | 530 | 26 | 10.53 | 557 | 55 | 8 | 4.9 | 123 | 75.9 | 73.5 |
| 17 | 538 | 26 | 10.88 | 573 | 54 | 10 | 6.2 | 133 | 82.1 | 79 |
| 18 | 545 | 25 | 11.21 | 590 | 54 | 5 | 3.1 | 138 | 85.2 | 83.6 |
| 19 | 553 | 25 | 11.5 | 605 | 53 | 9 | 5.6 | 147 | 90.7 | 88 |
| 20 | 560 | 25 | 11.77 | 621 | 52 | 4 | 2.5 | 151 | 93.2 | 92 |
| 21 | 567 | 24 | 12.02 | 636 | 52 | 0 | 0 | 151 | 93.2 | 93.2 |
| 22 | 574 | 24 | 12.24 | 651 | 51 | 1 | 0.6 | 152 | 93.8 | 93.5 |
| 23 | 581 | 24 | 12.43 | 665 | 51 | 1 | 0.6 | 153 | 94.4 | 94.1 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 588 | 24 | 12.61 | 680 | 51 | 3 | 1.9 | 156 | 96.3 | 95.4 |
| 25 | 594 | 24 | 12.76 | 694 | 50 | 0 | 0 | 156 | 96.3 | 96.3 |
| 26 | 601 | 24 | 12.89 | 708 | 50 | 0 | 0 | 156 | 96.3 | 96.3 |
| 27 | 607 | 23 | 13.01 | 722 | 50 | 1 | 0.6 | 157 | 96.9 | 96.6 |
| 28 | 614 | 23 | 13.1 | 735 | 50 | 2 | 1.2 | 159 | 98.1 | 97.5 |
| 29 | 620 | 23 | 13.17 | 749 | 49 | 0 | 0 | 159 | 98.1 | 98.1 |
| 30 | 627 | 23 | 13.22 | 763 | 49 | 0 | 0 | 159 | 98.1 | 98.1 |
| 31 | 633 | 23 | 13.24 | 776 | 49 | 2 | 1.2 | 161 | 99.4 | 98.8 |
| 32 | 639 | 23 | 13.24 | 790 | 49 | 0 | 0 | 161 | 99.4 | 99 |
| 33 | 646 | 23 | 13.2 | 803 | 49 | 0 | 0 | 161 | 99.4 | 99 |
| 34 | 652 | 23 | 13.12 | 817 | 50 | 0 | 0 | 161 | 99.4 | 99 |
| 35 | 659 | 23 | 13.01 | 831 | 50 | 0 | 0 | 161 | 99.4 | 99 |
| 36 | 665 | 24 | 12.85 | 845 | 50 | 0 | 0 | 161 | 99.4 | 99 |
| 37 | 672 | 24 | 12.65 | 859 | 50 | 0 | 0 | 161 | 99.4 | 99 |
| 38 | 679 | 24 | 12.42 | 873 | 51 | 0 | 0 | 161 | 99.4 | 99 |
| 39 | 686 | 24 | 12.14 | 888 | 52 | 0 | 0 | 161 | 99.4 | 99 |
| 40 | 693 | 25 | 11.83 | 903 | 52 | 0 | 0 | 161 | 99.4 | 99 |
| 41 | 700 | 25 | 11.49 | 918 | 53 | 0 | 0 | 161 | 99.4 | 99 |
| 42 | 707 | 25 | 11.13 | 934 | 54 | 0 | 0 | 161 | 99.4 | 99 |
| 43 | 715 | 26 | 10.74 | 950 | 55 | 0 | 0 | 161 | 99.4 | 99 |
| 44 | 723 | 26 | 10.34 | 967 | 56 | 1 | 0.6 | 162 | 100 | 99 |
| 45 | 731 | 27 | 9.92 | 985 | 57 | 0 | 0 | 162 | 100 | 100 |
| 46 | 740 | 27 | 9.5 | 1004 | 58 | 0 | 0 | 162 | 100 | 100 |
| 47 | 749 | 28 | 9.06 | 1023 | 60 | 0 | 0 | 162 | 100 | 100 |
| 48 | 759 | 29 | 8.61 | 1043 | 61 | 0 | 0 | 162 | 100 | 100 |
| 49 | 769 | 30 | 8.14 | 1065 | 63 | 0 | 0 | 162 | 100 | 100 |
| 50 | 780 | 31 | 7.66 | 1087 | 65 | 0 | 0 | 162 | 100 | 100 |
| 51 | 791 | 32 | 7.15 | 1112 | 67 | 0 | 0 | 162 | 100 | 100 |
| 52 | 803 | 33 | 6.63 | 1138 | 70 | 0 | 0 | 162 | 100 | 100 |
| 53 | 817 | 34 | 6.09 | 1166 | 73 | 0 | 0 | 162 | 100 | 100 |
| 54 | 831 | 36 | 5.53 | 1197 | 76 | 0 | 0 | 162 | 100 | 100 |
| 55 | 847 | 38 | 4.94 | 1231 | 81 | 0 | 0 | 162 | 100 | 100 |
| 56 | 866 | 41 | 4.34 | 1270 | 86 | 0 | 0 | 162 | 100 | 100 |
| 57 | 887 | 44 | 3.72 | 1315 | 93 | 0 | 0 | 162 | 100 | 100 |
| 58 | 911 | 48 | 3.08 | 1368 | 102 | 0 | 0 | 162 | 100 | 100 |
| 59 | 942 | 55 | 2.4 | 1433 | 116 | 0 | 0 | 162 | 100 | 100 |
| 60 | 984 | 65 | 1.69 | 1522 | 138 | 0 | 0 | 162 | 100 | 100 |
| 61 | 1051 | 89 | 0.9 | 1664 | 189 | 0 | 0 | 162 | 100 | 100 |
| 62 | 1159 | 157 | 0.29 | 1894 | 333 | 0 | 0 | 162 | 100 | 100 |

## Appendix Table H.12: 2021 Grade 8 MA IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 199 | 133 | 0.3 | -205 | 307 | 0 | 0 | 0 | 0 | 0 |
| 1 | 289 | 74 | 0.97 | 0 | 170 | 0 | 0 | 0 | 0 | 0 |
| 2 | 341 | 53 | 1.87 | 122 | 122 | 0 | 0 | 0 | 0 | 0 |
| 3 | 373 | 44 | 2.73 | 196 | 101 | 0 | 0 | 0 | 0 | 0 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 397 | 39 | 3.53 | 249 | 89 | 1 | 0.7 | 1 | 0.7 | 0.4 |
| 5 | 415 | 35 | 4.29 | 292 | 81 | 0 | 0 | 1 | 0.7 | 0.7 |
| 6 | 431 | 32 | 5.01 | 328 | 75 | 5 | 3.7 | 6 | 4.4 | 2.6 |
| 7 | 445 | 30 | 5.69 | 360 | 70 | 7 | 5.2 | 13 | 9.6 | 7 |
| 8 | 457 | 29 | 6.33 | 388 | 67 | 8 | 5.9 | 21 | 15.6 | 12.6 |
| 9 | 468 | 28 | 6.94 | 413 | 64 | 9 | 6.7 | 30 | 22.2 | 18.9 |
| 10 | 478 | 27 | 7.52 | 436 | 61 | 10 | 7.4 | 40 | 29.6 | 25.9 |
| 11 | 487 | 26 | 8.06 | 458 | 59 | 10 | 7.4 | 50 | 37 | 33.3 |
| 12 | 496 | 25 | 8.58 | 478 | 57 | 10 | 7.4 | 60 | 44.4 | 40.7 |
| 13 | 504 | 24 | 9.06 | 497 | 56 | 13 | 9.6 | 73 | 54.1 | 49.3 |
| 14 | 512 | 24 | 9.52 | 515 | 54 | 10 | 7.4 | 83 | 61.5 | 57.8 |
| 15 | 519 | 23 | 9.96 | 532 | 53 | 12 | 8.9 | 95 | 70.4 | 65.9 |
| 16 | 526 | 23 | 10.37 | 548 | 52 | 7 | 5.2 | 102 | 75.6 | 73 |
| 17 | 533 | 22 | 10.76 | 564 | 51 | 7 | 5.2 | 109 | 80.7 | 78.1 |
| 18 | 540 | 22 | 11.12 | 580 | 50 | 2 | 1.5 | 111 | 82.2 | 81.5 |
| 19 | 546 | 21 | 11.46 | 594 | 49 | 4 | 3 | 115 | 85.2 | 83.7 |
| 20 | 553 | 21 | 11.79 | 609 | 49 | 6 | 4.4 | 121 | 89.6 | 87.4 |
| 21 | 559 | 21 | 12.09 | 623 | 48 | 3 | 2.2 | 124 | 91.9 | 90.7 |
| 22 | 565 | 21 | 12.37 | 636 | 48 | 0 | 0 | 124 | 91.9 | 91.9 |
| 23 | 571 | 20 | 12.63 | 650 | 47 | 3 | 2.2 | 127 | 94.1 | 93 |
| 24 | 576 | 20 | 12.87 | 663 | 47 | 1 | 0.7 | 128 | 94.8 | 94.4 |
| 25 | 582 | 20 | 13.09 | 676 | 46 | 0 | 0 | 128 | 94.8 | 94.8 |
| 26 | 587 | 20 | 13.29 | 689 | 46 | 2 | 1.5 | 130 | 96.3 | 95.6 |
| 27 | 593 | 20 | 13.46 | 701 | 46 | 1 | 0.7 | 131 | 97 | 96.7 |
| 28 | 598 | 20 | 13.61 | 714 | 45 | 2 | 1.5 | 133 | 98.5 | 97.8 |
| 29 | 603 | 20 | 13.74 | 726 | 45 | 0 | 0 | 133 | 98.5 | 98.5 |
| 30 | 609 | 20 | 13.83 | 738 | 45 | 0 | 0 | 133 | 98.5 | 98.5 |
| 31 | 614 | 19 | 13.9 | 750 | 45 | 0 | 0 | 133 | 98.5 | 98.5 |
| 32 | 619 | 19 | 13.93 | 762 | 45 | 0 | 0 | 133 | 98.5 | 98.5 |
| 33 | 624 | 19 | 13.93 | 774 | 45 | 0 | 0 | 133 | 98.5 | 98.5 |
| 34 | 630 | 20 | 13.9 | 786 | 45 | 1 | 0.7 | 134 | 99.3 | 98.9 |
| 35 | 635 | 20 | 13.82 | 798 | 45 | 0 | 0 | 134 | 99.3 | 99 |
| 36 | 640 | 20 | 13.71 | 810 | 45 | 0 | 0 | 134 | 99.3 | 99 |
| 37 | 645 | 20 | 13.56 | 823 | 45 | 0 | 0 | 134 | 99.3 | 99 |
| 38 | 651 | 20 | 13.36 | 835 | 46 | 0 | 0 | 134 | 99.3 | 99 |
| 39 | 656 | 20 | 13.13 | 848 | 46 | 0 | 0 | 134 | 99.3 | 99 |
| 40 | 662 | 20 | 12.86 | 861 | 47 | 0 | 0 | 134 | 99.3 | 99 |
| 41 | 668 | 21 | 12.54 | 874 | 47 | 0 | 0 | 134 | 99.3 | 99 |
| 42 | 674 | 21 | 12.19 | 887 | 48 | 0 | 0 | 134 | 99.3 | 99 |
| 43 | 680 | 21 | 11.8 | 901 | 49 | 1 | 0.7 | 135 | 100 | 99 |
| 44 | 686 | 22 | 11.38 | 916 | 50 | 0 | 0 | 135 | 100 | 100 |
| 45 | 692 | 22 | 10.93 | 931 | 51 | 0 | 0 | 135 | 100 | 100 |
| 46 | 699 | 22 | 10.44 | 946 | 52 | 0 | 0 | 135 | 100 | 100 |
| 47 | 706 | 23 | 9.94 | 963 | 53 | 0 | 0 | 135 | 100 | 100 |
| 48 | 714 | 24 | 9.41 | 980 | 55 | 0 | 0 | 135 | 100 | 100 |
| 49 | 722 | 24 | 8.86 | 999 | 56 | 0 | 0 | 135 | 100 | 100 |
| 50 | 730 | 25 | 8.29 | 1018 | 58 | 0 | 0 | 135 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 51 | 739 | 26 | 7.71 | 1039 | 60 | 0 | 0 | 135 | 100 | 100 |
| 52 | 749 | 27 | 7.11 | 1062 | 63 | 0 | 0 | 135 | 100 | 100 |
| 53 | 760 | 29 | 6.5 | 1086 | 66 | 0 | 0 | 135 | 100 | 100 |
| 54 | 772 | 30 | 5.88 | 1113 | 69 | 0 | 0 | 135 | 100 | 100 |
| 55 | 785 | 32 | 5.24 | 1144 | 73 | 0 | 0 | 135 | 100 | 100 |
| 56 | 800 | 34 | 4.58 | 1178 | 78 | 0 | 0 | 135 | 100 | 100 |
| 57 | 817 | 37 | 3.9 | 1217 | 85 | 0 | 0 | 135 | 100 | 100 |
| 58 | 837 | 41 | 3.2 | 1265 | 94 | 0 | 0 | 135 | 100 | 100 |
| 59 | 863 | 46 | 2.48 | 1324 | 106 | 0 | 0 | 135 | 100 | 100 |
| 60 | 898 | 55 | 1.72 | 1404 | 128 | 0 | 0 | 135 | 100 | 100 |
| 61 | 955 | 76 | 0.91 | 1535 | 175 | 0 | 0 | 135 | 100 | 100 |
| 62 | 1047 | 135 | 0.29 | 1748 | 311 | 0 | 0 | 135 | 100 | 100 |

## Appendix Table H.13: 2021 Grade 5 SC IRT Statistics

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 181 | 127 | 0.3 | -138 | 255 | 0 | 0 | 0 | 0 | 0 |
| 1 | 266 | 71 | 0.97 | 32 | 141 | 0 | 0 | 0 | 0 | 0 |
| 2 | 316 | 51 | 1.88 | 133 | 101 | 0 | 0 | 0 | 0 | 0 |
| 3 | 347 | 42 | 2.75 | 194 | 84 | 1 | 0.4 | 1 | 0.4 | 0.2 |
| 4 | 369 | 37 | 3.56 | 238 | 74 | 0 | 0 | 1 | 0.4 | 0.4 |
| 5 | 387 | 33 | 4.34 | 273 | 67 | 5 | 2 | 6 | 2.4 | 1.4 |
| 6 | 401 | 31 | 5.08 | 303 | 62 | 5 | 2 | 11 | 4.4 | 3.4 |
| 7 | 414 | 29 | 5.78 | 328 | 58 | 4 | 1.6 | 15 | 6 | 5.2 |
| 8 | 425 | 27 | 6.46 | 351 | 55 | 5 | 2 | 20 | 8 | 7 |
| 9 | 436 | 26 | 7.1 | 371 | 52 | 7 | 2.8 | 27 | 10.8 | 9.4 |
| 10 | 445 | 25 | 7.72 | 390 | 50 | 6 | 2.4 | 33 | 13.1 | 12 |
| 11 | 454 | 24 | 8.32 | 408 | 48 | 20 | 8 | 53 | 21.1 | 17.1 |
| 12 | 462 | 23 | 8.89 | 424 | 47 | 13 | 5.2 | 66 | 26.3 | 23.7 |
| 13 | 469 | 23 | 9.44 | 439 | 45 | 8 | 3.2 | 74 | 29.5 | 27.9 |
| 14 | 477 | 22 | 9.97 | 453 | 44 | 13 | 5.2 | 87 | 34.7 | 32.1 |
| 15 | 483 | 21 | 10.48 | 467 | 43 | 11 | 4.4 | 98 | 39 | 36.9 |
| 16 | 490 | 21 | 10.98 | 480 | 42 | 15 | 6 | 113 | 45 | 42 |
| 17 | 496 | 21 | 11.45 | 492 | 41 | 10 | 4 | 123 | 49 | 47 |
| 18 | 502 | 20 | 11.91 | 504 | 40 | 12 | 4.8 | 135 | 53.8 | 51.4 |
| 19 | 508 | 20 | 12.35 | 515 | 40 | 10 | 4 | 145 | 57.8 | 55.8 |
| 20 | 513 | 19 | 12.78 | 527 | 39 | 5 | 2 | 150 | 59.8 | 58.8 |
| 21 | 519 | 19 | 13.18 | 537 | 38 | 13 | 5.2 | 163 | 64.9 | 62.4 |
| 22 | 524 | 19 | 13.58 | 548 | 38 | 10 | 4 | 173 | 68.9 | 66.9 |
| 23 | 529 | 19 | 13.95 | 558 | 37 | 13 | 5.2 | 186 | 74.1 | 71.5 |
| 24 | 534 | 18 | 14.32 | 568 | 37 | 7 | 2.8 | 193 | 76.9 | 75.5 |
| 25 | 539 | 18 | 14.66 | 577 | 36 | 6 | 2.4 | 199 | 79.3 | 78.1 |
| 26 | 543 | 18 | 14.99 | 587 | 36 | 7 | 2.8 | 206 | 82.1 | 80.7 |
| 27 | 548 | 18 | 15.3 | 596 | 36 | 4 | 1.6 | 210 | 83.7 | 82.9 |
| 28 | 552 | 18 | 15.59 | 605 | 35 | 6 | 2.4 | 216 | 86.1 | 84.9 |
| 29 | 557 | 17 | 15.86 | 614 | 35 | 3 | 1.2 | 219 | 87.3 | 86.7 |
| 30 | 561 | 17 | 16.11 | 622 | 35 | 4 | 1.6 | 223 | 88.8 | 88 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 565 | 17 | 16.34 | 631 | 34 | 4 | 1.6 | 227 | 90.4 | 89.6 |
| 32 | 570 | 17 | 16.54 | 639 | 34 | 4 | 1.6 | 231 | 92 | 91.2 |
| 33 | 574 | 17 | 16.71 | 648 | 34 | 3 | 1.2 | 234 | 93.2 | 92.6 |
| 34 | 578 | 17 | 16.85 | 656 | 34 | 2 | 0.8 | 236 | 94 | 93.6 |
| 35 | 582 | 17 | 16.96 | 664 | 34 | 4 | 1.6 | 240 | 95.6 | 94.8 |
| 36 | 586 | 17 | 17.02 | 672 | 34 | 3 | 1.2 | 243 | 96.8 | 96.2 |
| 37 | 590 | 17 | 17.05 | 680 | 34 | 1 | 0.4 | 244 | 97.2 | 97 |
| 38 | 594 | 17 | 17.03 | 689 | 34 | 0 | 0 | 244 | 97.2 | 97.2 |
| 39 | 598 | 17 | 16.97 | 697 | 34 | 2 | 0.8 | 246 | 98 | 97.6 |
| 40 | 602 | 17 | 16.86 | 705 | 34 | 2 | 0.8 | 248 | 98.8 | 98.4 |
| 41 | 607 | 17 | 16.7 | 713 | 34 | 1 | 0.4 | 249 | 99.2 | 99 |
| 42 | 611 | 17 | 16.49 | 722 | 34 | 1 | 0.4 | 250 | 99.6 | 99 |
| 43 | 615 | 17 | 16.23 | 730 | 34 | 0 | 0 | 250 | 99.6 | 99 |
| 44 | 619 | 17 | 15.93 | 739 | 35 | 0 | 0 | 250 | 99.6 | 99 |
| 45 | 624 | 18 | 15.57 | 748 | 35 | 1 | 0.4 | 251 | 100 | 99 |
| 46 | 628 | 18 | 15.17 | 757 | 36 | 0 | 0 | 251 | 100 | 100 |
| 47 | 633 | 18 | 14.72 | 766 | 36 | 0 | 0 | 251 | 100 | 100 |
| 48 | 638 | 18 | 14.24 | 776 | 37 | 0 | 0 | 251 | 100 | 100 |
| 49 | 643 | 19 | 13.71 | 785 | 38 | 0 | 0 | 251 | 100 | 100 |
| 50 | 648 | 19 | 13.16 | 796 | 38 | 0 | 0 | 251 | 100 | 100 |
| 51 | 653 | 20 | 12.58 | 807 | 39 | 0 | 0 | 251 | 100 | 100 |
| 52 | 659 | 20 | 11.97 | 818 | 40 | 0 | 0 | 251 | 100 | 100 |
| 53 | 665 | 21 | 11.34 | 830 | 41 | 0 | 0 | 251 | 100 | 100 |
| 54 | 671 | 21 | 10.7 | 842 | 42 | 0 | 0 | 251 | 100 | 100 |
| 55 | 678 | 22 | 10.04 | 856 | 44 | 0 | 0 | 251 | 100 | 100 |
| 56 | 685 | 23 | 9.37 | 870 | 45 | 0 | 0 | 251 | 100 | 100 |
| 57 | 693 | 24 | 8.69 | 886 | 47 | 0 | 0 | 251 | 100 | 100 |
| 58 | 701 | 25 | 8 | 902 | 49 | 0 | 0 | 251 | 100 | 100 |
| 59 | 710 | 26 | 7.3 | 920 | 51 | 0 | 0 | 251 | 100 | 100 |
| 60 | 720 | 27 | 6.59 | 940 | 54 | 0 | 0 | 251 | 100 | 100 |
| 61 | 731 | 29 | 5.87 | 963 | 57 | 0 | 0 | 251 | 100 | 100 |
| 62 | 744 | 31 | 5.12 | 988 | 61 | 0 | 0 | 251 | 100 | 100 |
| 63 | 759 | 33 | 4.36 | 1017 | 67 | 0 | 0 | 251 | 100 | 100 |
| 64 | 776 | 37 | 3.57 | 1053 | 74 | 0 | 0 | 251 | 100 | 100 |
| 65 | 798 | 42 | 2.74 | 1097 | 84 | 0 | 0 | 251 | 100 | 100 |
| 66 | 829 | 51 | 1.88 | 1158 | 101 | 0 | 0 | 251 | 100 | 100 |
| 67 | 879 | 71 | 0.97 | 1259 | 141 | 0 | 0 | 251 | 100 | 100 |
| 68 | 965 | 128 | 0.3 | 1429 | 255 | 0 | 0 | 251 | 100 | 100 |

### Appendix Table H.14: 2021 Grade 8 SC IRT Statistic

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 221 | 124 | 0.3 | -104 | 257 | 0 | 0 | 0 | 0 | 0 |
| 1 | 304 | 69 | 0.97 | 68 | 142 | 0 | 0 | 0 | 0 | 0 |
| 2 | 354 | 49 | 1.88 | 169 | 102 | 0 | 0 | 0 | 0 | 0 |
| 3 | 383 | 41 | 2.75 | 230 | 84 | 1 | 0.7 | 1 | 0.7 | 0.4 |
| 4 | 405 | 36 | 3.57 | 275 | 74 | 1 | 0.7 | 2 | 1.4 | 1.1 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 422 | 32 | 4.36 | 310 | 67 | 3 | 2.2 | 5 | 3.6 | 2.5 |
| 6 | 436 | 30 | 5.12 | 340 | 62 | 5 | 3.6 | 10 | 7.2 | 5.4 |
| 7 | 449 | 28 | 5.86 | 365 | 58 | 4 | 2.9 | 14 | 10.1 | 8.7 |
| 8 | 459 | 26 | 6.57 | 388 | 55 | 5 | 3.6 | 19 | 13.8 | 12 |
| 9 | 469 | 25 | 7.27 | 408 | 52 | 12 | 8.7 | 31 | 22.5 | 18.1 |
| 10 | 478 | 24 | 7.94 | 426 | 50 | 8 | 5.8 | 39 | 28.3 | 25.4 |
| 11 | 486 | 23 | 8.59 | 443 | 48 | 5 | 3.6 | 44 | 31.9 | 30.1 |
| 12 | 494 | 22 | 9.21 | 459 | 46 | 6 | 4.3 | 50 | 36.2 | 34.1 |
| 13 | 501 | 22 | 9.8 | 474 | 45 | 10 | 7.2 | 60 | 43.5 | 39.9 |
| 14 | 508 | 21 | 10.36 | 488 | 43 | 5 | 3.6 | 65 | 47.1 | 45.3 |
| 15 | 514 | 21 | 10.88 | 501 | 42 | 11 | 8 | 76 | 55.1 | 51.1 |
| 16 | 520 | 20 | 11.36 | 513 | 42 | 6 | 4.3 | 82 | 59.4 | 57.2 |
| 17 | 526 | 20 | 11.81 | 526 | 41 | 7 | 5.1 | 89 | 64.5 | 62 |
| 18 | 532 | 19 | 12.22 | 537 | 40 | 5 | 3.6 | 94 | 68.1 | 66.3 |
| 19 | 537 | 19 | 12.59 | 548 | 39 | 6 | 4.3 | 100 | 72.5 | 70.3 |
| 20 | 543 | 19 | 12.93 | 559 | 39 | 3 | 2.2 | 103 | 74.6 | 73.6 |
| 21 | 548 | 19 | 13.23 | 570 | 38 | 2 | 1.4 | 105 | 76.1 | 75.4 |
| 22 | 553 | 18 | 13.51 | 581 | 38 | 3 | 2.2 | 108 | 78.3 | 77.2 |
| 23 | 558 | 18 | 13.75 | 591 | 38 | 4 | 2.9 | 112 | 81.2 | 79.7 |
| 24 | 563 | 18 | 13.96 | 601 | 37 | 1 | 0.7 | 113 | 81.9 | 81.5 |
| 25 | 568 | 18 | 14.14 | 611 | 37 | 5 | 3.6 | 118 | 85.5 | 83.7 |
| 26 | 572 | 18 | 14.29 | 621 | 37 | 4 | 2.9 | 122 | 88.4 | 87 |
| 27 | 577 | 18 | 14.41 | 631 | 37 | 2 | 1.4 | 124 | 89.9 | 89.1 |
| 28 | 582 | 18 | 14.5 | 640 | 37 | 5 | 3.6 | 129 | 93.5 | 91.7 |
| 29 | 586 | 18 | 14.55 | 650 | 37 | 0 | 0 | 129 | 93.5 | 93.5 |
| 30 | 591 | 18 | 14.57 | 659 | 37 | 0 | 0 | 129 | 93.5 | 93.5 |
| 31 | 596 | 18 | 14.56 | 669 | 37 | 0 | 0 | 129 | 93.5 | 93.5 |
| 32 | 600 | 18 | 14.5 | 679 | 37 | 3 | 2.2 | 132 | 95.7 | 94.6 |
| 33 | 605 | 18 | 14.41 | 688 | 37 | 3 | 2.2 | 135 | 97.8 | 96.7 |
| 34 | 610 | 18 | 14.29 | 698 | 37 | 1 | 0.7 | 136 | 98.6 | 98.2 |
| 35 | 615 | 18 | 14.12 | 708 | 37 | 1 | 0.7 | 137 | 99.3 | 98.9 |
| 36 | 619 | 18 | 13.93 | 718 | 38 | 0 | 0 | 137 | 99.3 | 99 |
| 37 | 624 | 18 | 13.7 | 728 | 38 | 0 | 0 | 137 | 99.3 | 99 |
| 38 | 629 | 19 | 13.44 | 738 | 38 | 1 | 0.7 | 138 | 100 | 99 |
| 39 | 634 | 19 | 13.16 | 749 | 39 | 0 | 0 | 138 | 100 | 100 |
| 40 | 640 | 19 | 12.86 | 760 | 39 | 0 | 0 | 138 | 100 | 100 |
| 41 | 645 | 19 | 12.54 | 771 | 40 | 0 | 0 | 138 | 100 | 100 |
| 42 | 651 | 19 | 12.2 | 782 | 40 | 0 | 0 | 138 | 100 | 100 |
| 43 | 656 | 20 | 11.86 | 794 | 41 | 0 | 0 | 138 | 100 | 100 |
| 44 | 662 | 20 | 11.5 | 806 | 41 | 0 | 0 | 138 | 100 | 100 |
| 45 | 668 | 20 | 11.14 | 818 | 42 | 0 | 0 | 138 | 100 | 100 |
| 46 | 674 | 21 | 10.77 | 831 | 43 | 0 | 0 | 138 | 100 | 100 |
| 47 | 681 | 21 | 10.39 | 844 | 43 | 0 | 0 | 138 | 100 | 100 |
| 48 | 687 | 21 | 10 | 858 | 44 | 0 | 0 | 138 | 100 | 100 |
| 49 | 694 | 22 | 9.61 | 872 | 45 | 0 | 0 | 138 | 100 | 100 |
| 50 | 701 | 22 | 9.21 | 887 | 46 | 0 | 0 | 138 | 100 | 100 |
| 51 | 709 | 23 | 8.79 | 902 | 47 | 0 | 0 | 138 | 100 | 100 |

| SCORE | MEASURE | S.E. | INFO | NORMED | S.E.NORMED | FREQ | FREQ% | CUM.FREQ | CUMFREQ% | PERCENTILE |
|---|---|---|---|---|---|---|---|---|---|---|
| 52 | 717 | 23 | 8.37 | 919 | 48 | 0 | 0 | 138 | 100 | 100 |
| 53 | 725 | 24 | 7.93 | 936 | 50 | 0 | 0 | 138 | 100 | 100 |
| 54 | 734 | 25 | 7.48 | 954 | 51 | 0 | 0 | 138 | 100 | 100 |
| 55 | 743 | 26 | 7.01 | 973 | 53 | 0 | 0 | 138 | 100 | 100 |
| 56 | 753 | 27 | 6.53 | 994 | 55 | 0 | 0 | 138 | 100 | 100 |
| 57 | 764 | 28 | 6.03 | 1016 | 57 | 0 | 0 | 138 | 100 | 100 |
| 58 | 776 | 29 | 5.51 | 1041 | 60 | 0 | 0 | 138 | 100 | 100 |
| 59 | 789 | 30 | 4.96 | 1067 | 63 | 0 | 0 | 138 | 100 | 100 |
| 60 | 803 | 32 | 4.39 | 1097 | 67 | 0 | 0 | 138 | 100 | 100 |
| 61 | 820 | 35 | 3.79 | 1132 | 72 | 0 | 0 | 138 | 100 | 100 |
| 62 | 839 | 38 | 3.16 | 1172 | 79 | 0 | 0 | 138 | 100 | 100 |
| 63 | 864 | 43 | 2.48 | 1222 | 89 | 0 | 0 | 138 | 100 | 100 |
| 64 | 896 | 51 | 1.74 | 1289 | 106 | 0 | 0 | 138 | 100 | 100 |
| 65 | 948 | 70 | 0.93 | 1396 | 145 | 0 | 0 | 138 | 100 | 100 |
| 66 | 1034 | 125 | 0.29 | 1573 | 259 | 0 | 0 | 138 | 100 | 100 |

# Appendix I: : Differential Item Functioning tables

This appendix contains the details of the Differential Item Functioning (DIF) tables for FRL, gender and survey scale from Winsteps.

### Appendix Table I.1: Hawaiian Language Arts: DIF FRL

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 93 | C | 0.02 | -2.22 | 0.19 | D | -0.03 | -1.90 | 0.23 | -0.32 | 0.29 | -1.08 | 253 | 0.28 | 0.65 | 0.42 | -0.31 | 34 | 1 |
| HLA | 3 | 101 | C | -0.04 | 0.38 | 0.21 | D | 0.04 | -0.08 | 0.20 | 0.46 | 0.29 | 1.56 | 273 | 0.12 | 0.72 | 0.40 | 0.31 | 34 | 2 |
| HLA | 3 | 381 | C | 0.00 | 0.13 | 0.20 | D | 0.00 | 0.18 | 0.21 | -0.05 | 0.29 | -0.17 | 267 | 0.86 | 0.24 | 0.62 | -0.24 | 34 | 3 |
| HLA | 3 | 108 | C | -0.05 | 0.29 | 0.21 | D | 0.06 | -0.33 | 0.20 | 0.62 | 0.29 | 2.14 | 272 | 0.03 | 2.42 | 0.12 | 0.59 | 34 | 4 |
| HLA | 3 | 94 | C | 0.00 | -1.91 | 0.18 | D | 0.00 | -1.91 | 0.23 | 0.00 | 0.29 | 0.00 | 247 | 1.00 | 0.00 | 0.99 | -0.07 | 34 | 5 |
| HLA | 3 | 99 | C | 0.01 | -0.51 | 0.18 | D | -0.01 | -0.45 | 0.20 | -0.06 | 0.27 | -0.23 | 261 | 0.82 | 0.95 | 0.33 | -0.39 | 34 | 6 |
| HLA | 3 | 89 | C | 0.02 | -0.76 | 0.18 | D | -0.03 | -0.49 | 0.20 | -0.27 | 0.27 | -1.02 | 258 | 0.31 | 0.15 | 0.70 | -0.14 | 34 | 7 |
| HLA | 3 | 1026 | C | -0.04 | 0.95 | 0.25 | D | 0.05 | 0.31 | 0.21 | 0.64 | 0.33 | 1.96 | 274 | 0.05 | 0.83 | 0.36 | 0.48 | 34 | 8 |
| HLA | 3 | 84 | C | -0.01 | -0.91 | 0.17 | D | 0.01 | -1.01 | 0.20 | 0.10 | 0.27 | 0.37 | 256 | 0.71 | 0.27 | 0.60 | -0.24 | 34 | 9 |
| HLA | 3 | 88 | C | 0.01 | 0.13 | 0.20 | D | -0.01 | 0.22 | 0.21 | -0.09 | 0.29 | -0.32 | 267 | 0.75 | 0.23 | 0.63 | -0.24 | 34 | 10 |
| HLA | 3 | 90 | C | -0.02 | -2.08 | 0.18 | D | 0.03 | -2.41 | 0.25 | 0.33 | 0.31 | 1.06 | 233 | 0.29 | 0.02 | 0.88 | 0.11 | 34 | 11 |
| HLA | 3 | 91 | C | 0.02 | -1.91 | 0.18 | D | -0.02 | -1.71 | 0.22 | -0.21 | 0.28 | -0.73 | 252 | 0.46 | 1.88 | 0.17 | -0.50 | 34 | 12 |
| HLA | 3 | 87 | C | -0.01 | 1.01 | 0.25 | D | 0.02 | 0.80 | 0.23 | 0.22 | 0.34 | 0.64 | 274 | 0.53 | 0.15 | 0.70 | 0.25 | 34 | 13 |
| HLA | 3 | 92 | C | 0.00 | 0.07 | 0.20 | D | 0.00 | 0.05 | 0.21 | 0.02 | 0.29 | 0.07 | 268 | 0.94 | 0.01 | 0.90 | -0.11 | 34 | 14 |
| HLA | 3 | 1023 | C | 0.02 | 0.67 | 0.23 | D | -0.03 | 1.08 | 0.24 | -0.41 | 0.33 | -1.22 | 266 | 0.22 | 2.22 | 0.14 | -0.77 | 34 | 15 |
| HLA | 3 | 95 | C | 0.01 | 0.09 | 0.20 | D | -0.01 | 0.22 | 0.21 | -0.13 | 0.29 | -0.46 | 266 | 0.64 | 0.40 | 0.53 | -0.29 | 34 | 16 |
| HLA | 3 | 97 | C | -0.04 | 0.38 | 0.21 | D | 0.05 | -0.12 | 0.20 | 0.50 | 0.29 | 1.71 | 273 | 0.09 | 0.68 | 0.41 | 0.34 | 34 | 17 |
| HLA | 3 | 96 | C | -0.03 | 1.22 | 0.27 | D | 0.04 | 0.69 | 0.23 | 0.53 | 0.35 | 1.49 | 273 | 0.14 | 0.91 | 0.34 | 0.52 | 34 | 18 |
| HLA | 3 | 107 | C | -0.01 | -0.94 | 0.17 | D | 0.01 | -1.05 | 0.20 | 0.11 | 0.27 | 0.41 | 256 | 0.68 | 0.43 | 0.51 | 0.21 | 34 | 19 |
| HLA | 3 | 104 | C | -0.04 | 2.11 | 0.38 | D | 0.05 | 1.07 | 0.24 | 1.04 | 0.45 | 2.32 | 252 | 0.02 | 0.51 | 0.48 | 0.54 | 34 | 20 |
| HLA | 3 | 383 | C | 0.00 | -1.71 | 0.18 | D | 0.00 | -1.69 | 0.22 | -0.02 | 0.28 | -0.07 | 247 | 0.94 | 0.67 | 0.41 | 0.26 | 34 | 21 |
| HLA | 3 | 161 | C | 0.01 | -0.57 | 0.18 | D | -0.02 | -0.42 | 0.20 | -0.15 | 0.27 | -0.56 | 258 | 0.57 | 0.05 | 0.82 | -0.12 | 34 | 22 |
| HLA | 3 | 162 | C | 0.04 | -1.21 | 0.17 | D | -0.05 | -0.79 | 0.20 | -0.42 | 0.27 | -1.60 | 254 | 0.11 | 3.25 | 0.07 | -0.60 | 34 | 23 |
| HLA | 3 | 1025 | C | 0.01 | 1.37 | 0.28 | D | -0.02 | 1.68 | 0.28 | -0.31 | 0.40 | -0.76 | 270 | 0.45 | 0.00 | 0.98 | 0.11 | 34 | 24 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 110 | C | 0.01 | -0.14 | 0.19 | D | -0.01 | -0.01 | 0.21 | -0.13 | 0.28 | -0.46 | 263 | 0.64 | 0.21 | 0.65 | -0.19 | 34 | 25 |
| HLA | 3 | 113 | C | -0.01 | 2.87 | 0.52 | D | 0.02 | 2.13 | 0.32 | 0.73 | 0.61 | 1.20 | 248 | 0.23 | 0.44 | 0.51 | 0.62 | 34 | 26 |
| HLA | 3 | 1024 | C | -0.07 | 0.87 | 0.16 | D | 0.09 | 0.47 | 0.12 | 0.40 | 0.20 | 2.01 | 268 | 0.05 | 0.36 | 0.55 | 0.23 | 34 | 27 |
| HLA | 3 | 117 | C | -0.04 | -1.06 | 0.17 | D | 0.05 | -1.50 | 0.21 | 0.44 | 0.27 | 1.62 | 247 | 0.11 | 0.29 | 0.59 | 0.20 | 34 | 28 |
| HLA | 3 | 1020 | C | -0.03 | 1.18 | 0.21 | D | 0.04 | 0.89 | 0.16 | 0.29 | 0.27 | 1.09 | 268 | 0.28 | 1.48 | 0.22 | 0.58 | 34 | 29 |
| HLA | 3 | 114 | C | -0.01 | -0.48 | 0.18 | D | 0.01 | -0.58 | 0.20 | 0.11 | 0.27 | 0.39 | 260 | 0.69 | 1.70 | 0.19 | 0.42 | 34 | 30 |
| HLA | 3 | 112 | C | -0.01 | 2.11 | 0.38 | D | 0.02 | 1.68 | 0.28 | 0.43 | 0.47 | 0.91 | 267 | 0.36 | 0.01 | 0.92 | 0.17 | 34 | 31 |
| HLA | 3 | 1022 | C | 0.03 | -0.41 | 0.18 | D | -0.04 | -0.01 | 0.21 | -0.41 | 0.28 | -1.47 | 258 | 0.14 | 1.30 | 0.25 | 0.37 | 34 | 32 |
| HLA | 3 | 119 | C | 0.03 | -0.31 | 0.18 | D | -0.04 | 0.08 | 0.21 | -0.39 | 0.28 | -1.41 | 259 | 0.16 | 0.07 | 0.79 | 0.11 | 34 | 33 |
| HLA | 3 | 379 | C | -0.02 | 2.17 | 0.27 | D | 0.02 | 1.85 | 0.21 | 0.32 | 0.34 | 0.95 | 269 | 0.34 | 0.11 | 0.74 | 0.14 | 34 | 34 |
| HLA | 3 | 130 | C | 0.02 | -0.34 | 0.18 | D | -0.02 | -0.13 | 0.20 | -0.21 | 0.27 | -0.77 | 260 | 0.44 | 0.05 | 0.82 | 0.11 | 34 | 35 |
| HLA | 3 | 125 | C | 0.00 | -0.64 | 0.18 | D | -0.01 | -0.58 | 0.20 | -0.05 | 0.27 | -0.20 | 258 | 0.84 | 0.10 | 0.75 | -0.14 | 34 | 36 |
| HLA | 3 | 143 | C | 0.03 | 0.29 | 0.21 | D | -0.03 | 0.69 | 0.23 | -0.40 | 0.31 | -1.29 | 262 | 0.20 | 0.08 | 0.77 | -0.15 | 34 | 37 |
| HLA | 3 | 123 | C | 0.02 | -0.61 | 0.18 | D | -0.03 | -0.38 | 0.20 | -0.23 | 0.27 | -0.85 | 257 | 0.40 | 0.21 | 0.65 | 0.18 | 34 | 38 |
| HLA | 3 | 137 | C | 0.03 | -0.35 | 0.18 | D | -0.04 | 0.04 | 0.21 | -0.39 | 0.28 | -1.39 | 258 | 0.17 | 1.47 | 0.23 | -0.41 | 34 | 39 |
| HLA | 3 | 127 | C | 0.00 | 3.17 | 0.59 | D | 0.00 | 3.41 | 0.52 | -0.24 | 0.79 | -0.30 | 272 | 0.77 | 0.64 | 0.42 | -1.47 | 34 | 40 |
| HLA | 3 | 158 | C | -0.06 | 0.09 | 0.20 | D | 0.07 | -0.58 | 0.20 | 0.67 | 0.28 | 2.37 | 268 | 0.02 | 6.22 | 0.01 | 0.75 | 34 | 41 |
| HLA | 3 | 1021 | C | 0.05 | -1.19 | 0.17 | D | -0.07 | -0.62 | 0.20 | -0.56 | 0.27 | -2.12 | 254 | 0.03 | 1.47 | 0.22 | -0.40 | 34 | 42 |
| HLA | 3 | 384 | C | -0.02 | -1.37 | 0.17 | D | 0.02 | -1.55 | 0.21 | 0.18 | 0.28 | 0.67 | 247 | 0.50 | 0.25 | 0.62 | 0.19 | 34 | 43 |
| HLA | 3 | 156 | C | 0.00 | 0.21 | 0.20 | D | 0.00 | 0.26 | 0.21 | -0.05 | 0.29 | -0.17 | 266 | 0.86 | 0.78 | 0.38 | 0.33 | 34 | 44 |
| HLA | 3 | 150 | C | 0.00 | -1.66 | 0.18 | D | 0.00 | -1.66 | 0.22 | 0.00 | 0.28 | 0.00 | 247 | 1.00 | 0.03 | 0.87 | -0.10 | 34 | 45 |
| HLA | 3 | 138 | C | -0.03 | 1.33 | 0.20 | D | 0.04 | 0.99 | 0.17 | 0.33 | 0.26 | 1.26 | 271 | 0.21 | 0.11 | 0.74 | 0.12 | 34 | 46 |
| HLA | 3 | 145 | C | -0.03 | -1.13 | 0.17 | D | 0.04 | -1.46 | 0.21 | 0.33 | 0.27 | 1.22 | 248 | 0.22 | 0.00 | 0.95 | 0.08 | 34 | 47 |
| HLA | 3 | 1286 | C | 0.00 | 1.74 | 0.33 | D | 0.00 | 1.85 | 0.30 | -0.11 | 0.44 | -0.24 | 272 | 0.81 | 0.02 | 0.89 | -0.22 | 34 | 48 |
| HLA | 3 | 1282 | C | 0.03 | -0.55 | 0.18 | D | -0.04 | -0.17 | 0.20 | -0.37 | 0.27 | -1.37 | 257 | 0.17 | 0.78 | 0.38 | -0.32 | 34 | 49 |
| HLA | 3 | 1285 | C | -0.01 | 2.86 | 0.52 | D | 0.01 | 2.48 | 0.36 | 0.38 | 0.63 | 0.60 | 259 | 0.55 | 0.14 | 0.71 | -0.06 | 34 | 50 |
| HLA | 3 | 1277 | C | 0.01 | 0.38 | 0.21 | D | -0.02 | 0.59 | 0.22 | -0.21 | 0.31 | -0.68 | 265 | 0.50 | 2.20 | 0.14 | 0.53 | 34 | 51 |
| HLA | 3 | 1281 | C | 0.00 | -0.51 | 0.18 | D | -0.01 | -0.46 | 0.20 | -0.05 | 0.27 | -0.19 | 259 | 0.85 | 0.01 | 0.93 | 0.02 | 34 | 52 |
| HLA | 3 | 1283 | C | 0.01 | -1.06 | 0.17 | D | -0.02 | -0.91 | 0.20 | -0.16 | 0.27 | -0.58 | 254 | 0.56 | 0.37 | 0.54 | -0.22 | 34 | 53 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 1284 | C | -0.05 | 0.78 | 0.18 | D | 0.06 | 0.39 | 0.15 | 0.39 | 0.23 | 1.69 | 270 | 0.09 | 0.39 | 0.53 | 0.22 | 34 | 54 |
| HLA | 3 | 1478 | C | 0.02 | -0.27 | 0.19 | D | -0.02 | -0.05 | 0.21 | -0.22 | 0.28 | -0.80 | 260 | 0.42 | 0.05 | 0.82 | -0.12 | 34 | 55 |
| HLA | 3 | 1280 | C | 0.02 | 0.27 | 0.21 | D | -0.02 | 0.49 | 0.22 | -0.22 | 0.30 | -0.74 | 264 | 0.46 | 0.18 | 0.67 | 0.19 | 34 | 56 |
| HLA | 3 | 394 | C | 0.14 | -0.41 | 0.07 | D | -0.18 | -0.13 | 0.09 | -0.28 | 0.11 | -2.47 | 254 | 0.01 | 5.20 | 0.02 | -0.61 | 34 | 57 |
| HLA | 4 | 18 | C | -0.01 | -0.78 | 0.18 | D | 0.01 | -0.87 | 0.22 | 0.09 | 0.28 | 0.33 | 225 | 0.74 | 0.01 | 0.91 | 0.02 | 34 | 1 |
| HLA | 4 | 389 | C | -0.03 | -1.49 | 0.19 | D | 0.03 | -1.86 | 0.26 | 0.37 | 0.32 | 1.15 | 208 | 0.25 | 0.17 | 0.68 | 0.27 | 34 | 2 |
| HLA | 4 | 21 | C | 0.00 | 0.00 | 0.18 | D | 0.00 | 0.00 | 0.21 | 0.00 | 0.28 | 0.00 | 232 | 1.00 | 0.11 | 0.74 | 0.14 | 34 | 3 |
| HLA | 4 | 7 | C | -0.02 | -1.68 | 0.20 | D | 0.03 | -2.08 | 0.28 | 0.40 | 0.34 | 1.17 | 204 | 0.24 | 0.74 | 0.39 | 0.48 | 34 | 4 |
| HLA | 4 | 12 | C | 0.01 | -1.38 | 0.19 | D | -0.01 | -1.27 | 0.23 | -0.11 | 0.30 | -0.38 | 224 | 0.70 | 0.28 | 0.60 | -0.24 | 34 | 5 |
| HLA | 4 | 64 | C | 0.01 | -1.31 | 0.19 | D | -0.01 | -1.22 | 0.23 | -0.09 | 0.29 | -0.32 | 224 | 0.75 | 0.60 | 0.44 | -0.33 | 34 | 6 |
| HLA | 4 | 8 | C | -0.01 | -0.65 | 0.18 | D | 0.02 | -0.78 | 0.21 | 0.13 | 0.28 | 0.46 | 225 | 0.65 | 0.01 | 0.92 | -0.09 | 34 | 7 |
| HLA | 4 | 9 | C | 0.02 | 0.19 | 0.19 | D | -0.02 | 0.40 | 0.21 | -0.21 | 0.28 | -0.74 | 232 | 0.46 | 1.36 | 0.24 | -0.44 | 34 | 8 |
| HLA | 4 | 13 | C | -0.01 | -2.11 | 0.22 | D | 0.01 | -2.24 | 0.29 | 0.13 | 0.36 | 0.36 | 210 | 0.72 | 0.07 | 0.79 | -0.19 | 34 | 9 |
| HLA | 4 | 11 | C | -0.02 | 2.15 | 0.31 | D | 0.03 | 1.60 | 0.27 | 0.55 | 0.41 | 1.34 | 250 | 0.18 | 0.00 | 0.98 | 0.13 | 34 | 10 |
| HLA | 4 | 1019 | C | -0.01 | 0.68 | 0.20 | D | 0.02 | 0.50 | 0.22 | 0.19 | 0.30 | 0.63 | 240 | 0.53 | 0.00 | 0.99 | 0.06 | 34 | 11 |
| HLA | 4 | 14 | C | -0.04 | -1.07 | 0.18 | D | 0.05 | -1.55 | 0.24 | 0.47 | 0.30 | 1.56 | 211 | 0.12 | 0.28 | 0.60 | 0.21 | 34 | 12 |
| HLA | 4 | 16 | C | -0.01 | -1.04 | 0.18 | D | 0.01 | -1.12 | 0.22 | 0.07 | 0.29 | 0.26 | 222 | 0.80 | 0.11 | 0.74 | -0.17 | 34 | 13 |
| HLA | 4 | 15 | C | -0.03 | -0.31 | 0.18 | D | 0.04 | -0.60 | 0.21 | 0.30 | 0.28 | 1.07 | 228 | 0.28 | 0.79 | 0.38 | 0.34 | 34 | 14 |
| HLA | 4 | 17 | C | -0.03 | -0.01 | 0.18 | D | 0.03 | -0.30 | 0.21 | 0.28 | 0.28 | 1.03 | 232 | 0.31 | 1.04 | 0.31 | 0.38 | 34 | 15 |
| HLA | 4 | 65 | C | -0.03 | -1.53 | 0.19 | D | 0.04 | -1.93 | 0.27 | 0.40 | 0.33 | 1.23 | 206 | 0.22 | 2.10 | 0.15 | 0.60 | 34 | 16 |
| HLA | 4 | 20 | C | -0.03 | -1.24 | 0.19 | D | 0.04 | -1.67 | 0.25 | 0.42 | 0.31 | 1.37 | 210 | 0.17 | 0.05 | 0.83 | 0.17 | 34 | 17 |
| HLA | 4 | 22 | C | 0.04 | 0.09 | 0.18 | D | -0.05 | 0.54 | 0.22 | -0.45 | 0.28 | -1.59 | 229 | 0.11 | 1.59 | 0.21 | -0.43 | 34 | 18 |
| HLA | 4 | 23 | C | -0.02 | 0.16 | 0.19 | D | 0.03 | -0.08 | 0.21 | 0.24 | 0.28 | 0.86 | 235 | 0.39 | 3.49 | 0.06 | 0.60 | 34 | 19 |
| HLA | 4 | 30 | C | 0.00 | -0.17 | 0.18 | D | 0.00 | -0.17 | 0.21 | 0.00 | 0.28 | 0.00 | 231 | 1.00 | 0.39 | 0.53 | 0.24 | 34 | 20 |
| HLA | 4 | 34 | C | 0.01 | -0.56 | 0.18 | D | -0.02 | -0.43 | 0.21 | -0.13 | 0.27 | -0.49 | 229 | 0.62 | 0.08 | 0.78 | -0.14 | 34 | 21 |
| HLA | 4 | 35 | C | -0.04 | 1.87 | 0.22 | D | 0.06 | 1.38 | 0.18 | 0.49 | 0.28 | 1.72 | 249 | 0.09 | 4.06 | 0.04 | 0.97 | 34 | 22 |
| HLA | 4 | 24 | C | 0.02 | 0.52 | 0.20 | D | -0.03 | 0.83 | 0.23 | -0.31 | 0.30 | -1.04 | 231 | 0.30 | 0.89 | 0.34 | -0.42 | 34 | 23 |
| HLA | 4 | 36 | C | 0.01 | 0.02 | 0.18 | D | -0.01 | 0.09 | 0.21 | -0.07 | 0.28 | -0.25 | 232 | 0.80 | 0.70 | 0.40 | 0.28 | 34 | 24 |
| HLA | 4 | 1291 | C | -0.01 | 0.94 | 0.21 | D | 0.02 | 0.78 | 0.22 | 0.16 | 0.31 | 0.51 | 242 | 0.61 | 0.03 | 0.85 | -0.13 | 34 | 25 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 26 | C | -0.02 | 0.09 | 0.18 | D | 0.03 | -0.12 | 0.21 | 0.21 | 0.28 | 0.77 | 234 | 0.44 | 1.34 | 0.25 | 0.39 | 34 | 26 |
| HLA | 4 | 27 | C | 0.02 | -0.78 | 0.18 | D | -0.02 | -0.60 | 0.21 | -0.18 | 0.28 | -0.65 | 228 | 0.51 | 0.00 | 0.98 | 0.05 | 34 | 27 |
| HLA | 4 | 37 | C | 0.00 | 0.15 | 0.19 | D | 0.00 | 0.15 | 0.21 | 0.00 | 0.28 | 0.00 | 234 | 1.00 | 0.12 | 0.73 | 0.14 | 34 | 28 |
| HLA | 4 | 38 | C | 0.03 | -1.38 | 0.19 | D | -0.05 | -0.97 | 0.22 | -0.41 | 0.29 | -1.43 | 230 | 0.15 | 0.42 | 0.52 | -0.25 | 34 | 29 |
| HLA | 4 | 31 | C | 0.06 | -0.37 | 0.18 | D | -0.08 | 0.27 | 0.21 | -0.64 | 0.28 | -2.31 | 228 | 0.02 | 3.88 | 0.05 | -0.64 | 34 | 30 |
| HLA | 4 | 25 | C | 0.04 | 0.52 | 0.20 | D | -0.05 | 1.04 | 0.23 | -0.52 | 0.31 | -1.71 | 227 | 0.09 | 0.02 | 0.89 | -0.01 | 34 | 31 |
| HLA | 4 | 54 | C | -0.01 | -0.24 | 0.18 | D | 0.01 | -0.30 | 0.21 | 0.05 | 0.27 | 0.20 | 230 | 0.84 | 0.01 | 0.92 | 0.08 | 34 | 32 |
| HLA | 4 | 40 | C | 0.02 | 0.09 | 0.18 | D | -0.03 | 0.31 | 0.21 | -0.22 | 0.28 | -0.80 | 232 | 0.43 | 0.65 | 0.42 | -0.32 | 34 | 33 |
| HLA | 4 | 55 | C | 0.02 | 0.19 | 0.19 | D | -0.03 | 0.45 | 0.21 | -0.26 | 0.28 | -0.90 | 232 | 0.37 | 0.10 | 0.75 | 0.14 | 34 | 34 |
| HLA | 4 | 41 | C | -0.02 | 1.08 | 0.22 | D | 0.03 | 0.73 | 0.22 | 0.35 | 0.31 | 1.12 | 245 | 0.27 | 0.58 | 0.45 | 0.31 | 34 | 35 |
| HLA | 4 | 56 | C | 0.01 | 0.99 | 0.22 | D | -0.01 | 1.10 | 0.24 | -0.11 | 0.32 | -0.35 | 237 | 0.73 | 0.01 | 0.91 | -0.02 | 34 | 36 |
| HLA | 4 | 57 | C | 0.03 | 0.77 | 0.21 | D | -0.05 | 1.27 | 0.25 | -0.51 | 0.32 | -1.59 | 227 | 0.11 | 0.45 | 0.50 | -0.28 | 34 | 37 |
| HLA | 4 | 42 | C | -0.03 | 1.00 | 0.13 | D | 0.05 | 0.84 | 0.13 | 0.16 | 0.18 | 0.90 | 244 | 0.37 | 0.00 | 0.96 | 0.01 | 34 | 38 |
| HLA | 4 | 387 | C | -0.03 | 0.12 | 0.19 | D | 0.03 | -0.17 | 0.21 | 0.29 | 0.28 | 1.04 | 234 | 0.30 | 0.85 | 0.36 | 0.35 | 34 | 39 |
| HLA | 4 | 46 | C | 0.01 | 0.16 | 0.19 | D | -0.01 | 0.27 | 0.21 | -0.11 | 0.28 | -0.39 | 233 | 0.70 | 0.29 | 0.59 | -0.24 | 34 | 40 |
| HLA | 4 | 47 | C | 0.00 | -0.23 | 0.18 | D | 0.00 | -0.23 | 0.21 | 0.00 | 0.27 | 0.00 | 231 | 1.00 | 0.04 | 0.85 | -0.11 | 34 | 41 |
| HLA | 4 | 48 | C | -0.01 | -1.18 | 0.18 | D | 0.01 | -1.27 | 0.23 | 0.09 | 0.29 | 0.32 | 220 | 0.75 | 0.09 | 0.76 | -0.17 | 34 | 42 |
| HLA | 4 | 50 | C | 0.02 | -0.21 | 0.18 | D | -0.03 | 0.01 | 0.21 | -0.21 | 0.28 | -0.78 | 230 | 0.44 | 1.75 | 0.19 | -0.56 | 34 | 43 |
| HLA | 4 | 49 | C | -0.03 | -0.98 | 0.18 | D | 0.04 | -1.32 | 0.23 | 0.35 | 0.29 | 1.18 | 217 | 0.24 | 0.59 | 0.44 | 0.34 | 34 | 44 |
| HLA | 4 | 51 | C | 0.03 | -0.14 | 0.18 | D | -0.04 | 0.22 | 0.21 | -0.37 | 0.28 | -1.33 | 230 | 0.19 | 0.01 | 0.94 | -0.07 | 34 | 45 |
| HLA | 4 | 62 | C | -0.01 | 0.06 | 0.18 | D | 0.02 | -0.08 | 0.21 | 0.14 | 0.28 | 0.49 | 233 | 0.62 | 1.11 | 0.29 | 0.34 | 34 | 46 |
| HLA | 4 | 60 | C | 0.02 | -1.07 | 0.18 | D | -0.02 | -0.87 | 0.22 | -0.20 | 0.28 | -0.71 | 227 | 0.48 | 3.21 | 0.07 | -0.66 | 34 | 47 |
| HLA | 4 | 61 | C | 0.03 | -0.01 | 0.18 | D | -0.04 | 0.31 | 0.21 | -0.32 | 0.28 | -1.16 | 230 | 0.25 | 0.30 | 0.58 | -0.20 | 34 | 48 |
| HLA | 4 | 63 | C | -0.01 | 1.66 | 0.26 | D | 0.02 | 1.40 | 0.25 | 0.26 | 0.36 | 0.72 | 247 | 0.47 | 1.05 | 0.31 | 0.48 | 34 | 49 |
| HLA | 4 | 1016 | C | 0.05 | 0.37 | 0.19 | D | -0.07 | 1.04 | 0.23 | -0.67 | 0.30 | -2.22 | 223 | 0.03 | 3.45 | 0.06 | -0.67 | 34 | 50 |
| HLA | 4 | 1017 | C | -0.01 | 4.78 | 1.01 | D | 0.01 | 3.43 | 0.52 | 1.35 | 1.13 | 1.19 | 210 | 0.23 | 0.03 | 0.87 | 1.17 | 34 | 51 |
| HLA | 4 | 1015 | C | 0.03 | -0.24 | 0.18 | D | -0.03 | 0.04 | 0.21 | -0.28 | 0.28 | -1.01 | 228 | 0.31 | 0.18 | 0.67 | -0.18 | 34 | 52 |
| HLA | 4 | 1014 | C | 0.00 | 2.05 | 0.30 | D | 0.00 | 1.99 | 0.30 | 0.06 | 0.42 | 0.14 | 244 | 0.89 | 0.00 | 1.00 | -0.12 | 34 | 53 |
| HLA | 4 | 1011 | C | 0.04 | 0.34 | 0.19 | D | -0.05 | 0.83 | 0.23 | -0.49 | 0.30 | -1.66 | 226 | 0.10 | 0.11 | 0.75 | -0.19 | 34 | 54 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 1012 | C | -0.04 | 1.19 | 0.23 | D | 0.05 | 0.63 | 0.22 | 0.56 | 0.32 | 1.76 | 246 | 0.08 | 1.88 | 0.17 | 0.65 | 34 | 55 |
| HLA | 4 | 1013 | C | -0.02 | 0.65 | 0.11 | D | 0.02 | 0.59 | 0.12 | 0.07 | 0.16 | 0.41 | 240 | 0.68 | 0.10 | 0.76 | -0.09 | 34 | 56 |
| HLA | 4 | 395 | C | 0.01 | 0.42 | 0.08 | D | -0.01 | 0.42 | 0.09 | 0.00 | 0.12 | 0.00 | 232 | 1.00 | 0.08 | 0.78 | -0.08 | 34 | 57 |
| HLA | 5 | 642 | C | -0.02 | 0.63 | 0.22 | D | 0.02 | 0.37 | 0.22 | 0.26 | 0.31 | 0.83 | 248 | 0.41 | 0.15 | 0.70 | 0.19 | 40 | 1 |
| HLA | 5 | 644 | C | 0.00 | -2.52 | 0.23 | D | 0.00 | -2.54 | 0.28 | 0.03 | 0.37 | 0.07 | 230 | 0.94 | 0.04 | 0.84 | 0.02 | 40 | 2 |
| HLA | 5 | 636 | C | -0.02 | -0.37 | 0.19 | D | 0.03 | -0.63 | 0.21 | 0.26 | 0.28 | 0.93 | 241 | 0.35 | 1.24 | 0.27 | 0.45 | 40 | 3 |
| HLA | 5 | 716 | C | -0.01 | 0.19 | 0.20 | D | 0.01 | 0.10 | 0.21 | 0.09 | 0.29 | 0.32 | 245 | 0.75 | 1.33 | 0.25 | 0.39 | 40 | 4 |
| HLA | 5 | 633 | C | 0.00 | 0.04 | 0.20 | D | 0.00 | 0.04 | 0.21 | 0.00 | 0.29 | 0.00 | 244 | 1.00 | 0.79 | 0.38 | 0.35 | 40 | 5 |
| HLA | 5 | 723 | C | 0.01 | 0.99 | 0.24 | D | -0.01 | 1.09 | 0.24 | -0.10 | 0.34 | -0.30 | 247 | 0.76 | 1.35 | 0.25 | -0.73 | 40 | 6 |
| HLA | 5 | 1072 | C | 0.01 | 0.58 | 0.22 | D | -0.01 | 0.66 | 0.22 | -0.08 | 0.31 | -0.26 | 246 | 0.80 | 0.00 | 0.96 | -0.06 | 40 | 7 |
| HLA | 5 | 711 | C | 0.06 | 0.15 | 0.20 | D | -0.07 | 0.92 | 0.23 | -0.77 | 0.31 | -2.50 | 235 | 0.01 | 2.23 | 0.14 | -0.58 | 40 | 8 |
| HLA | 5 | 690 | C | 0.00 | -0.27 | 0.19 | D | 0.00 | -0.27 | 0.21 | 0.00 | 0.28 | 0.00 | 242 | 1.00 | 0.09 | 0.76 | -0.17 | 40 | 9 |
| HLA | 5 | 1074 | C | 0.00 | -2.48 | 0.23 | D | 0.00 | -2.46 | 0.28 | -0.02 | 0.36 | -0.06 | 232 | 0.95 | 0.00 | 0.96 | 0.06 | 40 | 10 |
| HLA | 5 | 713 | C | -0.02 | 0.58 | 0.22 | D | 0.02 | 0.32 | 0.21 | 0.25 | 0.30 | 0.84 | 248 | 0.40 | 0.29 | 0.59 | 0.28 | 40 | 11 |
| HLA | 5 | 721 | C | -0.01 | -1.19 | 0.19 | D | 0.01 | -1.30 | 0.22 | 0.10 | 0.29 | 0.37 | 235 | 0.72 | 0.52 | 0.47 | -0.32 | 40 | 12 |
| HLA | 5 | 726 | C | 0.01 | -0.08 | 0.19 | D | -0.01 | 0.06 | 0.21 | -0.13 | 0.28 | -0.47 | 243 | 0.64 | 0.01 | 0.92 | -0.02 | 40 | 13 |
| HLA | 5 | 724 | C | 0.00 | -0.41 | 0.19 | D | 0.00 | -0.41 | 0.21 | 0.00 | 0.28 | 0.00 | 241 | 1.00 | 0.05 | 0.82 | 0.11 | 40 | 14 |
| HLA | 5 | 725 | C | -0.04 | 0.03 | 0.20 | D | 0.05 | -0.42 | 0.21 | 0.45 | 0.28 | 1.58 | 245 | 0.11 | 2.18 | 0.14 | 0.56 | 40 | 15 |
| HLA | 5 | 627 | C | -0.01 | -0.40 | 0.19 | D | 0.02 | -0.54 | 0.21 | 0.14 | 0.28 | 0.50 | 241 | 0.62 | 0.84 | 0.36 | 0.29 | 40 | 16 |
| HLA | 5 | 722 | C | -0.02 | 0.91 | 0.13 | D | 0.02 | 0.84 | 0.13 | 0.07 | 0.18 | 0.39 | 245 | 0.70 | 0.08 | 0.77 | 0.09 | 40 | 17 |
| HLA | 5 | 1215 | C | 0.04 | 0.31 | 0.20 | D | -0.05 | 0.87 | 0.23 | -0.55 | 0.31 | -1.78 | 239 | 0.08 | 0.17 | 0.68 | -0.18 | 40 | 18 |
| HLA | 5 | 672 | C | 0.04 | -1.12 | 0.19 | D | -0.05 | -0.67 | 0.21 | -0.45 | 0.28 | -1.62 | 240 | 0.11 | 0.38 | 0.54 | -0.22 | 40 | 19 |
| HLA | 5 | 1183 | C | 0.04 | -0.08 | 0.19 | D | -0.04 | 0.32 | 0.21 | -0.40 | 0.29 | -1.40 | 241 | 0.16 | 0.17 | 0.68 | -0.17 | 40 | 20 |
| HLA | 5 | 681 | C | 0.01 | 1.30 | 0.26 | D | -0.01 | 1.40 | 0.26 | -0.11 | 0.37 | -0.29 | 248 | 0.77 | 0.14 | 0.71 | -0.26 | 40 | 21 |
| HLA | 5 | 673 | C | 0.02 | 1.51 | 0.28 | D | -0.02 | 1.86 | 0.29 | -0.35 | 0.41 | -0.86 | 244 | 0.39 | 0.02 | 0.89 | 0.03 | 40 | 22 |
| HLA | 5 | 1186 | C | 0.03 | -0.58 | 0.19 | D | -0.03 | -0.29 | 0.21 | -0.29 | 0.28 | -1.04 | 240 | 0.30 | 0.07 | 0.79 | -0.13 | 40 | 23 |
| HLA | 5 | 729 | C | 0.03 | -1.74 | 0.20 | D | -0.04 | -1.34 | 0.22 | -0.39 | 0.30 | -1.33 | 240 | 0.18 | 0.24 | 0.62 | -0.19 | 40 | 24 |
| HLA | 5 | 640 | C | 0.01 | 1.30 | 0.26 | D | -0.01 | 1.47 | 0.26 | -0.18 | 0.37 | -0.48 | 247 | 0.63 | 1.57 | 0.21 | -0.64 | 40 | 25 |
| HLA | 5 | 718 | C | 0.01 | 1.10 | 0.25 | D | -0.02 | 1.34 | 0.26 | -0.23 | 0.35 | -0.66 | 245 | 0.51 | 0.01 | 0.93 | 0.11 | 40 | 26 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 1193 | C | 0.02 | 0.00 | 0.19 | D | -0.03 | 0.28 | 0.21 | -0.28 | 0.29 | -0.98 | 242 | 0.33 | 0.15 | 0.70 | -0.17 | 40 | 27 |
| HLA | 5 | 689 | C | -0.02 | -1.05 | 0.19 | D | 0.02 | -1.25 | 0.22 | 0.20 | 0.29 | 0.69 | 235 | 0.49 | 0.09 | 0.76 | 0.13 | 40 | 28 |
| HLA | 5 | 631 | C | 0.01 | -0.23 | 0.19 | D | -0.01 | -0.16 | 0.21 | -0.07 | 0.28 | -0.23 | 242 | 0.82 | 0.26 | 0.61 | -0.21 | 40 | 29 |
| HLA | 5 | 648 | C | 0.00 | -0.56 | 0.19 | D | 0.00 | -0.56 | 0.21 | 0.00 | 0.28 | 0.00 | 240 | 1.00 | 0.02 | 0.89 | 0.00 | 40 | 30 |
| HLA | 5 | 1222 | C | 0.00 | -1.79 | 0.20 | D | 0.00 | -1.81 | 0.24 | 0.02 | 0.31 | 0.07 | 233 | 0.95 | 0.18 | 0.67 | -0.26 | 40 | 31 |
| HLA | 5 | 629 | C | -0.01 | 0.23 | 0.20 | D | 0.01 | 0.14 | 0.21 | 0.09 | 0.29 | 0.30 | 245 | 0.76 | 0.01 | 0.91 | 0.02 | 40 | 32 |
| HLA | 5 | 728 | C | -0.03 | -0.47 | 0.19 | D | 0.04 | -0.80 | 0.21 | 0.33 | 0.28 | 1.17 | 240 | 0.24 | 2.37 | 0.12 | 0.53 | 40 | 33 |
| HLA | 5 | 693 | C | 0.00 | 0.64 | 0.22 | D | 0.00 | 0.64 | 0.22 | 0.00 | 0.31 | 0.00 | 246 | 1.00 | 0.10 | 0.76 | -0.17 | 40 | 34 |
| HLA | 5 | 677 | C | -0.01 | 2.07 | 0.34 | D | 0.01 | 1.86 | 0.29 | 0.21 | 0.45 | 0.47 | 249 | 0.64 | 0.54 | 0.46 | -0.61 | 40 | 35 |
| HLA | 5 | 625 | C | 0.04 | -1.02 | 0.18 | D | -0.04 | -0.63 | 0.21 | -0.39 | 0.28 | -1.41 | 240 | 0.16 | 0.69 | 0.41 | -0.27 | 40 | 36 |
| HLA | 5 | 702 | C | -0.02 | 0.27 | 0.20 | D | 0.02 | 0.06 | 0.21 | 0.22 | 0.29 | 0.74 | 246 | 0.46 | 0.00 | 0.97 | 0.04 | 40 | 37 |
| HLA | 5 | 730 | C | 0.00 | 0.36 | 0.21 | D | -0.01 | 0.42 | 0.22 | -0.06 | 0.30 | -0.20 | 245 | 0.84 | 0.05 | 0.82 | 0.13 | 40 | 38 |
| HLA | 5 | 709 | C | -0.02 | -0.85 | 0.18 | D | 0.02 | -1.02 | 0.21 | 0.17 | 0.28 | 0.61 | 237 | 0.54 | 0.07 | 0.80 | 0.12 | 40 | 39 |
| HLA | 5 | 646 | C | -0.04 | -0.51 | 0.19 | D | 0.04 | -0.89 | 0.21 | 0.38 | 0.28 | 1.36 | 239 | 0.18 | 0.72 | 0.40 | 0.30 | 40 | 40 |
| HLA | 5 | 696 | C | 0.01 | -0.61 | 0.19 | D | -0.01 | -0.54 | 0.21 | -0.07 | 0.28 | -0.25 | 240 | 0.81 | 2.14 | 0.14 | -0.59 | 40 | 41 |
| HLA | 5 | 637 | C | -0.02 | 1.17 | 0.25 | D | 0.02 | 0.92 | 0.23 | 0.25 | 0.34 | 0.72 | 249 | 0.47 | 0.04 | 0.85 | -0.01 | 40 | 42 |
| HLA | 5 | 708 | C | -0.02 | 1.04 | 0.24 | D | 0.03 | 0.71 | 0.23 | 0.34 | 0.33 | 1.02 | 249 | 0.31 | 0.04 | 0.84 | 0.17 | 40 | 43 |
| HLA | 5 | 712 | C | -0.04 | 1.40 | 0.11 | D | 0.05 | 1.26 | 0.11 | 0.15 | 0.16 | 0.94 | 249 | 0.35 | 0.37 | 0.54 | 0.20 | 40 | 44 |
| HLA | 5 | 720 | C | -0.02 | 0.00 | 0.19 | D | 0.02 | -0.20 | 0.21 | 0.20 | 0.28 | 0.70 | 244 | 0.48 | 0.02 | 0.90 | 0.10 | 40 | 45 |
| HLA | 5 | 714 | C | 0.03 | -0.08 | 0.19 | D | -0.04 | 0.28 | 0.21 | -0.36 | 0.29 | -1.24 | 241 | 0.21 | 2.70 | 0.10 | -0.68 | 40 | 46 |
| HLA | 5 | 630 | C | 0.00 | 0.15 | 0.20 | D | 0.00 | 0.15 | 0.21 | 0.00 | 0.29 | 0.00 | 244 | 1.00 | 0.00 | 0.98 | 0.04 | 40 | 47 |
| HLA | 5 | 727 | C | -0.04 | 0.72 | 0.22 | D | 0.05 | 0.19 | 0.21 | 0.53 | 0.31 | 1.74 | 249 | 0.08 | 0.98 | 0.32 | 0.42 | 40 | 48 |
| HLA | 5 | 684 | C | -0.04 | -0.12 | 0.19 | D | 0.05 | -0.59 | 0.21 | 0.47 | 0.28 | 1.66 | 243 | 0.10 | 0.33 | 0.56 | 0.23 | 40 | 49 |
| HLA | 5 | 699 | C | -0.04 | -1.02 | 0.18 | D | 0.04 | -1.44 | 0.22 | 0.42 | 0.29 | 1.46 | 232 | 0.15 | 1.88 | 0.17 | 0.46 | 40 | 50 |
| HLA | 5 | 707 | C | -0.01 | 2.07 | 0.34 | D | 0.01 | 1.78 | 0.29 | 0.29 | 0.44 | 0.66 | 248 | 0.51 | 0.46 | 0.50 | 0.42 | 40 | 51 |
| HLA | 5 | 706 | C | 0.01 | 2.46 | 0.32 | D | -0.01 | 2.72 | 0.31 | -0.26 | 0.44 | -0.59 | 249 | 0.55 | 1.09 | 0.30 | -0.55 | 40 | 52 |
| HLA | 5 | 626 | C | 0.00 | -1.40 | 0.19 | D | 0.00 | -1.40 | 0.22 | 0.00 | 0.29 | 0.00 | 236 | 1.00 | 0.03 | 0.87 | 0.00 | 40 | 53 |
| HLA | 5 | 634 | C | 0.00 | -1.19 | 0.19 | D | 0.01 | -1.25 | 0.22 | 0.06 | 0.29 | 0.20 | 236 | 0.84 | 0.00 | 0.97 | -0.03 | 40 | 54 |
| HLA | 5 | 719 | C | -0.02 | 0.36 | 0.21 | D | 0.02 | 0.14 | 0.21 | 0.21 | 0.29 | 0.72 | 247 | 0.47 | 0.03 | 0.86 | 0.01 | 40 | 55 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 1208 | C | 0.06 | 0.19 | 0.20 | D | -0.07 | 0.92 | 0.23 | -0.73 | 0.31 | -2.37 | 236 | 0.02 | 1.84 | 0.18 | -0.45 | 40 | 56 |
| HLA | 5 | 1030 | C | 0.06 | -0.66 | 0.07 | D | -0.06 | -0.58 | 0.08 | -0.08 | 0.10 | -0.77 | 235 | 0.44 | 0.04 | 0.84 | -0.06 | 40 | 57 |
| HLA | 6 | 624 | C | 0.00 | -1.79 | 0.24 | D | 0.00 | -1.79 | 0.27 | 0.00 | 0.36 | 0.00 | 156 | 1.00 | 0.00 | 0.99 | -0.11 | 36 | 1 |
| HLA | 6 | 635 | C | 0.00 | -2.84 | 0.29 | D | 0.00 | -2.84 | 0.33 | 0.00 | 0.44 | 0.00 | 155 | 1.00 | 0.10 | 0.75 | 0.32 | 36 | 2 |
| HLA | 6 | 638 | C | 0.04 | -2.69 | 0.28 | D | -0.04 | -2.17 | 0.29 | -0.52 | 0.40 | -1.31 | 160 | 0.19 | 0.38 | 0.54 | -0.33 | 36 | 3 |
| HLA | 6 | 641 | C | -0.02 | 0.34 | 0.27 | D | 0.02 | 0.07 | 0.27 | 0.27 | 0.39 | 0.69 | 162 | 0.49 | 1.11 | 0.29 | 0.73 | 36 | 4 |
| HLA | 6 | 704 | C | -0.01 | -1.29 | 0.23 | D | 0.02 | -1.43 | 0.26 | 0.14 | 0.35 | 0.41 | 157 | 0.68 | 0.71 | 0.40 | 0.49 | 36 | 5 |
| HLA | 6 | 703 | C | -0.04 | -0.96 | 0.23 | D | 0.05 | -1.43 | 0.26 | 0.47 | 0.35 | 1.34 | 157 | 0.18 | 2.09 | 0.15 | 0.63 | 36 | 6 |
| HLA | 6 | 628 | C | 0.00 | -1.79 | 0.24 | D | 0.00 | -1.79 | 0.27 | 0.00 | 0.36 | 0.00 | 156 | 1.00 | 0.01 | 0.93 | -0.14 | 36 | 7 |
| HLA | 6 | 645 | C | 0.04 | -0.57 | 0.24 | D | -0.04 | -0.15 | 0.27 | -0.42 | 0.36 | -1.17 | 157 | 0.25 | 0.62 | 0.43 | -0.43 | 36 | 8 |
| HLA | 6 | 660 | C | 0.00 | 3.08 | 0.72 | D | 0.00 | 2.80 | 0.60 | 0.28 | 0.94 | 0.30 | 161 | 0.76 | 0.06 | 0.81 | 0.50 | 36 | 9 |
| HLA | 6 | 1171 | C | 0.02 | -0.27 | 0.25 | D | -0.02 | -0.08 | 0.27 | -0.19 | 0.37 | -0.53 | 158 | 0.60 | 0.07 | 0.80 | -0.19 | 36 | 10 |
| HLA | 6 | 661 | C | 0.00 | -0.28 | 0.25 | D | 0.00 | -0.28 | 0.26 | 0.00 | 0.36 | 0.00 | 159 | 1.00 | 0.02 | 0.88 | -0.02 | 36 | 11 |
| HLA | 6 | 659 | C | 0.06 | -0.85 | 0.24 | D | -0.07 | -0.22 | 0.27 | -0.63 | 0.35 | -1.78 | 156 | 0.08 | 1.56 | 0.21 | -0.57 | 36 | 12 |
| HLA | 6 | 643 | C | 0.02 | -0.82 | 0.12 | D | -0.03 | -0.75 | 0.14 | -0.07 | 0.18 | -0.36 | 158 | 0.72 | 0.03 | 0.87 | 0.06 | 36 | 13 |
| HLA | 6 | 665 | C | -0.03 | 0.12 | 0.26 | D | 0.04 | -0.29 | 0.26 | 0.41 | 0.37 | 1.10 | 161 | 0.27 | 0.00 | 0.96 | -0.10 | 36 | 14 |
| HLA | 6 | 678 | C | -0.01 | -0.79 | 0.24 | D | 0.01 | -0.90 | 0.26 | 0.10 | 0.35 | 0.29 | 158 | 0.77 | 0.02 | 0.90 | -0.19 | 36 | 15 |
| HLA | 6 | 652 | C | -0.03 | -1.02 | 0.23 | D | 0.03 | -1.30 | 0.26 | 0.28 | 0.35 | 0.80 | 157 | 0.42 | 1.40 | 0.24 | 0.63 | 36 | 16 |
| HLA | 6 | 639 | C | -0.04 | -0.14 | 0.25 | D | 0.04 | -0.56 | 0.26 | 0.42 | 0.36 | 1.15 | 161 | 0.25 | 0.37 | 0.54 | 0.39 | 36 | 17 |
| HLA | 6 | 1075 | C | -0.02 | -0.14 | 0.25 | D | 0.03 | -0.43 | 0.26 | 0.28 | 0.36 | 0.78 | 160 | 0.44 | 0.74 | 0.39 | 0.47 | 36 | 18 |
| HLA | 6 | 662 | C | 0.03 | -1.29 | 0.23 | D | -0.04 | -0.96 | 0.26 | -0.33 | 0.35 | -0.94 | 158 | 0.35 | 0.41 | 0.52 | -0.36 | 36 | 19 |
| HLA | 6 | 664 | C | -0.02 | 0.71 | 0.16 | D | 0.03 | 0.61 | 0.16 | 0.10 | 0.23 | 0.45 | 162 | 0.66 | 0.13 | 0.72 | -0.18 | 36 | 20 |
| HLA | 6 | 647 | C | -0.02 | 1.16 | 0.34 | D | 0.02 | 0.83 | 0.31 | 0.33 | 0.46 | 0.72 | 162 | 0.47 | 1.08 | 0.30 | 0.75 | 36 | 21 |
| HLA | 6 | 691 | C | -0.01 | 2.34 | 0.52 | D | 0.01 | 2.01 | 0.44 | 0.32 | 0.69 | 0.47 | 161 | 0.64 | 0.02 | 0.88 | 0.21 | 36 | 22 |
| HLA | 6 | 688 | C | -0.02 | 0.05 | 0.26 | D | 0.03 | -0.22 | 0.27 | 0.27 | 0.37 | 0.73 | 161 | 0.47 | 0.05 | 0.83 | 0.23 | 36 | 23 |
| HLA | 6 | 687 | C | -0.02 | 1.71 | 0.41 | D | 0.02 | 1.26 | 0.35 | 0.45 | 0.54 | 0.83 | 161 | 0.41 | 0.97 | 0.33 | 0.90 | 36 | 24 |
| HLA | 6 | 1309 | C | 0.02 | 0.49 | 0.28 | D | -0.02 | 0.73 | 0.31 | -0.24 | 0.42 | -0.57 | 159 | 0.57 | 0.53 | 0.46 | -0.41 | 36 | 25 |
| HLA | 6 | 651 | C | 0.00 | 1.16 | 0.34 | D | -0.01 | 1.26 | 0.35 | -0.10 | 0.49 | -0.21 | 161 | 0.83 | 0.03 | 0.86 | -0.07 | 36 | 26 |
| HLA | 6 | 683 | C | -0.01 | -1.85 | 0.24 | D | 0.01 | -1.94 | 0.28 | 0.09 | 0.37 | 0.24 | 155 | 0.81 | 0.00 | 0.95 | -0.06 | 36 | 27 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 649 | C | 0.01 | -0.21 | 0.25 | D | -0.01 | -0.08 | 0.27 | -0.13 | 0.37 | -0.36 | 159 | 0.72 | 0.00 | 0.98 | -0.07 | 36 | 28 |
| HLA | 6 | 1173 | C | -0.05 | 0.32 | 0.15 | D | 0.06 | 0.11 | 0.15 | 0.21 | 0.22 | 0.97 | 162 | 0.33 | 0.01 | 0.92 | 0.04 | 36 | 29 |
| HLA | 6 | 1083 | C | -0.04 | -0.21 | 0.25 | D | 0.04 | -0.63 | 0.26 | 0.42 | 0.36 | 1.17 | 160 | 0.24 | 0.64 | 0.42 | 0.43 | 36 | 30 |
| HLA | 6 | 653 | C | 0.02 | -1.79 | 0.24 | D | -0.02 | -1.57 | 0.27 | -0.22 | 0.36 | -0.61 | 157 | 0.54 | 0.39 | 0.53 | -0.36 | 36 | 31 |
| HLA | 6 | 682 | C | 0.01 | -0.39 | 0.24 | D | -0.01 | -0.29 | 0.26 | -0.10 | 0.36 | -0.28 | 159 | 0.78 | 0.03 | 0.87 | -0.01 | 36 | 32 |
| HLA | 6 | 698 | C | 0.00 | 1.88 | 0.44 | D | 0.00 | 1.83 | 0.42 | 0.05 | 0.60 | 0.09 | 162 | 0.93 | 0.02 | 0.88 | -0.11 | 36 | 33 |
| HLA | 6 | 1172 | C | 0.06 | -2.03 | 0.25 | D | -0.07 | -1.36 | 0.26 | -0.66 | 0.36 | -1.85 | 159 | 0.07 | 2.36 | 0.12 | -0.75 | 36 | 34 |
| HLA | 6 | 632 | C | -0.01 | -0.33 | 0.25 | D | 0.02 | -0.49 | 0.26 | 0.16 | 0.36 | 0.46 | 160 | 0.65 | 0.14 | 0.71 | 0.25 | 36 | 35 |
| HLA | 6 | 657 | C | -0.04 | -0.51 | 0.24 | D | 0.05 | -0.96 | 0.26 | 0.45 | 0.35 | 1.28 | 159 | 0.20 | 0.51 | 0.48 | 0.37 | 36 | 36 |
| HLA | 6 | 680 | C | -0.03 | -0.49 | 0.11 | D | 0.03 | -0.56 | 0.13 | 0.07 | 0.17 | 0.42 | 158 | 0.67 | 0.99 | 0.32 | 0.39 | 36 | 37 |
| HLA | 6 | 675 | C | -0.02 | 0.34 | 0.27 | D | 0.02 | 0.06 | 0.27 | 0.28 | 0.39 | 0.71 | 160 | 0.48 | 0.30 | 0.59 | 0.34 | 36 | 38 |
| HLA | 6 | 674 | C | 0.00 | 2.65 | 0.60 | D | 0.00 | 2.79 | 0.60 | -0.14 | 0.85 | -0.17 | 160 | 0.87 | 0.00 | 1.00 | -0.47 | 36 | 39 |
| HLA | 6 | 667 | C | 0.07 | -1.45 | 0.23 | D | -0.09 | -0.65 | 0.26 | -0.81 | 0.35 | -2.30 | 156 | 0.02 | 2.20 | 0.14 | -0.68 | 36 | 40 |
| HLA | 6 | 1170 | C | 0.00 | 2.34 | 0.52 | D | 0.00 | 2.47 | 0.53 | -0.14 | 0.74 | -0.18 | 160 | 0.85 | 2.36 | 0.12 | | 36 | 41 |
| HLA | 6 | 692 | C | 0.01 | 0.58 | 0.29 | D | -0.01 | 0.72 | 0.31 | -0.15 | 0.42 | -0.36 | 158 | 0.72 | 0.00 | 0.95 | -0.07 | 36 | 42 |
| HLA | 6 | 679 | C | 0.01 | 0.19 | 0.27 | D | -0.02 | 0.37 | 0.29 | -0.18 | 0.39 | -0.47 | 157 | 0.64 | 0.31 | 0.58 | -0.38 | 36 | 43 |
| HLA | 6 | 666 | C | -0.06 | 0.80 | 0.15 | D | 0.07 | 0.56 | 0.15 | 0.24 | 0.21 | 1.11 | 161 | 0.27 | 1.28 | 0.26 | 0.44 | 36 | 44 |
| HLA | 6 | 701 | C | -0.01 | 3.08 | 0.72 | D | 0.01 | 2.47 | 0.53 | 0.60 | 0.90 | 0.67 | 154 | 0.50 | 0.04 | 0.84 | 0.51 | 36 | 45 |
| HLA | 6 | 700 | C | 0.02 | -1.45 | 0.23 | D | -0.03 | -1.19 | 0.26 | -0.27 | 0.35 | -0.76 | 156 | 0.45 | 0.31 | 0.57 | -0.32 | 36 | 46 |
| HLA | 6 | 697 | C | 0.03 | -0.57 | 0.24 | D | -0.03 | -0.23 | 0.27 | -0.33 | 0.36 | -0.93 | 156 | 0.35 | 0.07 | 0.79 | -0.18 | 36 | 47 |
| HLA | 6 | 694 | C | 0.00 | 1.66 | 0.26 | D | 0.00 | 1.66 | 0.26 | 0.00 | 0.37 | 0.00 | 160 | 1.00 | 0.98 | 0.32 | -0.75 | 36 | 48 |
| HLA | 6 | 676 | C | 0.02 | 2.34 | 0.52 | D | -0.02 | 3.95 | 1.02 | -1.62 | 1.14 | -1.42 | 111 | 0.16 | 0.68 | 0.41 | -1.65 | 36 | 49 |
| HLA | 6 | 668 | C | -0.05 | 1.71 | 0.41 | D | 0.05 | 0.72 | 0.31 | 0.98 | 0.51 | 1.93 | 156 | 0.06 | 3.96 | 0.05 | 1.46 | 36 | 50 |
| HLA | 6 | 650 | C | -0.02 | 0.41 | 0.28 | D | 0.02 | 0.14 | 0.28 | 0.28 | 0.39 | 0.71 | 160 | 0.48 | 0.03 | 0.87 | 0.16 | 36 | 51 |
| HLA | 6 | 1169 | C | 0.00 | 0.28 | 0.27 | D | 0.00 | 0.28 | 0.28 | 0.00 | 0.39 | 0.00 | 159 | 1.00 | 0.45 | 0.50 | -0.33 | 36 | 52 |
| HLA | 6 | 669 | C | -0.03 | -0.21 | 0.25 | D | 0.03 | -0.51 | 0.26 | 0.30 | 0.36 | 0.84 | 159 | 0.40 | 0.15 | 0.70 | 0.22 | 36 | 53 |
| HLA | 6 | 663 | C | -0.01 | 3.08 | 0.72 | D | 0.01 | 2.47 | 0.53 | 0.60 | 0.90 | 0.67 | 154 | 0.50 | 0.26 | 0.61 | 0.00 | 36 | 54 |
| HLA | 6 | 656 | C | 0.02 | -0.33 | 0.25 | D | -0.02 | -0.09 | 0.27 | -0.24 | 0.37 | -0.66 | 156 | 0.51 | 0.00 | 0.96 | -0.11 | 36 | 55 |
| HLA | 6 | 655 | C | 0.02 | -1.56 | 0.24 | D | -0.02 | -1.39 | 0.26 | -0.17 | 0.35 | -0.48 | 155 | 0.63 | 0.28 | 0.59 | -0.32 | 36 | 56 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 1031 | C | 0.14 | -0.86 | 0.10 | D | -0.17 | -0.61 | 0.11 | -0.26 | 0.14 | -1.80 | 156 | 0.07 | 0.55 | 0.46 | -0.26 | 36 | 57 |
| HLA | 7 | 1118 | C | 0.06 | -2.47 | 0.26 | D | -0.09 | -1.58 | 0.29 | -0.89 | 0.39 | -2.30 | 144 | 0.02 | 1.24 | 0.27 | -0.59 | 27 | 1 |
| HLA | 7 | 784 | C | 0.04 | -1.94 | 0.23 | D | -0.06 | -1.41 | 0.28 | -0.53 | 0.37 | -1.44 | 136 | 0.15 | 0.03 | 0.86 | 0.02 | 27 | 2 |
| HLA | 7 | 888 | C | 0.00 | -2.26 | 0.25 | D | -0.01 | -2.23 | 0.32 | -0.03 | 0.41 | -0.09 | 130 | 0.93 | 0.00 | 0.99 | 0.09 | 27 | 3 |
| HLA | 7 | 883 | C | 0.01 | 1.02 | 0.31 | D | -0.01 | 1.12 | 0.35 | -0.11 | 0.47 | -0.23 | 143 | 0.82 | 0.56 | 0.46 | -0.67 | 27 | 4 |
| HLA | 7 | 885 | C | -0.05 | -1.94 | 0.23 | D | 0.07 | -2.69 | 0.36 | 0.75 | 0.43 | 1.76 | 114 | 0.08 | 1.37 | 0.24 | 0.73 | 27 | 5 |
| HLA | 7 | 886 | C | 0.02 | 1.74 | 0.40 | D | -0.03 | 2.70 | 0.61 | -0.97 | 0.73 | -1.33 | 116 | 0.19 | 0.46 | 0.50 | -0.94 | 27 | 6 |
| HLA | 7 | 882 | C | 0.02 | -1.99 | 0.23 | D | -0.03 | -1.75 | 0.30 | -0.24 | 0.38 | -0.65 | 133 | 0.52 | 0.31 | 0.58 | -0.35 | 27 | 7 |
| HLA | 7 | 763 | C | -0.02 | -1.68 | 0.22 | D | 0.03 | -1.93 | 0.31 | 0.25 | 0.38 | 0.66 | 126 | 0.51 | 0.99 | 0.32 | 0.56 | 27 | 8 |
| HLA | 7 | 762 | C | 0.01 | -0.88 | 0.22 | D | -0.02 | -0.72 | 0.27 | -0.16 | 0.35 | -0.46 | 134 | 0.65 | 0.03 | 0.86 | 0.01 | 27 | 9 |
| HLA | 7 | 1098 | C | 0.02 | 0.39 | 0.26 | D | -0.03 | 0.68 | 0.32 | -0.29 | 0.41 | -0.71 | 136 | 0.48 | 0.51 | 0.48 | 0.45 | 27 | 10 |
| HLA | 7 | 1175 | C | -0.02 | -0.40 | 0.22 | D | 0.03 | -0.64 | 0.27 | 0.25 | 0.35 | 0.70 | 137 | 0.49 | 0.00 | 0.97 | 0.15 | 27 | 11 |
| HLA | 7 | 871 | C | -0.04 | -1.78 | 0.23 | D | 0.05 | -2.34 | 0.33 | 0.55 | 0.40 | 1.38 | 120 | 0.17 | 0.34 | 0.56 | 0.38 | 27 | 12 |
| HLA | 7 | 790 | C | -0.01 | -1.78 | 0.23 | D | 0.02 | -1.93 | 0.31 | 0.15 | 0.38 | 0.39 | 127 | 0.70 | 0.01 | 0.93 | 0.12 | 27 | 13 |
| HLA | 7 | 774 | C | -0.06 | 1.74 | 0.40 | D | 0.08 | 0.49 | 0.31 | 1.25 | 0.50 | 2.49 | 160 | 0.01 | 3.41 | 0.06 | 1.72 | 27 | 14 |
| HLA | 7 | 1097 | C | 0.03 | -0.72 | 0.12 | D | -0.04 | -0.63 | 0.15 | -0.10 | 0.20 | -0.50 | 135 | 0.61 | 0.80 | 0.37 | -0.32 | 27 | 15 |
| HLA | 7 | 1099 | C | 0.01 | -0.83 | 0.22 | D | -0.01 | -0.72 | 0.27 | -0.11 | 0.35 | -0.32 | 134 | 0.75 | 0.25 | 0.62 | -0.30 | 27 | 16 |
| HLA | 7 | 1089 | C | 0.00 | 1.57 | 0.38 | D | 0.00 | 1.54 | 0.40 | 0.02 | 0.55 | 0.04 | 150 | 0.97 | 0.01 | 0.91 | 0.11 | 27 | 17 |
| HLA | 7 | 892 | C | -0.01 | 0.20 | 0.25 | D | 0.02 | 0.05 | 0.29 | 0.15 | 0.38 | 0.39 | 142 | 0.69 | 0.31 | 0.58 | 0.37 | 27 | 18 |
| HLA | 7 | 843 | C | 0.02 | 1.59 | 0.38 | D | -0.03 | 2.38 | 0.54 | -0.79 | 0.65 | -1.21 | 123 | 0.23 | 4.19 | 0.04 | | 27 | 19 |
| HLA | 7 | 1178 | C | -0.05 | 1.33 | 0.34 | D | 0.08 | 0.31 | 0.30 | 1.03 | 0.45 | 2.26 | 160 | 0.02 | 2.18 | 0.14 | 0.89 | 27 | 20 |
| HLA | 7 | 806 | C | 0.03 | -0.14 | 0.23 | D | -0.05 | 0.31 | 0.30 | -0.45 | 0.38 | -1.19 | 133 | 0.24 | 0.62 | 0.43 | -0.47 | 27 | 21 |
| HLA | 7 | 878 | C | 0.03 | 0.40 | 0.14 | D | -0.04 | 0.52 | 0.16 | -0.12 | 0.22 | -0.54 | 142 | 0.59 | 1.17 | 0.28 | -0.50 | 27 | 22 |
| HLA | 7 | 808 | C | 0.03 | -0.47 | 0.10 | D | -0.04 | -0.41 | 0.12 | -0.06 | 0.16 | -0.38 | 136 | 0.70 | 0.28 | 0.59 | -0.20 | 27 | 23 |
| HLA | 7 | 1088 | C | -0.02 | 0.68 | 0.28 | D | 0.03 | 0.40 | 0.30 | 0.28 | 0.41 | 0.69 | 148 | 0.49 | 0.06 | 0.81 | 0.01 | 27 | 24 |
| HLA | 7 | 769 | C | 0.00 | -1.94 | 0.23 | D | 0.00 | -1.94 | 0.31 | 0.00 | 0.38 | 0.00 | 129 | 1.00 | 0.98 | 0.32 | 0.62 | 27 | 25 |
| HLA | 7 | 803 | C | 0.00 | 0.14 | 0.24 | D | 0.00 | 0.14 | 0.29 | 0.00 | 0.38 | 0.00 | 140 | 1.00 | 0.01 | 0.93 | 0.05 | 27 | 26 |
| HLA | 7 | 877 | C | 0.01 | -1.02 | 0.22 | D | -0.02 | -0.87 | 0.27 | -0.15 | 0.35 | -0.43 | 133 | 0.67 | 0.00 | 0.96 | -0.05 | 27 | 27 |
| HLA | 7 | 1185 | C | 0.02 | 1.02 | 0.31 | D | -0.03 | 1.55 | 0.40 | -0.53 | 0.50 | -1.05 | 131 | 0.30 | 0.00 | 0.97 | -0.17 | 27 | 28 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 7 | 777 | C | 0.02 | -0.40 | 0.22 | D | -0.03 | -0.19 | 0.28 | -0.21 | 0.36 | -0.59 | 135 | 0.56 | 0.43 | 0.51 | 0.40 | 27 | 29 |
| HLA | 7 | 903 | C | 0.01 | 2.65 | 0.59 | D | -0.02 | 3.88 | 1.02 | -1.23 | 1.18 | -1.04 | 106 | 0.30 | 0.13 | 0.72 | -1.22 | 27 | 30 |
| HLA | 7 | 887 | C | -0.01 | -1.73 | 0.22 | D | 0.01 | -1.84 | 0.30 | 0.11 | 0.38 | 0.28 | 128 | 0.78 | 0.06 | 0.80 | 0.27 | 27 | 31 |
| HLA | 7 | 930 | C | 0.01 | -0.64 | 0.22 | D | -0.02 | -0.49 | 0.27 | -0.15 | 0.35 | -0.42 | 134 | 0.67 | 0.01 | 0.90 | 0.11 | 27 | 32 |
| HLA | 7 | 880 | C | 0.01 | 0.84 | 0.29 | D | -0.01 | 1.00 | 0.34 | -0.17 | 0.45 | -0.37 | 141 | 0.71 | 0.00 | 0.97 | -0.12 | 27 | 33 |
| HLA | 7 | 1096 | C | 0.02 | -0.35 | 0.12 | D | -0.02 | -0.29 | 0.14 | -0.05 | 0.19 | -0.29 | 137 | 0.77 | 0.59 | 0.44 | 0.29 | 27 | 34 |
| HLA | 7 | 875 | C | 0.01 | -0.97 | 0.22 | D | -0.02 | -0.79 | 0.27 | -0.18 | 0.35 | -0.51 | 133 | 0.61 | 0.09 | 0.76 | 0.25 | 27 | 35 |
| HLA | 7 | 811 | C | 0.00 | 0.03 | 0.24 | D | 0.01 | -0.03 | 0.28 | 0.05 | 0.37 | 0.15 | 140 | 0.88 | 0.00 | 0.99 | 0.10 | 27 | 36 |
| HLA | 7 | 869 | C | -0.03 | 2.65 | 0.59 | D | 0.04 | 1.54 | 0.40 | 1.11 | 0.71 | 1.56 | 156 | 0.12 | 0.80 | 0.37 | 1.91 | 27 | 37 |
| HLA | 7 | 879 | C | 0.04 | -0.30 | 0.23 | D | -0.06 | 0.22 | 0.29 | -0.52 | 0.37 | -1.40 | 132 | 0.16 | 0.02 | 0.90 | 0.03 | 27 | 38 |
| HLA | 7 | 897 | C | -0.03 | -0.69 | 0.22 | D | 0.04 | -1.02 | 0.28 | 0.33 | 0.35 | 0.94 | 134 | 0.35 | 0.00 | 0.99 | 0.09 | 27 | 39 |
| HLA | 7 | 1182 | C | -0.01 | 0.39 | 0.26 | D | 0.01 | 0.31 | 0.30 | 0.09 | 0.39 | 0.22 | 143 | 0.83 | 0.06 | 0.81 | -0.02 | 27 | 40 |
| HLA | 7 | 891 | C | -0.04 | 0.59 | 0.27 | D | 0.06 | -0.03 | 0.28 | 0.62 | 0.39 | 1.59 | 150 | 0.11 | 0.02 | 0.89 | 0.20 | 27 | 41 |
| HLA | 7 | 874 | C | 0.01 | 1.45 | 0.36 | D | -0.01 | 1.71 | 0.42 | -0.27 | 0.55 | -0.48 | 140 | 0.63 | 0.02 | 0.89 | -0.38 | 27 | 42 |
| HLA | 7 | 1179 | C | -0.02 | 1.33 | 0.34 | D | 0.03 | 0.89 | 0.33 | 0.43 | 0.48 | 0.91 | 155 | 0.36 | 0.05 | 0.82 | 0.04 | 27 | 43 |
| HLA | 7 | 870 | C | -0.03 | 2.65 | 0.59 | D | 0.04 | 1.54 | 0.40 | 1.11 | 0.71 | 1.55 | 155 | 0.12 | 0.11 | 0.74 | -0.19 | 27 | 44 |
| HLA | 7 | 872 | C | -0.03 | 0.69 | 0.15 | D | 0.05 | 0.55 | 0.14 | 0.14 | 0.21 | 0.68 | 155 | 0.50 | 0.45 | 0.50 | -0.33 | 27 | 45 |
| HLA | 7 | 889 | C | 0.04 | 0.24 | 0.14 | D | -0.06 | 0.41 | 0.16 | -0.16 | 0.21 | -0.78 | 141 | 0.43 | 1.28 | 0.26 | -0.52 | 27 | 46 |
| HLA | 7 | 829 | C | -0.03 | -0.80 | 0.22 | D | 0.05 | -1.17 | 0.28 | 0.38 | 0.35 | 1.07 | 132 | 0.29 | 1.04 | 0.31 | 0.48 | 27 | 47 |
| HLA | 7 | 839 | C | -0.07 | 0.83 | 0.29 | D | 0.11 | -0.26 | 0.28 | 1.10 | 0.40 | 2.73 | 156 | 0.01 | 5.11 | 0.02 | 1.32 | 27 | 48 |
| HLA | 7 | 899 | C | -0.03 | -0.56 | 0.22 | D | 0.04 | -0.87 | 0.27 | 0.31 | 0.35 | 0.88 | 135 | 0.38 | 2.24 | 0.13 | 0.79 | 27 | 49 |
| HLA | 7 | 876 | C | 0.06 | 0.45 | 0.26 | D | -0.09 | 1.71 | 0.42 | -1.26 | 0.50 | -2.54 | 111 | 0.01 | 1.82 | 0.18 | -0.77 | 27 | 50 |
| HLA | 7 | 770 | C | -0.04 | 1.00 | 0.23 | D | 0.07 | 0.58 | 0.21 | 0.42 | 0.31 | 1.34 | 158 | 0.18 | 0.06 | 0.80 | 0.12 | 27 | 51 |
| HLA | 7 | 834 | C | -0.05 | -0.36 | 0.23 | D | 0.08 | -1.02 | 0.28 | 0.66 | 0.36 | 1.86 | 137 | 0.07 | 0.70 | 0.40 | 0.54 | 27 | 52 |
| HLA | 7 | 884 | C | 0.03 | 1.01 | 0.31 | D | -0.05 | 1.90 | 0.45 | -0.89 | 0.54 | -1.64 | 120 | 0.10 | 1.28 | 0.26 | -1.01 | 27 | 53 |
| HLA | 7 | 902 | C | -0.01 | 0.02 | 0.24 | D | 0.01 | -0.11 | 0.28 | 0.13 | 0.37 | 0.34 | 140 | 0.73 | 0.81 | 0.37 | -0.46 | 27 | 54 |
| HLA | 7 | 1104 | C | 0.00 | 0.39 | 0.26 | D | 0.00 | 0.39 | 0.30 | 0.00 | 0.40 | 0.00 | 141 | 1.00 | 0.00 | 0.97 | -0.13 | 27 | 55 |
| HLA | 7 | 822 | C | -0.01 | 2.34 | 0.52 | D | 0.01 | 1.90 | 0.45 | 0.44 | 0.68 | 0.65 | 159 | 0.52 | 0.57 | 0.45 | 0.84 | 27 | 56 |
| HLA | 7 | 1032 | C | 0.10 | -0.86 | 0.09 | D | -0.16 | -0.65 | 0.12 | -0.21 | 0.15 | -1.46 | 129 | 0.15 | 2.23 | 0.14 | -0.61 | 27 | 57 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 909 | C | 0.01 | -2.69 | 0.31 | D | -0.01 | -2.50 | 0.39 | -0.19 | 0.50 | -0.39 | 123 | 0.70 | 0.64 | 0.42 | -0.63 | 26 | 1 |
| HLA | 8 | 917 | C | -0.03 | -3.01 | 0.34 | D | 0.04 | -4.28 | 0.74 | 1.27 | 0.81 | 1.56 | 85 | 0.12 | 0.95 | 0.33 | 0.90 | 26 | 2 |
| HLA | 8 | 894 | C | 0.02 | 0.51 | 0.29 | D | -0.03 | 0.84 | 0.32 | -0.34 | 0.43 | -0.79 | 130 | 0.43 | 0.96 | 0.33 | -0.90 | 26 | 3 |
| HLA | 8 | 867 | C | -0.01 | 0.98 | 0.33 | D | 0.02 | 0.75 | 0.31 | 0.23 | 0.45 | 0.51 | 135 | 0.61 | 0.37 | 0.54 | 0.53 | 26 | 4 |
| HLA | 8 | 913 | C | 0.00 | 1.32 | 0.36 | D | 0.00 | 1.28 | 0.35 | 0.05 | 0.50 | 0.10 | 135 | 0.92 | 0.17 | 0.68 | 0.42 | 26 | 5 |
| HLA | 8 | 929 | C | -0.05 | -1.86 | 0.27 | D | 0.06 | -2.65 | 0.41 | 0.79 | 0.49 | 1.63 | 107 | 0.11 | 1.52 | 0.22 | 1.01 | 26 | 6 |
| HLA | 8 | 904 | C | -0.01 | -1.86 | 0.27 | D | 0.01 | -1.97 | 0.34 | 0.11 | 0.43 | 0.25 | 120 | 0.80 | 0.11 | 0.74 | 0.38 | 26 | 7 |
| HLA | 8 | 927 | C | 0.00 | -1.65 | 0.26 | D | 0.00 | -1.65 | 0.32 | 0.00 | 0.41 | 0.00 | 123 | 1.00 | 0.34 | 0.56 | -0.44 | 26 | 8 |
| HLA | 8 | 1127 | C | 0.00 | 0.87 | 0.32 | D | -0.01 | 0.94 | 0.32 | -0.07 | 0.45 | -0.16 | 133 | 0.87 | 0.01 | 0.93 | -0.22 | 26 | 9 |
| HLA | 8 | 855 | C | 0.01 | -0.95 | 0.25 | D | -0.01 | -0.84 | 0.29 | -0.11 | 0.38 | -0.28 | 127 | 0.78 | 1.85 | 0.17 | 0.67 | 26 | 10 |
| HLA | 8 | 1126 | C | -0.01 | -2.50 | 0.30 | D | 0.01 | -2.65 | 0.41 | 0.15 | 0.50 | 0.31 | 116 | 0.76 | 0.03 | 0.87 | 0.11 | 26 | 11 |
| HLA | 8 | 848 | C | -0.05 | -2.01 | 0.27 | D | 0.06 | -2.83 | 0.43 | 0.82 | 0.51 | 1.61 | 105 | 0.11 | 2.32 | 0.13 | 0.93 | 26 | 12 |
| HLA | 8 | 802 | C | 0.00 | 3.16 | 0.73 | D | 0.00 | 2.98 | 0.61 | 0.18 | 0.95 | 0.19 | 135 | 0.85 | 0.22 | 0.64 | 0.29 | 26 | 13 |
| HLA | 8 | 771 | C | 0.00 | 0.40 | 0.29 | D | 0.00 | 0.38 | 0.29 | 0.02 | 0.41 | 0.05 | 133 | 0.96 | 0.38 | 0.54 | -0.50 | 26 | 14 |
| HLA | 8 | 785 | C | 0.06 | -0.88 | 0.25 | D | -0.08 | -0.20 | 0.28 | -0.69 | 0.38 | -1.82 | 128 | 0.07 | 4.82 | 0.03 | -0.98 | 26 | 15 |
| HLA | 8 | 767 | C | -0.07 | -0.19 | 0.17 | D | 0.09 | -0.52 | 0.18 | 0.32 | 0.25 | 1.32 | 132 | 0.19 | 1.06 | 0.30 | 0.46 | 26 | 16 |
| HLA | 8 | 914 | C | 0.09 | -0.10 | 0.26 | D | -0.12 | 1.16 | 0.34 | -1.26 | 0.43 | -2.96 | 120 | 0.00 | 4.00 | 0.05 | -1.11 | 26 | 17 |
| HLA | 8 | 921 | C | -0.04 | -0.76 | 0.25 | D | 0.05 | -1.18 | 0.30 | 0.42 | 0.39 | 1.09 | 125 | 0.28 | 0.02 | 0.88 | 0.22 | 26 | 18 |
| HLA | 8 | 911 | C | 0.05 | 0.44 | 0.19 | D | -0.06 | 0.72 | 0.20 | -0.28 | 0.27 | -1.01 | 130 | 0.31 | 2.52 | 0.11 | -0.77 | 26 | 19 |
| HLA | 8 | 833 | C | 0.00 | -1.20 | 0.25 | D | 0.01 | -1.25 | 0.30 | 0.05 | 0.39 | 0.13 | 123 | 0.89 | 0.10 | 0.75 | -0.30 | 26 | 20 |
| HLA | 8 | 912 | C | 0.00 | -0.02 | 0.27 | D | 0.00 | -0.02 | 0.29 | 0.00 | 0.39 | 0.00 | 129 | 1.00 | 0.01 | 0.93 | 0.08 | 26 | 21 |
| HLA | 8 | 916 | C | -0.03 | 1.09 | 0.33 | D | 0.04 | 0.62 | 0.31 | 0.47 | 0.45 | 1.03 | 134 | 0.30 | 0.00 | 0.97 | 0.15 | 26 | 22 |
| HLA | 8 | 796 | C | 0.00 | 0.04 | 0.27 | D | -0.01 | 0.09 | 0.29 | -0.05 | 0.40 | -0.12 | 129 | 0.90 | 2.68 | 0.10 | 0.84 | 26 | 23 |
| HLA | 8 | 793 | C | -0.01 | | 1.84 | D | 0.01 | 3.41 | 0.73 | 1.71 | 1.98 | 0.87 | 98 | 0.39 | | | | 26 | 24 |
| HLA | 8 | 772 | C | -0.01 | 1.61 | 0.39 | D | 0.01 | 1.37 | 0.36 | 0.23 | 0.53 | 0.44 | 134 | 0.66 | 0.53 | 0.46 | -1.41 | 26 | 25 |
| HLA | 8 | 810 | C | 0.01 | 2.73 | 0.60 | D | -0.01 | 3.41 | 0.73 | -0.68 | 0.95 | -0.71 | 122 | 0.48 | 1.18 | 0.28 | | 26 | 26 |
| HLA | 8 | 1079 | C | -0.07 | -0.17 | 0.26 | D | 0.09 | -0.99 | 0.29 | 0.81 | 0.39 | 2.07 | 127 | 0.04 | 1.90 | 0.17 | 0.80 | 26 | 27 |
| HLA | 8 | 761 | C | -0.04 | 0.87 | 0.32 | D | 0.06 | 0.26 | 0.29 | 0.62 | 0.43 | 1.43 | 134 | 0.16 | 1.31 | 0.25 | 0.94 | 26 | 28 |
| HLA | 8 | 910 | C | 0.06 | -1.52 | 0.26 | D | -0.08 | -0.82 | 0.29 | -0.70 | 0.39 | -1.82 | 127 | 0.07 | 2.38 | 0.12 | -1.04 | 26 | 29 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 906 | C | 0.02 | -0.50 | 0.25 | D | -0.03 | -0.24 | 0.29 | -0.26 | 0.38 | -0.68 | 127 | 0.50 | 0.01 | 0.94 | -0.19 | 26 | 30 |
| HLA | 8 | 922 | C | 0.03 | -0.69 | 0.25 | D | -0.04 | -0.32 | 0.29 | -0.37 | 0.38 | -0.97 | 126 | 0.33 | 0.00 | 0.99 | -0.15 | 26 | 31 |
| HLA | 8 | 1190 | C | -0.01 | -0.57 | 0.25 | D | 0.02 | -0.73 | 0.29 | 0.17 | 0.38 | 0.43 | 126 | 0.67 | 0.03 | 0.87 | 0.19 | 26 | 32 |
| HLA | 8 | 1105 | C | 0.04 | 0.04 | 0.27 | D | -0.05 | 0.52 | 0.30 | -0.48 | 0.41 | -1.20 | 127 | 0.23 | 0.72 | 0.40 | 0.52 | 26 | 33 |
| HLA | 8 | 893 | C | 0.04 | 0.19 | 0.27 | D | -0.05 | 0.71 | 0.31 | -0.53 | 0.42 | -1.27 | 126 | 0.21 | 0.29 | 0.59 | -0.37 | 26 | 34 |
| HLA | 8 | 1078 | C | 0.01 | 0.19 | 0.27 | D | -0.02 | 0.34 | 0.30 | -0.16 | 0.40 | -0.39 | 129 | 0.70 | 0.01 | 0.92 | 0.07 | 26 | 35 |
| HLA | 8 | 926 | C | 0.05 | -0.31 | 0.26 | D | -0.06 | 0.26 | 0.29 | -0.56 | 0.39 | -1.44 | 126 | 0.15 | 0.28 | 0.60 | -0.39 | 26 | 36 |
| HLA | 8 | 1210 | C | 0.04 | -0.31 | 0.26 | D | -0.05 | 0.17 | 0.29 | -0.48 | 0.39 | -1.23 | 127 | 0.22 | 0.37 | 0.54 | -0.38 | 26 | 37 |
| HLA | 8 | 820 | C | -0.03 | 0.71 | 0.15 | D | 0.04 | 0.60 | 0.15 | 0.11 | 0.21 | 0.50 | 133 | 0.62 | 0.03 | 0.86 | -0.08 | 26 | 38 |
| HLA | 8 | 780 | C | 0.04 | 0.93 | 0.15 | D | -0.05 | 1.09 | 0.16 | -0.16 | 0.22 | -0.73 | 129 | 0.47 | 0.02 | 0.89 | -0.06 | 26 | 39 |
| HLA | 8 | 1212 | C | 0.01 | -0.82 | 0.25 | D | -0.02 | -0.65 | 0.29 | -0.17 | 0.38 | -0.45 | 126 | 0.66 | 0.00 | 0.96 | -0.10 | 26 | 40 |
| HLA | 8 | 925 | C | -0.03 | -0.63 | 0.25 | D | 0.04 | -0.99 | 0.29 | 0.35 | 0.39 | 0.92 | 125 | 0.36 | 0.00 | 0.95 | 0.09 | 26 | 41 |
| HLA | 8 | 905 | C | -0.01 | 0.19 | 0.27 | D | 0.01 | 0.09 | 0.29 | 0.10 | 0.40 | 0.25 | 130 | 0.80 | 0.18 | 0.67 | -0.33 | 26 | 42 |
| HLA | 8 | 1214 | C | 0.00 | 0.25 | 0.13 | D | 0.00 | 0.25 | 0.13 | 0.00 | 0.19 | 0.00 | 133 | 1.00 | 0.00 | 0.96 | 0.02 | 26 | 43 |
| HLA | 8 | 1192 | C | 0.03 | -1.78 | 0.27 | D | -0.04 | -1.34 | 0.31 | -0.44 | 0.40 | -1.09 | 125 | 0.28 | 0.29 | 0.59 | -0.38 | 25 | 44 |
| HLA | 8 | 1199 | C | -0.06 | -0.14 | 0.26 | D | 0.08 | -0.82 | 0.29 | 0.68 | 0.39 | 1.73 | 128 | 0.09 | 0.25 | 0.62 | 0.49 | 25 | 45 |
| HLA | 8 | 1201 | C | 0.01 | 0.15 | 0.28 | D | -0.01 | 0.26 | 0.29 | -0.11 | 0.40 | -0.26 | 129 | 0.79 | 0.66 | 0.42 | -0.83 | 25 | 46 |
| HLA | 8 | 901 | C | -0.01 | 1.06 | 0.34 | D | 0.01 | 0.91 | 0.32 | 0.14 | 0.47 | 0.31 | 133 | 0.76 | 0.23 | 0.64 | -0.61 | 25 | 47 |
| HLA | 8 | 764 | C | -0.07 | 1.74 | 0.42 | D | 0.09 | 0.52 | 0.30 | 1.22 | 0.51 | 2.37 | 129 | 0.02 | 1.38 | 0.24 | 0.87 | 25 | 48 |
| HLA | 8 | 924 | C | -0.02 | 0.95 | 0.33 | D | 0.02 | 0.71 | 0.31 | 0.23 | 0.45 | 0.52 | 133 | 0.60 | 1.15 | 0.28 | 0.88 | 25 | 49 |
| HLA | 8 | 805 | C | 0.04 | -0.67 | 0.25 | D | -0.05 | -0.24 | 0.29 | -0.43 | 0.38 | -1.13 | 126 | 0.26 | 0.00 | 0.98 | 0.10 | 25 | 50 |
| HLA | 8 | 1092 | C | 0.02 | 1.43 | 0.38 | D | -0.03 | 1.97 | 0.42 | -0.54 | 0.57 | -0.95 | 126 | 0.34 | 0.14 | 0.71 | -0.50 | 25 | 51 |
| HLA | 8 | 920 | C | -0.03 | 0.15 | 0.28 | D | 0.03 | -0.16 | 0.29 | 0.31 | 0.40 | 0.79 | 130 | 0.43 | 0.00 | 1.00 | -0.13 | 25 | 52 |
| HLA | 8 | 766 | C | 0.00 | 2.39 | 0.53 | D | 0.00 | 2.39 | 0.49 | 0.00 | 0.72 | 0.00 | 133 | 1.00 | 0.26 | 0.61 | 1.04 | 25 | 53 |
| HLA | 8 | 826 | C | 0.02 | -0.14 | 0.26 | D | -0.02 | 0.09 | 0.29 | -0.23 | 0.39 | -0.58 | 128 | 0.57 | 0.01 | 0.91 | -0.17 | 25 | 54 |
| HLA | 8 | 778 | C | -0.06 | 0.65 | 0.30 | D | 0.07 | -0.08 | 0.29 | 0.73 | 0.42 | 1.75 | 133 | 0.08 | 3.89 | 0.05 | 1.29 | 25 | 55 |
| HLA | 8 | 1034 | C | 0.02 | -0.57 | 0.10 | D | -0.02 | -0.57 | 0.12 | 0.00 | 0.16 | 0.00 | 119 | 1.00 | 0.19 | 0.66 | -0.17 | 25 | 56 |

## Appendix Table I.2:Hawaiian Language Arts: DIF Gender

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 93 | F | 0.00 | -2.07 | 0.20 | M | 0.00 | -2.12 | 0.21 | 0.05 | 0.29 | 0.17 | 262 | 0.87 | 0.03 | 0.86 | 0.12 | 33 | 1 |
| HLA | 3 | 101 | F | 0.02 | 0.04 | 0.18 | M | -0.03 | 0.32 | 0.24 | -0.28 | 0.30 | -0.94 | 239 | 0.35 | 0.18 | 0.67 | -0.20 | 33 | 2 |
| HLA | 3 | 381 | F | 0.03 | -0.03 | 0.18 | M | -0.04 | 0.44 | 0.24 | -0.46 | 0.30 | -1.52 | 234 | 0.13 | 3.61 | 0.06 | -0.81 | 33 | 3 |
| HLA | 3 | 108 | F | -0.04 | 0.18 | 0.19 | M | 0.05 | -0.27 | 0.21 | 0.45 | 0.28 | 1.59 | 257 | 0.11 | 5.96 | 0.01 | 1.04 | 33 | 4 |
| HLA | 3 | 94 | F | 0.05 | -2.23 | 0.20 | M | -0.07 | -1.57 | 0.20 | -0.66 | 0.29 | -2.32 | 270 | 0.02 | 4.34 | 0.04 | -0.77 | 33 | 5 |
| HLA | 3 | 99 | F | 0.02 | -0.57 | 0.18 | M | -0.02 | -0.36 | 0.21 | -0.21 | 0.27 | -0.77 | 249 | 0.44 | 0.27 | 0.60 | -0.21 | 33 | 6 |
| HLA | 3 | 89 | F | -0.03 | -0.48 | 0.18 | M | 0.04 | -0.86 | 0.20 | 0.38 | 0.27 | 1.43 | 256 | 0.16 | 1.48 | 0.22 | 0.42 | 33 | 7 |
| HLA | 3 | 1026 | F | -0.02 | 0.72 | 0.21 | M | 0.02 | 0.44 | 0.24 | 0.29 | 0.32 | 0.90 | 252 | 0.37 | 5.80 | 0.02 | 1.18 | 33 | 8 |
| HLA | 3 | 84 | F | 0.02 | -1.06 | 0.18 | M | -0.03 | -0.82 | 0.20 | -0.24 | 0.27 | -0.91 | 255 | 0.36 | 0.01 | 0.91 | -0.09 | 33 | 9 |
| HLA | 3 | 88 | F | -0.02 | 0.29 | 0.19 | M | 0.03 | 0.01 | 0.22 | 0.28 | 0.29 | 0.95 | 253 | 0.34 | 1.37 | 0.24 | 0.49 | 33 | 10 |
| HLA | 3 | 90 | F | 0.04 | -2.50 | 0.22 | M | -0.06 | -1.90 | 0.21 | -0.60 | 0.30 | -2.00 | 272 | 0.05 | 0.93 | 0.33 | -0.42 | 33 | 11 |
| HLA | 3 | 91 | F | 0.01 | -1.88 | 0.19 | M | -0.01 | -1.77 | 0.20 | -0.11 | 0.28 | -0.39 | 263 | 0.70 | 0.19 | 0.66 | 0.21 | 33 | 12 |
| HLA | 3 | 87 | F | 0.02 | 0.77 | 0.21 | M | -0.02 | 1.13 | 0.29 | -0.36 | 0.36 | -1.02 | 225 | 0.31 | 0.03 | 0.86 | -0.01 | 33 | 13 |
| HLA | 3 | 92 | F | 0.04 | -0.13 | 0.18 | M | -0.05 | 0.38 | 0.24 | -0.50 | 0.30 | -1.68 | 234 | 0.09 | 0.28 | 0.59 | -0.28 | 33 | 14 |
| HLA | 3 | 1023 | F | 0.03 | 0.68 | 0.21 | M | -0.04 | 1.22 | 0.30 | -0.54 | 0.36 | -1.48 | 218 | 0.14 | 2.95 | 0.09 | -0.86 | 33 | 15 |
| HLA | 3 | 95 | F | 0.05 | -0.09 | 0.18 | M | -0.06 | 0.56 | 0.25 | -0.65 | 0.31 | -2.11 | 228 | 0.04 | 5.22 | 0.02 | -0.99 | 33 | 16 |
| HLA | 3 | 97 | F | 0.00 | 0.11 | 0.19 | M | 0.00 | 0.16 | 0.23 | -0.05 | 0.29 | -0.17 | 246 | 0.86 | 0.00 | 0.98 | 0.08 | 33 | 17 |
| HLA | 3 | 96 | F | -0.02 | 1.05 | 0.22 | M | 0.02 | 0.75 | 0.26 | 0.29 | 0.34 | 0.86 | 251 | 0.39 | 0.31 | 0.58 | 0.33 | 33 | 18 |
| HLA | 3 | 107 | F | -0.01 | -0.94 | 0.17 | M | 0.01 | -1.06 | 0.20 | 0.12 | 0.26 | 0.45 | 256 | 0.66 | 0.00 | 0.98 | 0.04 | 33 | 19 |
| HLA | 3 | 104 | F | 0.03 | 1.19 | 0.23 | M | -0.04 | 2.05 | 0.40 | -0.85 | 0.46 | -1.84 | 192 | 0.07 | 1.45 | 0.23 | -0.98 | 33 | 20 |
| HLA | 3 | 383 | F | -0.05 | -1.46 | 0.18 | M | 0.06 | -2.03 | 0.21 | 0.57 | 0.28 | 2.06 | 252 | 0.04 | 2.72 | 0.10 | 0.54 | 33 | 21 |
| HLA | 3 | 161 | F | -0.02 | -0.43 | 0.18 | M | 0.02 | -0.61 | 0.20 | 0.19 | 0.27 | 0.70 | 254 | 0.49 | 0.52 | 0.47 | 0.28 | 33 | 22 |
| HLA | 3 | 162 | F | 0.01 | -1.08 | 0.18 | M | -0.01 | -0.98 | 0.20 | -0.10 | 0.27 | -0.37 | 256 | 0.71 | 0.50 | 0.48 | 0.28 | 33 | 23 |
| HLA | 3 | 1025 | F | 0.00 | 1.54 | 0.25 | M | 0.00 | 1.54 | 0.33 | 0.00 | 0.42 | 0.00 | 235 | 1.00 | 0.05 | 0.82 | 0.00 | 33 | 24 |
| HLA | 3 | 110 | F | -0.01 | 0.00 | 0.18 | M | 0.02 | -0.18 | 0.21 | 0.18 | 0.28 | 0.63 | 252 | 0.53 | 0.23 | 0.63 | 0.20 | 33 | 25 |
| HLA | 3 | 113 | F | 0.00 | 2.39 | 0.33 | M | 0.00 | 2.42 | 0.47 | -0.03 | 0.57 | -0.06 | 222 | 0.95 | 0.10 | 0.75 | -0.03 | 33 | 26 |
| HLA | 3 | 1024 | F | 0.02 | 0.59 | 0.12 | M | -0.03 | 0.71 | 0.16 | -0.12 | 0.20 | -0.61 | 230 | 0.54 | 0.10 | 0.75 | 0.13 | 33 | 27 |
| HLA | 3 | 117 | F | 0.01 | -1.30 | 0.18 | M | -0.01 | -1.17 | 0.20 | -0.12 | 0.27 | -0.46 | 258 | 0.65 | 0.01 | 0.94 | 0.03 | 33 | 28 |
| HLA | 3 | 1020 | F | 0.02 | 0.94 | 0.16 | M | -0.02 | 1.11 | 0.22 | -0.17 | 0.27 | -0.62 | 222 | 0.53 | 0.03 | 0.87 | -0.08 | 33 | 29 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 114 | F | -0.01 | -0.49 | 0.18 | M | 0.01 | -0.57 | 0.20 | 0.08 | 0.27 | 0.31 | 253 | 0.76 | 0.53 | 0.47 | -0.25 | 33 | 30 |
| HLA | 3 | 112 | F | 0.01 | 1.68 | 0.26 | M | -0.02 | 2.22 | 0.43 | -0.54 | 0.51 | -1.07 | 201 | 0.29 | 0.02 | 0.89 | -0.33 | 33 | 31 |
| HLA | 3 | 1022 | F | -0.01 | -0.17 | 0.18 | M | 0.02 | -0.31 | 0.21 | 0.15 | 0.28 | 0.53 | 252 | 0.60 | 0.06 | 0.81 | -0.11 | 33 | 32 |
| HLA | 3 | 119 | F | -0.09 | 0.36 | 0.19 | M | 0.12 | -0.74 | 0.20 | 1.09 | 0.28 | 3.90 | 265 | 0.00 | 9.25 | 0.00 | 1.04 | 33 | 33 |
| HLA | 3 | 379 | F | 0.01 | 1.91 | 0.20 | M | -0.01 | 2.11 | 0.29 | -0.19 | 0.35 | -0.55 | 220 | 0.58 | 0.93 | 0.34 | -0.53 | 33 | 34 |
| HLA | 3 | 130 | F | -0.03 | -0.07 | 0.18 | M | 0.05 | -0.49 | 0.21 | 0.42 | 0.28 | 1.52 | 256 | 0.13 | 0.06 | 0.80 | 0.11 | 33 | 35 |
| HLA | 3 | 125 | F | -0.01 | -0.55 | 0.18 | M | 0.02 | -0.70 | 0.20 | 0.14 | 0.27 | 0.54 | 254 | 0.59 | 0.56 | 0.45 | 0.29 | 33 | 36 |
| HLA | 3 | 143 | F | 0.01 | 0.43 | 0.20 | M | -0.01 | 0.56 | 0.25 | -0.13 | 0.32 | -0.40 | 240 | 0.69 | 0.83 | 0.36 | -0.39 | 33 | 37 |
| HLA | 3 | 123 | F | -0.04 | -0.33 | 0.18 | M | 0.05 | -0.74 | 0.20 | 0.40 | 0.27 | 1.49 | 256 | 0.14 | 0.01 | 0.93 | 0.07 | 33 | 38 |
| HLA | 3 | 137 | F | 0.00 | -0.17 | 0.18 | M | 0.00 | -0.17 | 0.21 | 0.00 | 0.28 | 0.00 | 249 | 1.00 | 0.19 | 0.67 | -0.19 | 33 | 39 |
| HLA | 3 | 127 | F | 0.01 | 2.89 | 0.40 | M | -0.02 | | 1.84 | -2.45 | 1.89 | -1.30 | 129 | 0.20 | 0.25 | 0.61 | | 33 | 40 |
| HLA | 3 | 158 | F | 0.01 | -0.27 | 0.18 | M | -0.01 | -0.18 | 0.21 | -0.09 | 0.28 | -0.32 | 248 | 0.75 | 0.19 | 0.66 | -0.20 | 33 | 41 |
| HLA | 3 | 1021 | F | 0.00 | -0.93 | 0.18 | M | 0.01 | -0.98 | 0.20 | 0.05 | 0.27 | 0.19 | 255 | 0.85 | 0.07 | 0.79 | 0.11 | 33 | 42 |
| HLA | 3 | 384 | F | 0.00 | -1.47 | 0.18 | M | -0.01 | -1.41 | 0.20 | -0.06 | 0.27 | -0.21 | 259 | 0.83 | 0.87 | 0.35 | -0.31 | 33 | 43 |
| HLA | 3 | 156 | F | 0.00 | 0.23 | 0.19 | M | 0.00 | 0.23 | 0.23 | 0.00 | 0.30 | 0.00 | 247 | 1.00 | 0.02 | 0.89 | -0.09 | 33 | 44 |
| HLA | 3 | 150 | F | 0.00 | -1.63 | 0.19 | M | 0.01 | -1.69 | 0.20 | 0.05 | 0.27 | 0.20 | 259 | 0.84 | 0.00 | 0.98 | -0.04 | 33 | 45 |
| HLA | 3 | 138 | F | 0.04 | 0.98 | 0.16 | M | -0.05 | 1.45 | 0.23 | -0.47 | 0.28 | -1.66 | 213 | 0.10 | 2.51 | 0.11 | -0.64 | 33 | 46 |
| HLA | 3 | 145 | F | 0.05 | -1.53 | 0.18 | M | -0.07 | -0.94 | 0.20 | -0.60 | 0.27 | -2.20 | 260 | 0.03 | 4.21 | 0.04 | -0.73 | 33 | 47 |
| HLA | 3 | 1286 | F | 0.02 | 1.61 | 0.26 | M | -0.02 | 2.22 | 0.43 | -0.61 | 0.50 | -1.21 | 198 | 0.23 | 1.41 | 0.24 | -0.89 | 33 | 48 |
| HLA | 3 | 1282 | F | -0.03 | -0.24 | 0.18 | M | 0.04 | -0.57 | 0.20 | 0.33 | 0.27 | 1.23 | 255 | 0.22 | 0.70 | 0.40 | 0.30 | 33 | 49 |
| HLA | 3 | 1285 | F | 0.01 | 2.37 | 0.33 | M | -0.02 | 3.40 | 0.72 | -1.03 | 0.79 | -1.30 | 166 | 0.19 | 0.13 | 0.72 | -0.61 | 33 | 50 |
| HLA | 3 | 1277 | F | -0.02 | 0.63 | 0.20 | M | 0.03 | 0.27 | 0.23 | 0.36 | 0.31 | 1.17 | 254 | 0.24 | 0.10 | 0.75 | 0.17 | 33 | 51 |
| HLA | 3 | 1281 | F | 0.01 | -0.52 | 0.18 | M | -0.01 | -0.45 | 0.21 | -0.08 | 0.27 | -0.29 | 251 | 0.77 | 0.72 | 0.40 | -0.31 | 33 | 52 |
| HLA | 3 | 1283 | F | 0.02 | -1.11 | 0.18 | M | -0.03 | -0.86 | 0.20 | -0.25 | 0.27 | -0.94 | 255 | 0.35 | 0.36 | 0.55 | -0.23 | 33 | 53 |
| HLA | 3 | 1284 | F | 0.00 | 0.56 | 0.14 | M | 0.00 | 0.56 | 0.18 | 0.00 | 0.23 | 0.00 | 239 | 1.00 | 0.00 | 0.98 | 0.01 | 33 | 54 |
| HLA | 3 | 1478 | F | -0.05 | 0.08 | 0.19 | M | 0.06 | -0.49 | 0.21 | 0.56 | 0.28 | 2.03 | 258 | 0.04 | 0.18 | 0.67 | 0.19 | 33 | 55 |
| HLA | 3 | 1280 | F | -0.01 | 0.41 | 0.20 | M | 0.01 | 0.32 | 0.24 | 0.09 | 0.31 | 0.28 | 247 | 0.78 | 0.12 | 0.72 | -0.17 | 33 | 56 |
| HLA | 3 | 394 | F | -0.11 | -0.20 | 0.07 | M | 0.15 | -0.42 | 0.09 | 0.22 | 0.11 | 1.95 | 247 | 0.05 | 2.39 | 0.12 | 0.40 | 33 | 57 |
| HLA | 4 | 18 | F | -0.06 | -0.53 | 0.19 | M | 0.06 | -1.12 | 0.20 | 0.59 | 0.27 | 2.15 | 250 | 0.03 | 2.40 | 0.12 | 0.56 | 33 | 1 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 389 | F | 0.01 | -1.71 | 0.23 | M | -0.01 | -1.56 | 0.21 | -0.14 | 0.31 | -0.46 | 249 | 0.65 | 0.10 | 0.75 | 0.22 | 33 | 2 |
| HLA | 4 | 21 | F | -0.01 | 0.04 | 0.19 | M | 0.01 | -0.06 | 0.20 | 0.10 | 0.27 | 0.37 | 249 | 0.71 | 0.14 | 0.71 | -0.16 | 33 | 3 |
| HLA | 4 | 7 | F | 0.03 | -2.05 | 0.25 | M | -0.03 | -1.65 | 0.21 | -0.40 | 0.33 | -1.23 | 245 | 0.22 | 0.02 | 0.89 | -0.14 | 33 | 4 |
| HLA | 4 | 12 | F | -0.01 | -1.27 | 0.21 | M | 0.01 | -1.40 | 0.20 | 0.12 | 0.29 | 0.41 | 250 | 0.68 | 0.10 | 0.76 | 0.16 | 33 | 5 |
| HLA | 4 | 64 | F | 0.01 | -1.32 | 0.21 | M | -0.01 | -1.23 | 0.20 | -0.08 | 0.29 | -0.29 | 250 | 0.77 | 0.03 | 0.87 | -0.11 | 33 | 6 |
| HLA | 4 | 8 | F | 0.07 | -1.06 | 0.20 | M | -0.07 | -0.37 | 0.19 | -0.70 | 0.28 | -2.49 | 250 | 0.01 | 4.52 | 0.03 | -0.75 | 33 | 7 |
| HLA | 4 | 9 | F | -0.02 | 0.37 | 0.19 | M | 0.02 | 0.19 | 0.20 | 0.19 | 0.28 | 0.66 | 249 | 0.51 | 0.59 | 0.44 | 0.28 | 33 | 8 |
| HLA | 4 | 13 | F | 0.04 | -2.58 | 0.30 | M | -0.04 | -1.88 | 0.22 | -0.70 | 0.37 | -1.88 | 232 | 0.06 | 1.10 | 0.29 | -0.46 | 33 | 9 |
| HLA | 4 | 11 | F | 0.02 | 1.68 | 0.25 | M | -0.02 | 2.15 | 0.35 | -0.47 | 0.43 | -1.09 | 220 | 0.28 | 0.43 | 0.51 | -0.47 | 33 | 10 |
| HLA | 4 | 1019 | F | 0.04 | 0.37 | 0.19 | M | -0.05 | 0.90 | 0.24 | -0.52 | 0.30 | -1.72 | 239 | 0.09 | 2.39 | 0.12 | -0.61 | 33 | 11 |
| HLA | 4 | 14 | F | -0.01 | -1.19 | 0.21 | M | 0.01 | -1.31 | 0.20 | 0.13 | 0.29 | 0.44 | 250 | 0.66 | 0.02 | 0.88 | 0.00 | 33 | 12 |
| HLA | 4 | 16 | F | 0.00 | -1.07 | 0.20 | M | 0.00 | -1.07 | 0.20 | 0.00 | 0.28 | 0.00 | 250 | 1.00 | 0.33 | 0.56 | 0.26 | 33 | 13 |
| HLA | 4 | 15 | F | 0.05 | -0.68 | 0.19 | M | -0.05 | -0.17 | 0.20 | -0.50 | 0.28 | -1.82 | 250 | 0.07 | 1.63 | 0.20 | -0.45 | 33 | 14 |
| HLA | 4 | 17 | F | 0.01 | -0.17 | 0.19 | M | -0.01 | -0.10 | 0.20 | -0.07 | 0.27 | -0.27 | 249 | 0.79 | 0.38 | 0.54 | 0.28 | 33 | 15 |
| HLA | 4 | 65 | F | 0.00 | -1.71 | 0.23 | M | 0.00 | -1.65 | 0.21 | -0.06 | 0.31 | -0.18 | 250 | 0.86 | 0.18 | 0.67 | 0.23 | 33 | 16 |
| HLA | 4 | 20 | F | 0.03 | -1.60 | 0.22 | M | -0.03 | -1.23 | 0.20 | -0.37 | 0.30 | -1.23 | 248 | 0.22 | 0.03 | 0.87 | 0.13 | 33 | 17 |
| HLA | 4 | 22 | F | 0.02 | 0.19 | 0.19 | M | -0.02 | 0.40 | 0.21 | -0.21 | 0.28 | -0.75 | 246 | 0.45 | 1.04 | 0.31 | -0.33 | 33 | 18 |
| HLA | 4 | 23 | F | -0.08 | 0.41 | 0.19 | M | 0.08 | -0.33 | 0.19 | 0.74 | 0.27 | 2.68 | 250 | 0.01 | 2.10 | 0.15 | 0.47 | 33 | 19 |
| HLA | 4 | 30 | F | 0.01 | -0.21 | 0.19 | M | -0.01 | -0.14 | 0.20 | -0.07 | 0.27 | -0.25 | 249 | 0.80 | 0.00 | 0.98 | -0.03 | 33 | 20 |
| HLA | 4 | 34 | F | -0.02 | -0.42 | 0.19 | M | 0.02 | -0.59 | 0.19 | 0.17 | 0.27 | 0.63 | 250 | 0.53 | 1.76 | 0.19 | 0.44 | 33 | 21 |
| HLA | 4 | 35 | F | 0.03 | 1.50 | 0.17 | M | -0.03 | 1.78 | 0.24 | -0.28 | 0.30 | -0.94 | 218 | 0.35 | 0.00 | 0.94 | -0.03 | 33 | 22 |
| HLA | 4 | 24 | F | -0.01 | 0.72 | 0.20 | M | 0.01 | 0.59 | 0.22 | 0.13 | 0.30 | 0.44 | 247 | 0.66 | 0.87 | 0.35 | 0.39 | 33 | 23 |
| HLA | 4 | 36 | F | -0.01 | 0.12 | 0.19 | M | 0.01 | -0.02 | 0.20 | 0.13 | 0.28 | 0.49 | 249 | 0.63 | 1.04 | 0.31 | -0.35 | 33 | 24 |
| HLA | 4 | 1291 | F | -0.02 | 0.97 | 0.21 | M | 0.02 | 0.74 | 0.23 | 0.24 | 0.31 | 0.76 | 248 | 0.45 | 1.68 | 0.19 | 0.52 | 33 | 25 |
| HLA | 4 | 26 | F | -0.05 | 0.23 | 0.19 | M | 0.05 | -0.25 | 0.20 | 0.48 | 0.27 | 1.74 | 250 | 0.08 | 1.11 | 0.29 | 0.37 | 33 | 26 |
| HLA | 4 | 27 | F | 0.01 | -0.75 | 0.19 | M | -0.01 | -0.66 | 0.19 | -0.09 | 0.27 | -0.31 | 250 | 0.75 | 0.08 | 0.78 | -0.12 | 33 | 27 |
| HLA | 4 | 37 | F | -0.01 | 0.19 | 0.19 | M | 0.01 | 0.10 | 0.20 | 0.09 | 0.28 | 0.31 | 249 | 0.76 | 0.55 | 0.46 | -0.24 | 33 | 28 |
| HLA | 4 | 38 | F | 0.01 | -1.27 | 0.21 | M | -0.01 | -1.16 | 0.20 | -0.12 | 0.29 | -0.41 | 250 | 0.68 | 0.15 | 0.70 | -0.19 | 33 | 29 |
| HLA | 4 | 31 | F | -0.04 | 0.08 | 0.19 | M | 0.04 | -0.29 | 0.20 | 0.37 | 0.27 | 1.36 | 250 | 0.18 | 1.47 | 0.22 | 0.42 | 33 | 30 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 25 | F | -0.05 | 1.02 | 0.21 | M | 0.05 | 0.45 | 0.21 | 0.57 | 0.30 | 1.90 | 250 | 0.06 | 0.11 | 0.74 | 0.16 | 33 | 31 |
| HLA | 4 | 54 | F | 0.00 | -0.26 | 0.19 | M | 0.00 | -0.26 | 0.20 | 0.00 | 0.27 | 0.00 | 250 | 1.00 | 0.00 | 0.99 | -0.05 | 33 | 32 |
| HLA | 4 | 40 | F | 0.00 | 0.19 | 0.19 | M | 0.00 | 0.19 | 0.20 | 0.00 | 0.28 | 0.00 | 248 | 1.00 | 0.03 | 0.87 | -0.10 | 33 | 33 |
| HLA | 4 | 55 | F | -0.02 | 0.41 | 0.19 | M | 0.02 | 0.19 | 0.20 | 0.22 | 0.28 | 0.79 | 249 | 0.43 | 0.20 | 0.66 | 0.16 | 33 | 34 |
| HLA | 4 | 41 | F | -0.01 | 0.97 | 0.21 | M | 0.01 | 0.84 | 0.23 | 0.13 | 0.31 | 0.42 | 246 | 0.68 | 0.22 | 0.64 | -0.24 | 33 | 35 |
| HLA | 4 | 56 | F | -0.05 | 1.35 | 0.23 | M | 0.05 | 0.69 | 0.22 | 0.66 | 0.32 | 2.09 | 250 | 0.04 | 0.61 | 0.44 | 0.33 | 33 | 36 |
| HLA | 4 | 57 | F | -0.07 | 1.46 | 0.23 | M | 0.08 | 0.49 | 0.22 | 0.96 | 0.32 | 3.04 | 250 | 0.00 | 1.98 | 0.16 | 0.53 | 33 | 37 |
| HLA | 4 | 42 | F | 0.05 | 0.83 | 0.12 | M | -0.05 | 1.05 | 0.14 | -0.22 | 0.19 | -1.17 | 237 | 0.24 | 0.04 | 0.84 | 0.06 | 33 | 38 |
| HLA | 4 | 387 | F | 0.04 | -0.17 | 0.19 | M | -0.04 | 0.19 | 0.20 | -0.36 | 0.28 | -1.28 | 248 | 0.20 | 0.78 | 0.38 | -0.33 | 33 | 39 |
| HLA | 4 | 46 | F | -0.01 | 0.26 | 0.19 | M | 0.01 | 0.14 | 0.20 | 0.12 | 0.28 | 0.42 | 249 | 0.68 | 0.00 | 0.97 | -0.04 | 33 | 40 |
| HLA | 4 | 47 | F | 0.02 | -0.31 | 0.19 | M | -0.02 | -0.14 | 0.20 | -0.18 | 0.27 | -0.65 | 249 | 0.52 | 0.10 | 0.76 | -0.15 | 33 | 41 |
| HLA | 4 | 48 | F | 0.06 | -1.55 | 0.22 | M | -0.06 | -0.93 | 0.19 | -0.63 | 0.29 | -2.12 | 248 | 0.03 | 2.67 | 0.10 | -0.63 | 33 | 42 |
| HLA | 4 | 50 | F | 0.02 | -0.21 | 0.19 | M | -0.02 | -0.02 | 0.20 | -0.19 | 0.27 | -0.68 | 249 | 0.50 | 0.04 | 0.84 | 0.13 | 33 | 43 |
| HLA | 4 | 49 | F | -0.01 | -1.06 | 0.20 | M | 0.01 | -1.16 | 0.20 | 0.09 | 0.28 | 0.33 | 250 | 0.74 | 1.07 | 0.30 | 0.42 | 33 | 44 |
| HLA | 4 | 51 | F | -0.03 | 0.15 | 0.19 | M | 0.03 | -0.14 | 0.20 | 0.29 | 0.27 | 1.05 | 249 | 0.29 | 0.23 | 0.63 | 0.18 | 33 | 45 |
| HLA | 4 | 62 | F | -0.07 | 0.34 | 0.19 | M | 0.08 | -0.37 | 0.19 | 0.70 | 0.27 | 2.56 | 250 | 0.01 | 2.65 | 0.10 | 0.53 | 33 | 46 |
| HLA | 4 | 60 | F | 0.04 | -1.19 | 0.21 | M | -0.04 | -0.81 | 0.19 | -0.37 | 0.28 | -1.33 | 250 | 0.19 | 0.15 | 0.70 | -0.19 | 33 | 47 |
| HLA | 4 | 61 | F | -0.02 | 0.23 | 0.19 | M | 0.02 | 0.02 | 0.20 | 0.20 | 0.28 | 0.73 | 249 | 0.47 | 0.02 | 0.88 | 0.09 | 33 | 48 |
| HLA | 4 | 63 | F | -0.06 | 2.02 | 0.27 | M | 0.06 | 1.01 | 0.24 | 1.01 | 0.36 | 2.77 | 248 | 0.01 | 0.85 | 0.36 | 0.46 | 33 | 49 |
| HLA | 4 | 1016 | F | 0.01 | 0.60 | 0.20 | M | -0.01 | 0.74 | 0.23 | -0.14 | 0.30 | -0.45 | 244 | 0.65 | 0.13 | 0.72 | -0.16 | 33 | 50 |
| HLA | 4 | 1017 | F | 0.01 | 3.67 | 0.52 | M | -0.01 | 4.46 | 1.01 | -0.80 | 1.13 | -0.70 | 182 | 0.48 | 0.01 | 0.93 | 0.89 | 33 | 51 |
| HLA | 4 | 1015 | F | 0.01 | -0.17 | 0.19 | M | -0.01 | -0.07 | 0.20 | -0.10 | 0.27 | -0.37 | 248 | 0.71 | 0.48 | 0.49 | -0.26 | 33 | 52 |
| HLA | 4 | 1014 | F | -0.01 | 2.09 | 0.28 | M | 0.01 | 1.92 | 0.32 | 0.18 | 0.43 | 0.41 | 241 | 0.68 | 0.42 | 0.52 | 0.50 | 33 | 53 |
| HLA | 4 | 1011 | F | 0.05 | 0.30 | 0.19 | M | -0.05 | 0.89 | 0.24 | -0.59 | 0.30 | -1.95 | 237 | 0.05 | 6.12 | 0.01 | -1.01 | 33 | 54 |
| HLA | 4 | 1012 | F | 0.03 | 0.76 | 0.20 | M | -0.03 | 1.12 | 0.25 | -0.36 | 0.32 | -1.13 | 236 | 0.26 | 0.02 | 0.88 | -0.15 | 33 | 55 |
| HLA | 4 | 1013 | F | 0.03 | 0.57 | 0.10 | M | -0.03 | 0.68 | 0.12 | -0.11 | 0.16 | -0.66 | 240 | 0.51 | 0.13 | 0.72 | -0.11 | 33 | 56 |
| HLA | 4 | 395 | F | 0.00 | 0.42 | 0.08 | M | 0.00 | 0.42 | 0.09 | 0.00 | 0.12 | 0.00 | 242 | 1.00 | 0.42 | 0.52 | -0.16 | 33 | 57 |
| HLA | 5 | 642 | F | -0.02 | 0.62 | 0.20 | M | 0.03 | 0.33 | 0.23 | 0.29 | 0.31 | 0.95 | 233 | 0.34 | 0.21 | 0.64 | 0.22 | 37 | 1 |
| HLA | 5 | 644 | F | 0.03 | -2.80 | 0.27 | M | -0.04 | -2.26 | 0.24 | -0.54 | 0.37 | -1.48 | 249 | 0.14 | 0.86 | 0.35 | -0.63 | 37 | 2 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 636 | F | 0.01 | -0.52 | 0.18 | M | -0.01 | -0.44 | 0.21 | -0.08 | 0.28 | -0.29 | 233 | 0.77 | 0.00 | 0.97 | 0.07 | 37 | 3 |
| HLA | 5 | 716 | F | -0.06 | 0.46 | 0.20 | M | 0.08 | -0.26 | 0.21 | 0.72 | 0.29 | 2.48 | 239 | 0.01 | 1.01 | 0.32 | 0.37 | 37 | 4 |
| HLA | 5 | 633 | F | -0.05 | 0.27 | 0.19 | M | 0.06 | -0.26 | 0.21 | 0.53 | 0.29 | 1.86 | 236 | 0.06 | 2.02 | 0.16 | 0.50 | 37 | 5 |
| HLA | 5 | 723 | F | -0.04 | 1.31 | 0.23 | M | 0.05 | 0.67 | 0.25 | 0.64 | 0.34 | 1.88 | 240 | 0.06 | 6.50 | 0.01 | 1.32 | 37 | 6 |
| HLA | 5 | 1072 | F | -0.04 | 0.83 | 0.21 | M | 0.05 | 0.33 | 0.23 | 0.50 | 0.31 | 1.61 | 237 | 0.11 | 0.56 | 0.45 | 0.29 | 37 | 7 |
| HLA | 5 | 711 | F | -0.01 | 0.54 | 0.20 | M | 0.01 | 0.44 | 0.24 | 0.10 | 0.31 | 0.33 | 229 | 0.74 | 0.25 | 0.61 | -0.21 | 37 | 8 |
| HLA | 5 | 690 | F | 0.02 | -0.39 | 0.18 | M | -0.03 | -0.12 | 0.22 | -0.27 | 0.28 | -0.94 | 229 | 0.35 | 1.01 | 0.31 | -0.39 | 37 | 9 |
| HLA | 5 | 1074 | F | 0.03 | -2.73 | 0.27 | M | -0.03 | -2.26 | 0.24 | -0.47 | 0.36 | -1.29 | 249 | 0.20 | 0.91 | 0.34 | -0.44 | 37 | 10 |
| HLA | 5 | 713 | F | 0.00 | 0.45 | 0.20 | M | 0.00 | 0.45 | 0.24 | 0.00 | 0.31 | 0.00 | 227 | 1.00 | 0.10 | 0.76 | 0.20 | 37 | 11 |
| HLA | 5 | 721 | F | 0.02 | -1.32 | 0.19 | M | -0.02 | -1.14 | 0.21 | -0.19 | 0.28 | -0.65 | 239 | 0.52 | 0.02 | 0.88 | -0.01 | 37 | 12 |
| HLA | 5 | 726 | F | 0.01 | -0.08 | 0.19 | M | -0.02 | 0.07 | 0.22 | -0.15 | 0.29 | -0.53 | 228 | 0.60 | 0.30 | 0.58 | -0.24 | 37 | 13 |
| HLA | 5 | 724 | F | 0.04 | -0.59 | 0.18 | M | -0.05 | -0.17 | 0.22 | -0.42 | 0.28 | -1.49 | 230 | 0.14 | 2.67 | 0.10 | -0.50 | 37 | 14 |
| HLA | 5 | 725 | F | -0.01 | -0.15 | 0.19 | M | 0.01 | -0.21 | 0.21 | 0.06 | 0.28 | 0.22 | 232 | 0.82 | 0.49 | 0.48 | 0.26 | 37 | 15 |
| HLA | 5 | 627 | F | -0.03 | -0.32 | 0.18 | M | 0.04 | -0.66 | 0.21 | 0.34 | 0.28 | 1.22 | 234 | 0.22 | 0.11 | 0.74 | 0.15 | 37 | 16 |
| HLA | 5 | 722 | F | -0.03 | 0.93 | 0.12 | M | 0.03 | 0.80 | 0.14 | 0.13 | 0.18 | 0.70 | 231 | 0.48 | 0.79 | 0.37 | 0.28 | 37 | 17 |
| HLA | 5 | 1215 | F | -0.03 | 0.74 | 0.21 | M | 0.04 | 0.33 | 0.23 | 0.41 | 0.31 | 1.34 | 235 | 0.18 | 0.02 | 0.90 | -0.10 | 37 | 18 |
| HLA | 5 | 672 | F | 0.00 | -0.92 | 0.19 | M | 0.00 | -0.92 | 0.21 | 0.00 | 0.28 | 0.00 | 236 | 1.00 | 0.04 | 0.84 | -0.09 | 37 | 19 |
| HLA | 5 | 1183 | F | 0.05 | -0.15 | 0.19 | M | -0.07 | 0.50 | 0.24 | -0.65 | 0.30 | -2.14 | 218 | 0.03 | 2.69 | 0.10 | -0.58 | 37 | 20 |
| HLA | 5 | 681 | F | 0.00 | 1.35 | 0.24 | M | 0.00 | 1.32 | 0.29 | 0.03 | 0.38 | 0.07 | 222 | 0.94 | 0.02 | 0.87 | 0.02 | 37 | 21 |
| HLA | 5 | 673 | F | 0.00 | 1.69 | 0.26 | M | 0.00 | 1.71 | 0.33 | -0.03 | 0.42 | -0.06 | 217 | 0.95 | 0.00 | 0.96 | 0.13 | 37 | 22 |
| HLA | 5 | 1186 | F | 0.00 | -0.45 | 0.18 | M | 0.00 | -0.45 | 0.21 | 0.00 | 0.28 | 0.00 | 233 | 1.00 | 0.02 | 0.89 | -0.09 | 37 | 23 |
| HLA | 5 | 729 | F | -0.04 | -1.32 | 0.19 | M | 0.06 | -1.88 | 0.23 | 0.56 | 0.30 | 1.88 | 231 | 0.06 | 4.00 | 0.05 | 0.64 | 37 | 24 |
| HLA | 5 | 640 | F | -0.01 | 1.48 | 0.24 | M | 0.02 | 1.24 | 0.29 | 0.24 | 0.38 | 0.65 | 229 | 0.52 | 0.05 | 0.82 | 0.18 | 37 | 25 |
| HLA | 5 | 718 | F | -0.01 | 1.26 | 0.23 | M | 0.01 | 1.16 | 0.28 | 0.10 | 0.36 | 0.28 | 225 | 0.78 | 0.01 | 0.91 | -0.12 | 37 | 26 |
| HLA | 5 | 1193 | F | -0.01 | 0.17 | 0.19 | M | 0.01 | 0.07 | 0.22 | 0.09 | 0.29 | 0.32 | 230 | 0.75 | 0.07 | 0.78 | 0.14 | 37 | 27 |
| HLA | 5 | 689 | F | 0.03 | -1.28 | 0.19 | M | -0.04 | -0.96 | 0.21 | -0.32 | 0.28 | -1.14 | 239 | 0.26 | 0.78 | 0.38 | -0.33 | 37 | 28 |
| HLA | 5 | 631 | F | 0.03 | -0.32 | 0.18 | M | -0.03 | -0.02 | 0.22 | -0.29 | 0.29 | -1.03 | 228 | 0.30 | 0.65 | 0.42 | -0.30 | 37 | 29 |
| HLA | 5 | 648 | F | 0.00 | -0.56 | 0.18 | M | 0.00 | -0.56 | 0.21 | 0.00 | 0.28 | 0.00 | 233 | 1.00 | 0.02 | 0.89 | 0.09 | 37 | 30 |
| HLA | 5 | 1222 | F | 0.03 | -1.98 | 0.22 | M | -0.04 | -1.59 | 0.22 | -0.40 | 0.31 | -1.29 | 246 | 0.20 | 0.01 | 0.93 | -0.13 | 37 | 31 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 629 | F | 0.00 | 0.17 | 0.19 | M | -0.01 | 0.22 | 0.23 | -0.06 | 0.30 | -0.20 | 227 | 0.84 | 0.13 | 0.72 | -0.19 | 37 | 32 |
| HLA | 5 | 728 | F | 0.03 | -0.76 | 0.18 | M | -0.04 | -0.44 | 0.21 | -0.32 | 0.28 | -1.14 | 233 | 0.26 | 0.71 | 0.40 | -0.33 | 37 | 33 |
| HLA | 5 | 693 | F | -0.02 | 0.74 | 0.21 | M | 0.02 | 0.50 | 0.24 | 0.25 | 0.32 | 0.79 | 231 | 0.43 | 0.00 | 0.97 | 0.08 | 37 | 34 |
| HLA | 5 | 677 | F | 0.00 | 1.96 | 0.28 | M | 0.00 | 1.96 | 0.36 | 0.00 | 0.46 | 0.00 | 217 | 1.00 | 0.46 | 0.50 | 0.82 | 37 | 35 |
| HLA | 5 | 625 | F | 0.04 | -1.03 | 0.19 | M | -0.05 | -0.61 | 0.21 | -0.42 | 0.28 | -1.49 | 236 | 0.14 | 2.41 | 0.12 | -0.49 | 37 | 36 |
| HLA | 5 | 702 | F | 0.01 | 0.13 | 0.19 | M | -0.01 | 0.22 | 0.23 | -0.09 | 0.30 | -0.32 | 227 | 0.75 | 0.00 | 0.96 | -0.08 | 37 | 37 |
| HLA | 5 | 730 | F | -0.02 | 0.50 | 0.20 | M | 0.03 | 0.22 | 0.23 | 0.28 | 0.30 | 0.92 | 232 | 0.36 | 0.06 | 0.81 | 0.13 | 37 | 38 |
| HLA | 5 | 709 | F | -0.04 | -0.72 | 0.18 | M | 0.05 | -1.18 | 0.21 | 0.46 | 0.28 | 1.64 | 234 | 0.10 | 3.10 | 0.08 | 0.59 | 37 | 39 |
| HLA | 5 | 646 | F | -0.03 | -0.52 | 0.18 | M | 0.04 | -0.87 | 0.21 | 0.35 | 0.28 | 1.28 | 234 | 0.20 | 1.30 | 0.25 | 0.40 | 37 | 40 |
| HLA | 5 | 696 | F | 0.02 | -0.66 | 0.18 | M | -0.02 | -0.48 | 0.21 | -0.17 | 0.28 | -0.62 | 233 | 0.54 | 0.01 | 0.93 | -0.08 | 37 | 41 |
| HLA | 5 | 637 | F | 0.02 | 0.92 | 0.21 | M | -0.02 | 1.24 | 0.29 | -0.32 | 0.36 | -0.89 | 212 | 0.37 | 0.53 | 0.47 | -0.40 | 37 | 42 |
| HLA | 5 | 708 | F | 0.00 | 0.87 | 0.21 | M | 0.00 | 0.87 | 0.26 | 0.00 | 0.33 | 0.00 | 224 | 1.00 | 0.00 | 0.98 | 0.06 | 37 | 43 |
| HLA | 5 | 712 | F | -0.01 | 1.33 | 0.10 | M | 0.01 | 1.33 | 0.12 | 0.00 | 0.16 | 0.00 | 224 | 1.00 | 0.05 | 0.83 | 0.08 | 37 | 44 |
| HLA | 5 | 720 | F | 0.05 | -0.35 | 0.18 | M | -0.07 | 0.28 | 0.23 | -0.63 | 0.29 | -2.14 | 222 | 0.03 | 2.22 | 0.14 | -0.55 | 37 | 45 |
| HLA | 5 | 714 | F | 0.01 | 0.02 | 0.19 | M | -0.02 | 0.17 | 0.23 | -0.15 | 0.29 | -0.51 | 227 | 0.61 | 0.01 | 0.91 | 0.02 | 37 | 46 |
| HLA | 5 | 630 | F | -0.02 | 0.24 | 0.19 | M | 0.02 | 0.02 | 0.22 | 0.21 | 0.29 | 0.73 | 232 | 0.46 | 0.11 | 0.74 | 0.15 | 37 | 47 |
| HLA | 5 | 727 | F | 0.01 | 0.39 | 0.19 | M | -0.02 | 0.55 | 0.24 | -0.17 | 0.31 | -0.54 | 223 | 0.59 | 0.00 | 0.98 | 0.09 | 37 | 48 |
| HLA | 5 | 684 | F | 0.01 | -0.39 | 0.18 | M | -0.01 | -0.26 | 0.21 | -0.13 | 0.28 | -0.45 | 231 | 0.65 | 0.04 | 0.85 | -0.13 | 37 | 49 |
| HLA | 5 | 699 | F | 0.03 | -1.36 | 0.19 | M | -0.04 | -1.00 | 0.21 | -0.35 | 0.28 | -1.24 | 240 | 0.22 | 0.79 | 0.37 | -0.30 | 37 | 50 |
| HLA | 5 | 707 | F | 0.00 | 1.95 | 0.28 | M | 0.01 | 1.83 | 0.35 | 0.13 | 0.45 | 0.28 | 223 | 0.78 | 0.03 | 0.87 | 0.05 | 37 | 51 |
| HLA | 5 | 706 | F | 0.01 | 2.51 | 0.26 | M | -0.01 | 2.79 | 0.41 | -0.28 | 0.49 | -0.57 | 192 | 0.57 | 0.01 | 0.91 | 0.09 | 37 | 52 |
| HLA | 5 | 626 | F | -0.01 | -1.36 | 0.19 | M | 0.01 | -1.45 | 0.21 | 0.09 | 0.29 | 0.31 | 237 | 0.76 | 0.02 | 0.90 | -0.01 | 37 | 53 |
| HLA | 5 | 634 | F | -0.03 | -1.07 | 0.19 | M | 0.04 | -1.40 | 0.21 | 0.33 | 0.28 | 1.18 | 234 | 0.24 | 0.45 | 0.50 | 0.24 | 37 | 54 |
| HLA | 5 | 719 | F | 0.00 | 0.25 | 0.19 | M | 0.00 | 0.28 | 0.23 | -0.02 | 0.30 | -0.08 | 227 | 0.94 | 0.01 | 0.91 | 0.03 | 37 | 55 |
| HLA | 5 | 1208 | F | -0.07 | 0.97 | 0.21 | M | 0.10 | -0.02 | 0.22 | 0.99 | 0.31 | 3.23 | 244 | 0.00 | 2.63 | 0.10 | 0.59 | 37 | 56 |
| HLA | 5 | 1030 | F | 0.09 | -0.69 | 0.07 | M | -0.12 | -0.55 | 0.08 | -0.14 | 0.10 | -1.35 | 237 | 0.18 | 0.73 | 0.39 | -0.24 | 37 | 57 |
| HLA | 6 | 624 | F | 0.02 | -1.87 | 0.25 | M | -0.02 | -1.70 | 0.26 | -0.18 | 0.36 | -0.50 | 160 | 0.62 | 0.07 | 0.79 | -0.23 | 30 | 1 |
| HLA | 6 | 635 | F | -0.01 | -2.77 | 0.30 | M | 0.01 | -2.91 | 0.31 | 0.14 | 0.43 | 0.32 | 160 | 0.75 | 0.25 | 0.61 | 0.43 | 30 | 2 |
| HLA | 6 | 638 | F | -0.01 | -2.36 | 0.27 | M | 0.02 | -2.56 | 0.28 | 0.20 | 0.40 | 0.52 | 159 | 0.61 | 0.02 | 0.88 | -0.04 | 30 | 3 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 641 | F | 0.01 | 0.16 | 0.25 | M | -0.01 | 0.27 | 0.31 | -0.11 | 0.40 | -0.28 | 147 | 0.78 | 0.01 | 0.94 | 0.09 | 30 | 4 |
| HLA | 6 | 704 | F | 0.02 | -1.45 | 0.24 | M | -0.02 | -1.23 | 0.26 | -0.22 | 0.35 | -0.63 | 158 | 0.53 | 0.01 | 0.94 | 0.06 | 30 | 5 |
| HLA | 6 | 703 | F | -0.03 | -1.01 | 0.23 | M | 0.04 | -1.37 | 0.26 | 0.36 | 0.35 | 1.03 | 156 | 0.31 | 0.05 | 0.83 | 0.17 | 30 | 6 |
| HLA | 6 | 628 | F | 0.03 | -1.94 | 0.25 | M | -0.03 | -1.63 | 0.26 | -0.31 | 0.36 | -0.85 | 160 | 0.39 | 1.35 | 0.24 | -0.60 | 30 | 7 |
| HLA | 6 | 645 | F | -0.05 | -0.13 | 0.24 | M | 0.06 | -0.69 | 0.27 | 0.56 | 0.36 | 1.56 | 156 | 0.12 | 3.22 | 0.07 | 0.84 | 30 | 8 |
| HLA | 6 | 660 | F | 0.00 | 2.98 | 0.60 | M | 0.00 | 2.82 | 0.73 | 0.16 | 0.94 | 0.17 | 149 | 0.86 | 0.02 | 0.90 | 0.98 | 30 | 9 |
| HLA | 6 | 1171 | F | 0.01 | -0.25 | 0.24 | M | -0.02 | -0.08 | 0.29 | -0.16 | 0.37 | -0.44 | 149 | 0.66 | 0.62 | 0.43 | -0.47 | 30 | 10 |
| HLA | 6 | 661 | F | -0.06 | 0.04 | 0.24 | M | 0.08 | -0.69 | 0.27 | 0.73 | 0.36 | 2.03 | 157 | 0.04 | 0.12 | 0.73 | 0.23 | 30 | 11 |
| HLA | 6 | 659 | F | 0.05 | -0.79 | 0.23 | M | -0.06 | -0.24 | 0.28 | -0.55 | 0.36 | -1.50 | 150 | 0.13 | 1.81 | 0.18 | -0.69 | 30 | 12 |
| HLA | 6 | 643 | F | -0.03 | -0.75 | 0.12 | M | 0.03 | -0.83 | 0.14 | 0.08 | 0.18 | 0.45 | 153 | 0.65 | 0.05 | 0.83 | 0.08 | 30 | 13 |
| HLA | 6 | 665 | F | 0.00 | -0.08 | 0.24 | M | 0.00 | -0.08 | 0.29 | 0.00 | 0.38 | 0.00 | 150 | 1.00 | 0.50 | 0.48 | 0.60 | 30 | 14 |
| HLA | 6 | 678 | F | 0.02 | -0.96 | 0.23 | M | -0.03 | -0.69 | 0.27 | -0.26 | 0.35 | -0.75 | 154 | 0.46 | 0.10 | 0.76 | 0.36 | 30 | 15 |
| HLA | 6 | 652 | F | -0.05 | -0.90 | 0.23 | M | 0.06 | -1.43 | 0.26 | 0.53 | 0.35 | 1.53 | 156 | 0.13 | 0.93 | 0.34 | 0.59 | 30 | 16 |
| HLA | 6 | 639 | F | -0.04 | -0.13 | 0.24 | M | 0.05 | -0.62 | 0.27 | 0.49 | 0.36 | 1.36 | 155 | 0.18 | 0.64 | 0.42 | 0.49 | 30 | 17 |
| HLA | 6 | 1075 | F | 0.00 | -0.30 | 0.24 | M | -0.01 | -0.24 | 0.28 | -0.06 | 0.37 | -0.16 | 151 | 0.88 | 0.03 | 0.87 | 0.03 | 30 | 18 |
| HLA | 6 | 662 | F | -0.02 | -1.06 | 0.23 | M | 0.02 | -1.23 | 0.26 | 0.17 | 0.35 | 0.49 | 156 | 0.63 | 0.00 | 0.98 | 0.06 | 30 | 19 |
| HLA | 6 | 664 | F | 0.00 | 0.66 | 0.14 | M | 0.00 | 0.66 | 0.19 | 0.00 | 0.23 | 0.00 | 143 | 1.00 | 0.37 | 0.54 | 0.36 | 30 | 20 |
| HLA | 6 | 647 | F | 0.04 | 0.70 | 0.27 | M | -0.05 | 1.59 | 0.45 | -0.89 | 0.52 | -1.70 | 123 | 0.09 | 1.91 | 0.17 | -1.01 | 30 | 21 |
| HLA | 6 | 691 | F | 0.02 | 1.89 | 0.38 | M | -0.02 | 2.82 | 0.73 | -0.94 | 0.83 | -1.13 | 111 | 0.26 | 5.87 | 0.02 | | 30 | 22 |
| HLA | 6 | 688 | F | 0.04 | -0.30 | 0.24 | M | -0.05 | 0.27 | 0.31 | -0.58 | 0.39 | -1.48 | 143 | 0.14 | 0.46 | 0.50 | -0.52 | 30 | 23 |
| HLA | 6 | 687 | F | -0.04 | 1.89 | 0.38 | M | 0.05 | 0.94 | 0.37 | 0.95 | 0.53 | 1.79 | 162 | 0.08 | 0.35 | 0.55 | 0.96 | 30 | 24 |
| HLA | 6 | 1309 | F | -0.01 | 0.70 | 0.27 | M | 0.02 | 0.47 | 0.32 | 0.22 | 0.42 | 0.53 | 151 | 0.60 | 0.01 | 0.92 | 0.22 | 30 | 25 |
| HLA | 6 | 651 | F | 0.05 | 0.85 | 0.28 | M | -0.06 | 2.06 | 0.53 | -1.21 | 0.60 | -2.01 | 112 | 0.05 | 1.84 | 0.18 | -1.34 | 30 | 26 |
| HLA | 6 | 683 | F | -0.01 | -1.81 | 0.25 | M | 0.02 | -1.97 | 0.26 | 0.15 | 0.36 | 0.43 | 159 | 0.67 | 0.14 | 0.71 | 0.29 | 30 | 27 |
| HLA | 6 | 649 | F | 0.00 | -0.15 | 0.24 | M | 0.00 | -0.15 | 0.28 | 0.00 | 0.37 | 0.00 | 151 | 1.00 | 0.37 | 0.55 | 0.37 | 30 | 28 |
| HLA | 6 | 1173 | F | -0.07 | 0.33 | 0.14 | M | 0.08 | 0.04 | 0.17 | 0.29 | 0.22 | 1.35 | 151 | 0.18 | 1.18 | 0.28 | 0.50 | 30 | 29 |
| HLA | 6 | 1083 | F | 0.02 | -0.52 | 0.23 | M | -0.03 | -0.24 | 0.28 | -0.28 | 0.37 | -0.76 | 150 | 0.45 | 0.05 | 0.82 | -0.01 | 30 | 30 |
| HLA | 6 | 653 | F | -0.01 | -1.63 | 0.24 | M | 0.01 | -1.76 | 0.26 | 0.13 | 0.36 | 0.38 | 158 | 0.71 | 0.14 | 0.71 | 0.31 | 30 | 31 |
| HLA | 6 | 682 | F | 0.06 | -0.63 | 0.23 | M | -0.07 | 0.09 | 0.30 | -0.72 | 0.38 | -1.91 | 145 | 0.06 | 8.67 | 0.00 | -1.41 | 30 | 32 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 698 | F | 0.01 | 1.75 | 0.37 | M | -0.01 | 2.06 | 0.53 | -0.31 | 0.65 | -0.48 | 133 | 0.63 | 0.04 | 0.84 | 0.16 | 30 | 33 |
| HLA | 6 | 1172 | F | 0.00 | -1.75 | 0.25 | M | -0.01 | -1.70 | 0.26 | -0.05 | 0.36 | -0.15 | 159 | 0.88 | 0.00 | 0.96 | -0.12 | 30 | 34 |
| HLA | 6 | 632 | F | 0.03 | -0.58 | 0.23 | M | -0.04 | -0.16 | 0.28 | -0.41 | 0.37 | -1.12 | 149 | 0.26 | 0.00 | 0.99 | -0.10 | 30 | 35 |
| HLA | 6 | 657 | F | 0.03 | -0.85 | 0.23 | M | -0.03 | -0.55 | 0.27 | -0.30 | 0.36 | -0.84 | 153 | 0.40 | 0.03 | 0.87 | -0.18 | 30 | 36 |
| HLA | 6 | 680 | F | 0.03 | -0.56 | 0.11 | M | -0.04 | -0.48 | 0.13 | -0.08 | 0.17 | -0.48 | 156 | 0.63 | 0.08 | 0.77 | 0.12 | 30 | 37 |
| HLA | 6 | 675 | F | 0.03 | 0.04 | 0.24 | M | -0.04 | 0.46 | 0.32 | -0.42 | 0.41 | -1.04 | 140 | 0.30 | 0.11 | 0.74 | -0.38 | 30 | 38 |
| HLA | 6 | 674 | F | 0.00 | 2.67 | 0.52 | M | 0.00 | 2.81 | 0.73 | -0.14 | 0.90 | -0.16 | 135 | 0.87 | 0.06 | 0.81 | -0.19 | 30 | 39 |
| HLA | 6 | 667 | F | 0.10 | -1.63 | 0.24 | M | -0.13 | -0.42 | 0.28 | -1.21 | 0.37 | -3.30 | 153 | 0.00 | 6.37 | 0.01 | -1.07 | 30 | 40 |
| HLA | 6 | 1170 | F | 0.02 | 2.04 | 0.41 | M | -0.03 | 3.55 | 1.02 | -1.51 | 1.10 | -1.37 | 94 | 0.17 | 0.00 | 0.95 | -0.59 | 30 | 41 |
| HLA | 6 | 692 | F | -0.04 | 0.93 | 0.29 | M | 0.05 | 0.26 | 0.31 | 0.67 | 0.42 | 1.59 | 156 | 0.11 | 0.20 | 0.65 | 0.39 | 30 | 42 |
| HLA | 6 | 679 | F | 0.03 | 0.10 | 0.25 | M | -0.04 | 0.57 | 0.33 | -0.47 | 0.41 | -1.13 | 138 | 0.26 | 3.96 | 0.05 | -1.27 | 30 | 43 |
| HLA | 6 | 666 | F | -0.10 | 0.86 | 0.14 | M | 0.13 | 0.42 | 0.16 | 0.44 | 0.21 | 2.08 | 153 | 0.04 | 2.28 | 0.13 | 0.62 | 30 | 44 |
| HLA | 6 | 701 | F | 0.01 | 2.43 | 0.47 | M | -0.02 | 3.55 | 1.02 | -1.12 | 1.12 | -1.00 | 102 | 0.32 | 0.00 | 1.00 | | 30 | 45 |
| HLA | 6 | 700 | F | 0.06 | -1.63 | 0.24 | M | -0.07 | -0.99 | 0.26 | -0.64 | 0.36 | -1.79 | 156 | 0.08 | 1.19 | 0.28 | -0.52 | 30 | 46 |
| HLA | 6 | 697 | F | -0.04 | -0.19 | 0.24 | M | 0.06 | -0.71 | 0.27 | 0.52 | 0.36 | 1.45 | 154 | 0.15 | 0.51 | 0.47 | 0.38 | 30 | 47 |
| HLA | 6 | 694 | F | 0.02 | 1.56 | 0.23 | M | -0.03 | 1.82 | 0.31 | -0.27 | 0.38 | -0.70 | 140 | 0.49 | 0.08 | 0.78 | 0.28 | 30 | 48 |
| HLA | 6 | 676 | F | 0.00 | 2.98 | 0.60 | M | 0.00 | 2.81 | 0.73 | 0.17 | 0.94 | 0.18 | 147 | 0.86 | 0.04 | 0.85 | -1.00 | 30 | 49 |
| HLA | 6 | 668 | F | -0.01 | 1.19 | 0.31 | M | 0.01 | 1.07 | 0.38 | 0.12 | 0.49 | 0.25 | 146 | 0.81 | 1.57 | 0.21 | 1.06 | 30 | 50 |
| HLA | 6 | 650 | F | 0.02 | 0.16 | 0.25 | M | -0.03 | 0.46 | 0.32 | -0.30 | 0.41 | -0.73 | 141 | 0.46 | 0.26 | 0.61 | -0.46 | 30 | 51 |
| HLA | 6 | 1169 | F | 0.00 | 0.28 | 0.25 | M | 0.00 | 0.28 | 0.31 | 0.00 | 0.40 | 0.00 | 147 | 1.00 | 0.00 | 0.94 | -0.08 | 30 | 52 |
| HLA | 6 | 669 | F | -0.01 | -0.30 | 0.24 | M | 0.01 | -0.42 | 0.28 | 0.11 | 0.36 | 0.31 | 151 | 0.75 | 0.04 | 0.85 | 0.01 | 30 | 53 |
| HLA | 6 | 663 | F | 0.01 | 2.43 | 0.47 | M | -0.02 | 3.55 | 1.02 | -1.12 | 1.12 | -1.00 | 102 | 0.32 | 0.30 | 0.58 | 0.12 | 30 | 54 |
| HLA | 6 | 656 | F | 0.03 | -0.36 | 0.24 | M | -0.03 | -0.01 | 0.29 | -0.35 | 0.38 | -0.92 | 145 | 0.36 | 4.23 | 0.04 | -1.25 | 30 | 55 |
| HLA | 6 | 655 | F | -0.01 | -1.45 | 0.24 | M | 0.01 | -1.53 | 0.26 | 0.07 | 0.35 | 0.21 | 156 | 0.84 | 0.84 | 0.36 | 0.47 | 30 | 56 |
| HLA | 6 | | F | -0.17 | -0.61 | 0.10 | M | 0.21 | -0.92 | 0.11 | 0.32 | 0.14 | 2.23 | 154 | 0.03 | 1.58 | 0.21 | 0.47 | 30 | 57 |
| HLA | 7 | 1118 | F | -0.04 | -1.85 | 0.27 | M | 0.04 | -2.35 | 0.27 | 0.50 | 0.38 | 1.34 | 160 | 0.18 | 0.75 | 0.39 | 0.53 | 26 | 1 |
| HLA | 7 | 784 | F | -0.05 | -1.46 | 0.25 | M | 0.05 | -2.02 | 0.25 | 0.56 | 0.36 | 1.58 | 160 | 0.12 | 1.51 | 0.22 | 0.64 | 26 | 2 |
| HLA | 7 | 888 | F | -0.02 | -2.15 | 0.29 | M | 0.02 | -2.35 | 0.27 | 0.20 | 0.39 | 0.51 | 160 | 0.61 | 0.29 | 0.59 | -0.33 | 26 | 3 |
| HLA | 7 | 883 | F | -0.03 | 1.35 | 0.33 | M | 0.04 | 0.71 | 0.33 | 0.63 | 0.46 | 1.37 | 160 | 0.17 | 0.20 | 0.65 | 0.40 | 26 | 4 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 7 | 885 | F | 0.01 | -2.23 | 0.29 | M | -0.01 | -2.15 | 0.26 | -0.09 | 0.39 | -0.23 | 159 | 0.82 | 0.25 | 0.62 | -0.36 | 26 | 5 |
| HLA | 7 | 886 | F | 0.00 | 2.18 | 0.44 | M | 0.00 | 2.01 | 0.53 | 0.16 | 0.68 | 0.24 | 154 | 0.81 | 0.51 | 0.47 | -1.01 | 26 | 6 |
| HLA | 7 | 882 | F | -0.01 | -1.85 | 0.27 | M | 0.01 | -1.95 | 0.25 | 0.10 | 0.37 | 0.28 | 160 | 0.78 | 0.00 | 0.96 | -0.08 | 26 | 7 |
| HLA | 7 | 763 | F | -0.02 | -1.65 | 0.26 | M | 0.02 | -1.89 | 0.25 | 0.24 | 0.36 | 0.68 | 160 | 0.50 | 0.01 | 0.92 | -0.06 | 26 | 8 |
| HLA | 7 | 762 | F | 0.11 | -1.34 | 0.24 | M | -0.11 | -0.22 | 0.27 | -1.11 | 0.36 | -3.09 | 159 | 0.00 | 5.79 | 0.02 | -1.15 | 26 | 9 |
| HLA | 7 | 1098 | F | 0.00 | 0.51 | 0.26 | M | 0.00 | 0.51 | 0.31 | 0.00 | 0.41 | 0.00 | 155 | 1.00 | 0.00 | 0.98 | 0.11 | 26 | 10 |
| HLA | 7 | 1175 | F | -0.01 | -0.44 | 0.23 | M | 0.01 | -0.56 | 0.25 | 0.11 | 0.34 | 0.33 | 159 | 0.74 | 1.18 | 0.28 | 0.59 | 26 | 11 |
| HLA | 7 | 871 | F | 0.05 | -2.32 | 0.30 | M | -0.05 | -1.70 | 0.25 | -0.62 | 0.39 | -1.60 | 156 | 0.11 | 5.29 | 0.02 | -1.40 | 26 | 12 |
| HLA | 7 | 790 | F | 0.03 | -2.00 | 0.27 | M | -0.03 | -1.70 | 0.25 | -0.29 | 0.37 | -0.79 | 159 | 0.43 | 0.04 | 0.84 | 0.02 | 26 | 13 |
| HLA | 7 | 774 | F | 0.01 | 0.97 | 0.29 | M | -0.01 | 1.22 | 0.39 | -0.25 | 0.49 | -0.52 | 148 | 0.61 | 0.25 | 0.62 | -0.75 | 26 | 14 |
| HLA | 7 | 1097 | F | 0.12 | -0.85 | 0.13 | M | -0.12 | -0.48 | 0.15 | -0.37 | 0.20 | -1.90 | 157 | 0.06 | 1.83 | 0.18 | -0.56 | 26 | 15 |
| HLA | 7 | 1099 | F | 0.01 | -0.82 | 0.23 | M | -0.01 | -0.75 | 0.25 | -0.08 | 0.34 | -0.23 | 160 | 0.82 | 0.02 | 0.90 | -0.04 | 26 | 16 |
| HLA | 7 | 1089 | F | -0.01 | 1.70 | 0.37 | M | 0.01 | 1.38 | 0.41 | 0.32 | 0.55 | 0.59 | 158 | 0.56 | 0.07 | 0.80 | 0.09 | 26 | 17 |
| HLA | 7 | 892 | F | 0.03 | 0.01 | 0.24 | M | -0.03 | 0.32 | 0.30 | -0.32 | 0.38 | -0.83 | 153 | 0.41 | 0.89 | 0.35 | -0.51 | 26 | 18 |
| HLA | 7 | 843 | F | 0.01 | 1.84 | 0.39 | M | -0.01 | 2.01 | 0.53 | -0.17 | 0.65 | -0.26 | 146 | 0.79 | 0.00 | 1.00 | -0.34 | 26 | 19 |
| HLA | 7 | 1178 | F | -0.03 | 1.06 | 0.30 | M | 0.04 | 0.51 | 0.31 | 0.55 | 0.43 | 1.27 | 160 | 0.21 | 2.95 | 0.09 | 1.14 | 26 | 20 |
| HLA | 7 | 806 | F | -0.01 | 0.07 | 0.24 | M | 0.01 | 0.00 | 0.28 | 0.07 | 0.37 | 0.19 | 157 | 0.85 | 0.23 | 0.63 | -0.33 | 26 | 21 |
| HLA | 7 | 878 | F | 0.00 | 0.45 | 0.14 | M | 0.00 | 0.45 | 0.17 | 0.00 | 0.22 | 0.00 | 151 | 1.00 | 1.37 | 0.24 | 0.58 | 26 | 22 |
| HLA | 7 | 808 | F | 0.12 | -0.55 | 0.10 | M | -0.13 | -0.30 | 0.12 | -0.25 | 0.16 | -1.60 | 155 | 0.11 | 0.44 | 0.51 | -0.26 | 26 | 23 |
| HLA | 7 | 1088 | F | -0.02 | 0.65 | 0.27 | M | 0.02 | 0.41 | 0.30 | 0.24 | 0.41 | 0.59 | 158 | 0.56 | 0.01 | 0.92 | 0.14 | 26 | 24 |
| HLA | 7 | 769 | F | 0.02 | -2.07 | 0.28 | M | -0.02 | -1.83 | 0.25 | -0.25 | 0.37 | -0.66 | 159 | 0.51 | 0.46 | 0.50 | -0.47 | 26 | 25 |
| HLA | 7 | 803 | F | -0.03 | 0.31 | 0.25 | M | 0.04 | -0.08 | 0.27 | 0.39 | 0.37 | 1.05 | 159 | 0.29 | 0.35 | 0.55 | 0.36 | 26 | 26 |
| HLA | 7 | 877 | F | -0.05 | -0.72 | 0.23 | M | 0.06 | -1.23 | 0.24 | 0.51 | 0.34 | 1.51 | 160 | 0.13 | 0.02 | 0.87 | 0.02 | 26 | 27 |
| HLA | 7 | 1185 | F | -0.05 | 1.70 | 0.37 | M | 0.05 | 0.71 | 0.33 | 0.99 | 0.49 | 2.01 | 159 | 0.05 | 1.36 | 0.24 | 0.95 | 26 | 28 |
| HLA | 7 | 777 | F | -0.02 | -0.22 | 0.24 | M | 0.02 | -0.43 | 0.26 | 0.20 | 0.35 | 0.58 | 159 | 0.56 | 0.21 | 0.65 | -0.28 | 26 | 29 |
| HLA | 7 | 903 | F | -0.02 | 4.10 | 1.02 | M | 0.02 | 2.33 | 0.60 | 1.77 | 1.18 | 1.50 | 132 | 0.14 | 0.14 | 0.71 | | 26 | 30 |
| HLA | 7 | 887 | F | 0.07 | -2.24 | 0.29 | M | -0.08 | -1.40 | 0.24 | -0.83 | 0.38 | -2.19 | 157 | 0.03 | 0.22 | 0.64 | -0.34 | 26 | 31 |
| HLA | 7 | 930 | F | -0.01 | -0.55 | 0.23 | M | 0.01 | -0.62 | 0.25 | 0.07 | 0.34 | 0.20 | 159 | 0.84 | 0.01 | 0.93 | -0.10 | 26 | 32 |
| HLA | 7 | 880 | F | 0.03 | 0.73 | 0.27 | M | -0.03 | 1.22 | 0.39 | -0.49 | 0.48 | -1.03 | 143 | 0.30 | 0.39 | 0.53 | -0.62 | 26 | 33 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 7 | 1096 | F | 0.02 | -0.35 | 0.12 | M | -0.02 | -0.30 | 0.14 | -0.05 | 0.19 | -0.29 | 156 | 0.78 | 0.38 | 0.54 | 0.25 | 26 | 34 |
| HLA | 7 | 875 | F | 0.07 | -1.22 | 0.24 | M | -0.07 | -0.56 | 0.25 | -0.66 | 0.35 | -1.89 | 160 | 0.06 | 1.12 | 0.29 | -0.54 | 26 | 35 |
| HLA | 7 | 811 | F | 0.02 | -0.11 | 0.24 | M | -0.02 | 0.16 | 0.29 | -0.26 | 0.37 | -0.71 | 155 | 0.48 | 0.00 | 0.97 | -0.08 | 26 | 36 |
| HLA | 7 | 869 | F | 0.01 | 1.84 | 0.39 | M | -0.01 | 2.33 | 0.60 | -0.48 | 0.71 | -0.68 | 135 | 0.50 | 0.03 | 0.86 | 0.83 | 26 | 37 |
| HLA | 7 | 879 | F | -0.08 | 0.31 | 0.25 | M | 0.08 | -0.56 | 0.25 | 0.87 | 0.36 | 2.43 | 160 | 0.02 | 0.06 | 0.81 | 0.17 | 26 | 38 |
| HLA | 7 | 897 | F | -0.06 | -0.55 | 0.23 | M | 0.06 | -1.11 | 0.24 | 0.56 | 0.34 | 1.64 | 160 | 0.10 | 0.84 | 0.36 | 0.50 | 26 | 39 |
| HLA | 7 | 1182 | F | 0.01 | 0.31 | 0.25 | M | -0.01 | 0.41 | 0.30 | -0.10 | 0.40 | -0.25 | 154 | 0.80 | 0.42 | 0.52 | 0.57 | 26 | 40 |
| HLA | 7 | 891 | F | -0.06 | 0.65 | 0.27 | M | 0.06 | -0.08 | 0.27 | 0.73 | 0.38 | 1.89 | 159 | 0.06 | 3.90 | 0.05 | 1.13 | 26 | 41 |
| HLA | 7 | 874 | F | 0.04 | 1.24 | 0.32 | M | -0.04 | 2.33 | 0.60 | -1.09 | 0.68 | -1.61 | 119 | 0.11 | 0.02 | 0.90 | -0.50 | 26 | 42 |
| HLA | 7 | 1179 | F | 0.02 | 0.96 | 0.29 | M | -0.02 | 1.38 | 0.41 | -0.42 | 0.50 | -0.82 | 143 | 0.41 | 0.40 | 0.52 | -0.89 | 26 | 43 |
| HLA | 7 | 870 | F | -0.02 | 2.38 | 0.47 | M | 0.02 | 1.56 | 0.44 | 0.82 | 0.65 | 1.28 | 159 | 0.20 | 0.19 | 0.67 | 1.53 | 26 | 44 |
| HLA | 7 | 872 | F | 0.00 | 0.63 | 0.13 | M | 0.00 | 0.63 | 0.17 | 0.00 | 0.22 | 0.00 | 146 | 1.00 | 0.81 | 0.37 | 0.44 | 26 | 45 |
| HLA | 7 | 889 | F | -0.04 | 0.37 | 0.13 | M | 0.04 | 0.22 | 0.16 | 0.15 | 0.21 | 0.71 | 153 | 0.48 | 0.58 | 0.45 | 0.36 | 26 | 46 |
| HLA | 7 | 829 | F | -0.08 | -0.57 | 0.23 | M | 0.08 | -1.34 | 0.24 | 0.78 | 0.34 | 2.30 | 159 | 0.02 | 0.98 | 0.32 | 0.44 | 26 | 47 |
| HLA | 7 | 839 | F | 0.04 | 0.12 | 0.25 | M | -0.04 | 0.61 | 0.32 | -0.49 | 0.40 | -1.21 | 149 | 0.23 | 1.71 | 0.19 | -0.73 | 26 | 48 |
| HLA | 7 | 899 | F | 0.05 | -0.90 | 0.24 | M | -0.05 | -0.43 | 0.26 | -0.47 | 0.35 | -1.35 | 158 | 0.18 | 0.00 | 0.95 | -0.07 | 26 | 49 |
| HLA | 7 | 876 | F | -0.09 | 1.70 | 0.37 | M | 0.10 | 0.16 | 0.29 | 1.54 | 0.46 | 3.32 | 151 | 0.00 | 2.47 | 0.12 | 1.08 | 26 | 50 |
| HLA | 7 | 770 | F | -0.03 | 0.89 | 0.20 | M | 0.03 | 0.63 | 0.23 | 0.27 | 0.31 | 0.86 | 156 | 0.39 | 1.33 | 0.25 | 0.72 | 26 | 51 |
| HLA | 7 | 834 | F | 0.04 | -0.79 | 0.24 | M | -0.04 | -0.43 | 0.26 | -0.36 | 0.35 | -1.03 | 158 | 0.30 | 2.49 | 0.11 | -0.90 | 26 | 52 |
| HLA | 7 | 884 | F | -0.01 | 1.45 | 0.34 | M | 0.01 | 1.22 | 0.39 | 0.23 | 0.51 | 0.45 | 156 | 0.65 | 0.29 | 0.59 | 0.66 | 26 | 53 |
| HLA | 7 | 902 | F | 0.01 | -0.06 | 0.24 | M | -0.01 | 0.00 | 0.28 | -0.06 | 0.37 | -0.16 | 156 | 0.88 | 0.05 | 0.82 | 0.00 | 26 | 54 |
| HLA | 7 | 1104 | F | -0.08 | 0.88 | 0.29 | M | 0.08 | -0.15 | 0.27 | 1.03 | 0.39 | 2.63 | 159 | 0.01 | 0.85 | 0.36 | 0.52 | 26 | 55 |
| HLA | 7 | 822 | F | -0.02 | 2.38 | 0.47 | M | 0.02 | 1.77 | 0.47 | 0.62 | 0.67 | 0.92 | 159 | 0.36 | 0.21 | 0.65 | 0.84 | 26 | 56 |
| HLA | 7 | 1032 | F | 0.10 | -0.86 | 0.10 | M | -0.10 | -0.71 | 0.10 | -0.16 | 0.14 | -1.10 | 157 | 0.27 | 0.68 | 0.41 | -0.31 | 26 | 57 |
| HLA | 8 | 909 | F | -0.01 | -2.57 | 0.34 | M | 0.01 | -2.66 | 0.35 | 0.09 | 0.49 | 0.18 | 134 | 0.85 | 0.01 | 0.92 | -0.12 | 24 | 1 |
| HLA | 8 | 917 | F | -0.01 | -3.28 | 0.42 | M | 0.01 | -3.42 | 0.44 | 0.15 | 0.61 | 0.24 | 133 | 0.81 | 0.05 | 0.82 | 0.14 | 24 | 2 |
| HLA | 8 | 894 | F | 0.01 | 0.59 | 0.28 | M | -0.01 | 0.77 | 0.34 | -0.17 | 0.44 | -0.40 | 127 | 0.69 | 0.07 | 0.79 | 0.43 | 24 | 3 |
| HLA | 8 | 867 | F | -0.05 | 1.21 | 0.31 | M | 0.06 | 0.45 | 0.31 | 0.75 | 0.44 | 1.70 | 135 | 0.09 | 1.16 | 0.28 | 0.70 | 24 | 4 |
| HLA | 8 | 913 | F | 0.00 | 1.30 | 0.32 | M | 0.00 | 1.30 | 0.39 | 0.00 | 0.51 | 0.00 | 125 | 1.00 | 0.01 | 0.92 | 0.31 | 24 | 5 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 929 | F | 0.00 | -2.14 | 0.31 | M | 0.00 | -2.14 | 0.31 | 0.00 | 0.44 | 0.00 | 135 | 1.00 | 0.00 | 1.00 | -0.17 | 24 | 6 |
| HLA | 8 | 904 | F | -0.02 | -1.79 | 0.29 | M | 0.02 | -2.03 | 0.30 | 0.24 | 0.42 | 0.57 | 133 | 0.57 | 0.21 | 0.64 | 0.43 | 24 | 7 |
| HLA | 8 | 927 | F | 0.04 | -1.87 | 0.29 | M | -0.04 | -1.44 | 0.28 | -0.43 | 0.41 | -1.07 | 135 | 0.29 | 0.20 | 0.66 | -0.45 | 24 | 8 |
| HLA | 8 | 1127 | F | -0.02 | 1.02 | 0.30 | M | 0.02 | 0.77 | 0.34 | 0.25 | 0.45 | 0.55 | 130 | 0.58 | 0.00 | 0.96 | -0.20 | 24 | 9 |
| HLA | 8 | 855 | F | 0.00 | -0.90 | 0.26 | M | 0.00 | -0.90 | 0.27 | 0.00 | 0.38 | 0.00 | 134 | 1.00 | 0.01 | 0.94 | -0.07 | 24 | 10 |
| HLA | 8 | 1126 | F | 0.03 | -2.82 | 0.37 | M | -0.03 | -2.32 | 0.32 | -0.50 | 0.49 | -1.02 | 135 | 0.31 | 0.40 | 0.53 | -0.86 | 24 | 11 |
| HLA | 8 | 848 | F | -0.05 | -1.96 | 0.30 | M | 0.05 | -2.66 | 0.35 | 0.70 | 0.46 | 1.52 | 128 | 0.13 | 1.76 | 0.19 | 0.96 | 24 | 12 |
| HLA | 8 | 802 | F | 0.01 | 2.87 | 0.53 | M | -0.01 | 3.57 | 1.01 | -0.69 | 1.14 | -0.61 | 94 | 0.55 | 0.30 | 0.58 | 0.12 | 24 | 13 |
| HLA | 8 | 771 | F | -0.01 | 0.44 | 0.28 | M | 0.01 | 0.36 | 0.31 | 0.08 | 0.41 | 0.20 | 131 | 0.85 | 0.16 | 0.69 | 0.37 | 24 | 14 |
| HLA | 8 | 785 | F | 0.03 | -0.75 | 0.26 | M | -0.04 | -0.39 | 0.28 | -0.36 | 0.38 | -0.94 | 133 | 0.35 | 0.23 | 0.63 | -0.32 | 24 | 15 |
| HLA | 8 | 767 | F | 0.04 | -0.43 | 0.17 | M | -0.05 | -0.25 | 0.18 | -0.17 | 0.24 | -0.72 | 133 | 0.47 | 0.04 | 0.84 | 0.10 | 24 | 16 |
| HLA | 8 | 914 | F | -0.03 | 0.59 | 0.28 | M | 0.03 | 0.27 | 0.30 | 0.33 | 0.41 | 0.79 | 132 | 0.43 | 0.05 | 0.82 | 0.00 | 24 | 17 |
| HLA | 8 | 921 | F | 0.02 | -1.03 | 0.27 | M | -0.02 | -0.84 | 0.27 | -0.19 | 0.38 | -0.50 | 134 | 0.62 | 1.20 | 0.27 | -0.68 | 24 | 18 |
| HLA | 8 | 911 | F | 0.06 | 0.42 | 0.18 | M | -0.07 | 0.78 | 0.22 | -0.36 | 0.28 | -1.27 | 124 | 0.21 | 0.23 | 0.63 | -0.23 | 24 | 19 |
| HLA | 8 | 833 | F | 0.00 | -1.24 | 0.27 | M | -0.01 | -1.19 | 0.28 | -0.05 | 0.39 | -0.13 | 133 | 0.90 | 0.00 | 0.99 | -0.15 | 24 | 20 |
| HLA | 8 | 912 | F | 0.01 | -0.07 | 0.26 | M | -0.01 | 0.05 | 0.29 | -0.11 | 0.39 | -0.29 | 129 | 0.77 | 0.04 | 0.84 | -0.02 | 24 | 21 |
| HLA | 8 | 916 | F | -0.07 | 1.31 | 0.32 | M | 0.08 | 0.32 | 0.31 | 0.99 | 0.44 | 2.23 | 134 | 0.03 | 1.75 | 0.19 | 0.81 | 24 | 22 |
| HLA | 8 | 796 | F | -0.03 | 0.22 | 0.27 | M | 0.03 | -0.12 | 0.29 | 0.34 | 0.39 | 0.86 | 131 | 0.39 | 0.01 | 0.91 | -0.17 | 24 | 23 |
| HLA | 8 | 793 | F | -0.01 | 4.35 | 1.02 | M | 0.01 | 3.54 | 1.01 | 0.82 | 1.44 | 0.57 | 133 | 0.57 | | | | 24 | 24 |
| HLA | 8 | 772 | F | -0.02 | 1.64 | 0.35 | M | 0.02 | 1.25 | 0.39 | 0.39 | 0.53 | 0.74 | 129 | 0.46 | 0.00 | 0.95 | -0.46 | 24 | 25 |
| HLA | 8 | 810 | F | -0.01 | 3.19 | 0.60 | M | 0.01 | 2.81 | 0.73 | 0.38 | 0.95 | 0.40 | 125 | 0.69 | 0.56 | 0.45 | | 24 | 26 |
| HLA | 8 | 1079 | F | 0.02 | -0.61 | 0.26 | M | -0.02 | -0.44 | 0.28 | -0.17 | 0.38 | -0.46 | 131 | 0.65 | 0.02 | 0.88 | -0.22 | 24 | 27 |
| HLA | 8 | 761 | F | 0.03 | 0.36 | 0.27 | M | -0.04 | 0.85 | 0.35 | -0.48 | 0.44 | -1.09 | 121 | 0.28 | 0.00 | 0.99 | -0.24 | 24 | 28 |
| HLA | 8 | 910 | F | 0.00 | -1.24 | 0.27 | M | -0.01 | -1.19 | 0.28 | -0.05 | 0.39 | -0.13 | 133 | 0.90 | 0.24 | 0.62 | -0.43 | 24 | 29 |
| HLA | 8 | 906 | F | 0.04 | -0.62 | 0.26 | M | -0.05 | -0.12 | 0.29 | -0.49 | 0.39 | -1.27 | 130 | 0.21 | 0.39 | 0.53 | -0.43 | 24 | 30 |
| HLA | 8 | 922 | F | 0.04 | -0.75 | 0.26 | M | -0.05 | -0.28 | 0.28 | -0.47 | 0.38 | -1.22 | 131 | 0.23 | 0.03 | 0.86 | 0.25 | 24 | 31 |
| HLA | 8 | 1190 | F | -0.06 | -0.34 | 0.26 | M | 0.07 | -0.97 | 0.27 | 0.63 | 0.38 | 1.65 | 132 | 0.10 | 2.27 | 0.13 | 0.87 | 24 | 32 |
| HLA | 8 | 1105 | F | -0.07 | 0.67 | 0.28 | M | 0.09 | -0.20 | 0.28 | 0.88 | 0.40 | 2.18 | 133 | 0.03 | 0.07 | 0.80 | 0.23 | 24 | 33 |
| HLA | 8 | 893 | F | -0.02 | 0.51 | 0.28 | M | 0.02 | 0.32 | 0.31 | 0.20 | 0.41 | 0.48 | 130 | 0.63 | 0.00 | 0.99 | -0.11 | 24 | 34 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 1078 | F | -0.09 | 0.76 | 0.29 | M | 0.10 | -0.28 | 0.28 | 1.04 | 0.40 | 2.58 | 134 | 0.01 | 1.16 | 0.28 | 0.63 | 24 | 35 |
| HLA | 8 | 926 | F | 0.03 | -0.21 | 0.26 | M | -0.04 | 0.13 | 0.30 | -0.34 | 0.40 | -0.86 | 128 | 0.39 | 0.42 | 0.52 | -0.47 | 24 | 36 |
| HLA | 8 | 1210 | F | 0.06 | -0.41 | 0.26 | M | -0.08 | 0.32 | 0.31 | -0.73 | 0.40 | -1.81 | 126 | 0.07 | 2.16 | 0.14 | -0.77 | 24 | 37 |
| HLA | 8 | 820 | F | 0.01 | 0.66 | 0.14 | M | -0.01 | 0.66 | 0.16 | 0.00 | 0.22 | 0.00 | 125 | 1.00 | 0.32 | 0.57 | -0.28 | 24 | 38 |
| HLA | 8 | 780 | F | 0.04 | 0.94 | 0.15 | M | -0.04 | 1.08 | 0.17 | -0.13 | 0.22 | -0.61 | 128 | 0.54 | 0.27 | 0.60 | 0.25 | 24 | 39 |
| HLA | 8 | 1212 | F | -0.05 | -0.48 | 0.26 | M | 0.06 | -1.04 | 0.27 | 0.56 | 0.38 | 1.49 | 132 | 0.14 | 0.53 | 0.47 | 0.47 | 24 | 40 |
| HLA | 8 | 925 | F | 0.06 | -1.10 | 0.27 | M | -0.07 | -0.44 | 0.28 | -0.66 | 0.39 | -1.71 | 132 | 0.09 | 1.86 | 0.17 | -0.84 | 24 | 41 |
| HLA | 8 | 905 | F | 0.01 | 0.07 | 0.27 | M | -0.02 | 0.22 | 0.30 | -0.15 | 0.40 | -0.38 | 128 | 0.71 | 0.02 | 0.89 | -0.06 | 24 | 42 |
| HLA | 8 | 1214 | F | 0.07 | 0.17 | 0.12 | M | -0.08 | 0.36 | 0.15 | -0.19 | 0.19 | -0.97 | 124 | 0.33 | 2.52 | 0.11 | -0.74 | 24 | 43 |
| HLA | 8 | 1192 | F | -0.05 | -1.30 | 0.27 | M | 0.06 | -1.93 | 0.30 | 0.63 | 0.41 | 1.54 | 129 | 0.12 | 2.19 | 0.14 | 0.83 | 24 | 44 |
| HLA | 8 | 1199 | F | -0.01 | -0.38 | 0.26 | M | 0.01 | -0.52 | 0.28 | 0.13 | 0.38 | 0.35 | 131 | 0.73 | 0.02 | 0.89 | 0.25 | 24 | 45 |
| HLA | 8 | 1201 | F | -0.02 | 0.33 | 0.27 | M | 0.03 | 0.05 | 0.29 | 0.28 | 0.40 | 0.71 | 130 | 0.48 | 2.86 | 0.09 | 1.64 | 24 | 46 |
| HLA | 8 | 901 | F | 0.00 | 0.98 | 0.30 | M | 0.00 | 0.98 | 0.36 | 0.00 | 0.47 | 0.00 | 125 | 1.00 | 1.26 | 0.26 | 1.50 | 24 | 47 |
| HLA | 8 | 764 | F | -0.09 | 1.75 | 0.36 | M | 0.10 | 0.32 | 0.31 | 1.43 | 0.48 | 3.01 | 133 | 0.00 | 5.17 | 0.02 | 1.46 | 24 | 48 |
| HLA | 8 | 924 | F | 0.04 | 0.56 | 0.28 | M | -0.05 | 1.25 | 0.39 | -0.69 | 0.48 | -1.43 | 114 | 0.16 | 0.01 | 0.91 | 0.13 | 24 | 49 |
| HLA | 8 | 805 | F | -0.01 | -0.45 | 0.26 | M | 0.01 | -0.52 | 0.28 | 0.06 | 0.38 | 0.17 | 131 | 0.87 | 0.05 | 0.83 | 0.22 | 24 | 50 |
| HLA | 8 | 1092 | F | -0.01 | 1.75 | 0.36 | M | 0.01 | 1.60 | 0.44 | 0.15 | 0.57 | 0.26 | 123 | 0.79 | 0.73 | 0.39 | -0.70 | 24 | 51 |
| HLA | 8 | 920 | F | -0.02 | 0.11 | 0.27 | M | 0.02 | -0.12 | 0.29 | 0.23 | 0.39 | 0.59 | 130 | 0.56 | 0.02 | 0.88 | -0.20 | 24 | 52 |
| HLA | 8 | 766 | F | 0.01 | 2.20 | 0.42 | M | -0.02 | 2.81 | 0.73 | -0.61 | 0.84 | -0.73 | 98 | 0.47 | 0.30 | 0.58 | 0.00 | 24 | 53 |
| HLA | 8 | 826 | F | -0.01 | 0.04 | 0.27 | M | 0.02 | -0.12 | 0.29 | 0.16 | 0.39 | 0.40 | 130 | 0.69 | 0.06 | 0.80 | -0.21 | 24 | 54 |
| HLA | 8 | 778 | F | -0.01 | 0.33 | 0.27 | M | 0.01 | 0.22 | 0.30 | 0.11 | 0.41 | 0.26 | 129 | 0.79 | 0.21 | 0.64 | 0.41 | 24 | 55 |
| HLA | 8 | 1034 | F | 0.09 | -0.65 | 0.11 | M | -0.10 | -0.50 | 0.11 | -0.15 | 0.16 | -0.94 | 125 | 0.35 | 1.44 | 0.23 | -0.50 | 24 | 56 |

## Appendix Table I.3:Hawaiian Language Arts: DIF Survey

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 93 | 0 | 0.02 | -2.21 | 0.31 | 1 | -0.01 | -2.05 | 0.17 | -0.16 | 0.36 | -0.46 | 91 | 0.65 | 0.29 | 0.59 | -0.30 | 29 | 1 |
| HLA | 3 | 101 | 0 | 0.01 | 0.10 | 0.32 | 1 | 0.00 | 0.16 | 0.16 | -0.06 | 0.36 | -0.17 | 88 | 0.86 | 0.03 | 0.86 | -0.17 | 29 | 2 |
| HLA | 3 | 381 | 0 | 0.02 | -0.01 | 0.32 | 1 | -0.01 | 0.18 | 0.16 | -0.18 | 0.36 | -0.50 | 89 | 0.62 | 0.13 | 0.72 | -0.22 | 29 | 3 |
| HLA | 3 | 108 | 0 | -0.03 | 0.21 | 0.33 | 1 | 0.01 | -0.06 | 0.16 | 0.26 | 0.37 | 0.72 | 85 | 0.47 | 0.04 | 0.84 | 0.17 | 29 | 4 |
| HLA | 3 | 94 | 0 | -0.03 | -1.75 | 0.30 | 1 | 0.01 | -1.97 | 0.16 | 0.22 | 0.34 | 0.65 | 94 | 0.52 | 0.01 | 0.93 | -0.06 | 29 | 5 |
| HLA | 3 | 99 | 0 | 0.02 | -0.57 | 0.30 | 1 | 0.00 | -0.47 | 0.15 | -0.10 | 0.33 | -0.30 | 89 | 0.77 | 0.27 | 0.61 | -0.29 | 29 | 6 |
| HLA | 3 | 89 | 0 | 0.10 | -1.16 | 0.29 | 1 | -0.03 | -0.52 | 0.15 | -0.65 | 0.33 | -1.98 | 91 | 0.05 | 2.21 | 0.14 | -0.61 | 29 | 7 |
| HLA | 3 | 1026 | 0 | 0.01 | 0.56 | 0.36 | 1 | 0.00 | 0.60 | 0.18 | -0.04 | 0.40 | -0.11 | 87 | 0.91 | 0.04 | 0.85 | -0.23 | 29 | 8 |
| HLA | 3 | 84 | 0 | 0.01 | -0.99 | 0.29 | 1 | 0.00 | -0.96 | 0.15 | -0.04 | 0.33 | -0.11 | 90 | 0.91 | 0.00 | 0.97 | -0.09 | 29 | 9 |
| HLA | 3 | 88 | 0 | -0.03 | 0.32 | 0.34 | 1 | 0.01 | 0.10 | 0.16 | 0.22 | 0.38 | 0.59 | 85 | 0.56 | 0.01 | 0.90 | -0.04 | 29 | 10 |
| HLA | 3 | 90 | 0 | -0.08 | -1.75 | 0.30 | 1 | 0.02 | -2.35 | 0.18 | 0.59 | 0.34 | 1.72 | 101 | 0.09 | 1.05 | 0.31 | 0.58 | 29 | 11 |
| HLA | 3 | 91 | 0 | -0.01 | -1.75 | 0.30 | 1 | 0.00 | -1.82 | 0.16 | 0.07 | 0.34 | 0.20 | 93 | 0.84 | 0.01 | 0.90 | -0.13 | 29 | 12 |
| HLA | 3 | 87 | 0 | 0.03 | 0.69 | 0.37 | 1 | -0.01 | 0.95 | 0.19 | -0.27 | 0.41 | -0.64 | 90 | 0.52 | 0.05 | 0.82 | -0.28 | 29 | 13 |
| HLA | 3 | 92 | 0 | -0.02 | 0.21 | 0.33 | 1 | 0.00 | 0.07 | 0.16 | 0.14 | 0.37 | 0.37 | 86 | 0.71 | 0.28 | 0.60 | 0.41 | 29 | 14 |
| HLA | 3 | 1023 | 0 | 0.01 | 0.83 | 0.38 | 1 | 0.00 | 0.87 | 0.19 | -0.04 | 0.43 | -0.10 | 87 | 0.92 | 0.00 | 0.99 | 0.11 | 29 | 15 |
| HLA | 3 | 95 | 0 | -0.11 | 0.98 | 0.40 | 1 | 0.03 | 0.02 | 0.16 | 0.96 | 0.43 | 2.25 | 76 | 0.03 | 3.53 | 0.06 | 1.07 | 29 | 16 |
| HLA | 3 | 97 | 0 | -0.08 | 0.69 | 0.37 | 1 | 0.02 | 0.02 | 0.16 | 0.67 | 0.40 | 1.67 | 80 | 0.10 | 2.43 | 0.12 | 0.94 | 29 | 17 |
| HLA | 3 | 96 | 0 | -0.02 | 1.14 | 0.41 | 1 | 0.01 | 0.92 | 0.19 | 0.23 | 0.46 | 0.49 | 82 | 0.62 | 0.97 | 0.32 | 0.73 | 29 | 18 |
| HLA | 3 | 107 | 0 | 0.03 | -1.16 | 0.29 | 1 | -0.01 | -0.95 | 0.15 | -0.21 | 0.32 | -0.66 | 90 | 0.51 | 0.11 | 0.74 | -0.17 | 29 | 19 |
| HLA | 3 | 104 | 0 | 0.01 | 1.32 | 0.44 | 1 | 0.00 | 1.46 | 0.22 | -0.14 | 0.49 | -0.28 | 88 | 0.78 | 0.59 | 0.44 | -0.68 | 29 | 20 |
| HLA | 3 | 383 | 0 | -0.01 | -1.67 | 0.29 | 1 | 0.00 | -1.70 | 0.16 | 0.04 | 0.33 | 0.11 | 92 | 0.91 | 0.03 | 0.86 | 0.11 | 29 | 21 |
| HLA | 3 | 161 | 0 | -0.02 | -0.39 | 0.30 | 1 | 0.01 | -0.52 | 0.15 | 0.13 | 0.34 | 0.37 | 88 | 0.71 | 0.08 | 0.78 | -0.18 | 29 | 22 |
| HLA | 3 | 162 | 0 | -0.02 | -0.91 | 0.29 | 1 | 0.01 | -1.06 | 0.15 | 0.15 | 0.33 | 0.45 | 89 | 0.65 | 0.01 | 0.92 | -0.03 | 29 | 23 |
| HLA | 3 | 1025 | 0 | -0.02 | 1.76 | 0.50 | 1 | 0.01 | 1.46 | 0.22 | 0.30 | 0.55 | 0.54 | 80 | 0.59 | 0.01 | 0.91 | 0.26 | 29 | 24 |
| HLA | 3 | 110 | 0 | -0.01 | -0.01 | 0.32 | 1 | 0.00 | -0.07 | 0.16 | 0.06 | 0.36 | 0.18 | 87 | 0.86 | 0.08 | 0.78 | -0.20 | 29 | 25 |
| HLA | 3 | 113 | 0 | -0.02 | 2.85 | 0.75 | 1 | 0.00 | 2.28 | 0.29 | 0.57 | 0.81 | 0.71 | 74 | 0.48 | 0.30 | 0.59 | 0.88 | 29 | 26 |
| HLA | 3 | 1024 | 0 | -0.11 | 0.98 | 0.25 | 1 | 0.03 | 0.56 | 0.10 | 0.43 | 0.27 | 1.59 | 77 | 0.12 | 3.67 | 0.06 | 1.04 | 29 | 27 |
| HLA | 3 | 117 | 0 | 0.03 | -1.41 | 0.29 | 1 | -0.01 | -1.20 | 0.15 | -0.22 | 0.33 | -0.66 | 90 | 0.51 | 1.36 | 0.24 | -0.48 | 29 | 28 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 3 | 1020 | 0 | -0.03 | 1.17 | 0.32 | 1 | 0.01 | 0.95 | 0.14 | 0.22 | 0.35 | 0.64 | 80 | 0.52 | 0.04 | 0.83 | -0.12 | 29 | 29 |
| HLA | 3 | 114 | 0 | 0.05 | -0.74 | 0.29 | 1 | -0.01 | -0.45 | 0.15 | -0.30 | 0.33 | -0.90 | 90 | 0.37 | 0.03 | 0.85 | -0.12 | 29 | 30 |
| HLA | 3 | 112 | 0 | 0.01 | 1.76 | 0.50 | 1 | 0.00 | 1.91 | 0.25 | -0.15 | 0.56 | -0.27 | 88 | 0.79 | 0.16 | 0.69 | -0.03 | 29 | 31 |
| HLA | 3 | 1022 | 0 | 0.03 | -0.39 | 0.30 | 1 | -0.01 | -0.21 | 0.16 | -0.18 | 0.34 | -0.53 | 89 | 0.60 | 0.01 | 0.91 | -0.09 | 29 | 32 |
| HLA | 3 | 119 | 0 | 0.00 | -0.11 | 0.31 | 1 | 0.00 | -0.13 | 0.16 | 0.02 | 0.35 | 0.06 | 87 | 0.95 | 0.04 | 0.84 | 0.13 | 29 | 33 |
| HLA | 3 | 379 | 0 | -0.03 | 2.22 | 0.41 | 1 | 0.01 | 1.93 | 0.18 | 0.29 | 0.45 | 0.64 | 79 | 0.52 | 0.00 | 0.97 | 0.03 | 29 | 34 |
| HLA | 3 | 130 | 0 | -0.01 | -0.20 | 0.31 | 1 | 0.00 | -0.30 | 0.15 | 0.10 | 0.35 | 0.29 | 87 | 0.77 | 0.29 | 0.59 | 0.25 | 29 | 35 |
| HLA | 3 | 125 | 0 | 0.02 | -0.74 | 0.29 | 1 | -0.01 | -0.58 | 0.15 | -0.16 | 0.33 | -0.48 | 89 | 0.64 | 0.12 | 0.73 | -0.21 | 29 | 36 |
| HLA | 3 | 143 | 0 | 0.03 | 0.32 | 0.34 | 1 | -0.01 | 0.55 | 0.18 | -0.23 | 0.38 | -0.61 | 90 | 0.55 | 0.11 | 0.74 | -0.23 | 29 | 37 |
| HLA | 3 | 123 | 0 | 0.06 | -0.83 | 0.29 | 1 | -0.02 | -0.45 | 0.15 | -0.38 | 0.33 | -1.15 | 90 | 0.25 | 0.13 | 0.72 | -0.18 | 29 | 38 |
| HLA | 3 | 137 | 0 | 0.11 | -0.74 | 0.29 | 1 | -0.03 | -0.01 | 0.16 | -0.73 | 0.33 | -2.19 | 93 | 0.03 | 2.08 | 0.15 | -0.49 | 29 | 39 |
| HLA | 3 | 127 | 0 | -0.01 | 3.61 | 1.04 | 1 | 0.00 | 3.23 | 0.42 | 0.38 | 1.12 | 0.34 | 77 | 0.73 | 0.31 | 0.58 | | 29 | 40 |
| HLA | 3 | 158 | 0 | -0.04 | -0.01 | 0.32 | 1 | 0.01 | -0.31 | 0.15 | 0.30 | 0.35 | 0.85 | 85 | 0.40 | 0.85 | 0.36 | 0.41 | 29 | 41 |
| HLA | 3 | 1021 | 0 | 0.08 | -1.33 | 0.29 | 1 | -0.02 | -0.86 | 0.15 | -0.47 | 0.33 | -1.43 | 90 | 0.16 | 1.48 | 0.22 | -0.46 | 29 | 42 |
| HLA | 3 | 384 | 0 | -0.12 | -0.83 | 0.29 | 1 | 0.03 | -1.60 | 0.16 | 0.77 | 0.33 | 2.34 | 92 | 0.02 | 3.30 | 0.07 | 0.76 | 29 | 43 |
| HLA | 3 | 156 | 0 | 0.09 | -0.30 | 0.31 | 1 | -0.03 | 0.40 | 0.17 | -0.70 | 0.35 | -1.99 | 95 | 0.05 | 0.91 | 0.34 | -0.41 | 29 | 44 |
| HLA | 3 | 150 | 0 | 0.04 | -1.84 | 0.30 | 1 | -0.01 | -1.57 | 0.16 | -0.27 | 0.34 | -0.79 | 90 | 0.43 | 0.00 | 1.00 | -0.07 | 29 | 45 |
| HLA | 3 | 138 | 0 | -0.03 | 1.31 | 0.31 | 1 | 0.01 | 1.09 | 0.14 | 0.22 | 0.34 | 0.63 | 81 | 0.53 | 0.17 | 0.68 | 0.19 | 29 | 46 |
| HLA | 3 | 145 | 0 | -0.13 | -0.66 | 0.29 | 1 | 0.04 | -1.46 | 0.15 | 0.80 | 0.33 | 2.41 | 90 | 0.02 | 8.40 | 0.00 | 1.24 | 29 | 47 |
| HLA | 3 | 1286 | 0 | -0.02 | 2.04 | 0.55 | 1 | 0.00 | 1.73 | 0.24 | 0.31 | 0.60 | 0.52 | 79 | 0.61 | 0.93 | 0.34 | 1.02 | 29 | 48 |
| HLA | 3 | 1282 | 0 | 0.00 | -0.38 | 0.30 | 1 | 0.00 | -0.38 | 0.15 | 0.00 | 0.34 | 0.00 | 88 | 1.00 | 0.07 | 0.78 | -0.17 | 29 | 49 |
| HLA | 3 | 1285 | 0 | 0.01 | 2.38 | 0.63 | 1 | 0.00 | 2.67 | 0.34 | -0.28 | 0.71 | -0.40 | 92 | 0.69 | 0.00 | 0.96 | 0.51 | 29 | 50 |
| HLA | 3 | 1277 | 0 | 0.06 | 0.10 | 0.32 | 1 | -0.02 | 0.61 | 0.18 | -0.51 | 0.37 | -1.39 | 94 | 0.17 | 0.09 | 0.77 | -0.19 | 29 | 51 |
| HLA | 3 | 1281 | 0 | 0.00 | -0.49 | 0.30 | 1 | 0.00 | -0.49 | 0.15 | 0.00 | 0.34 | 0.00 | 88 | 1.00 | 0.00 | 0.98 | 0.05 | 29 | 52 |
| HLA | 3 | 1283 | 0 | -0.07 | -0.66 | 0.29 | 1 | 0.02 | -1.08 | 0.15 | 0.43 | 0.33 | 1.29 | 89 | 0.20 | 0.29 | 0.59 | 0.25 | 29 | 53 |
| HLA | 3 | 1284 | 0 | -0.02 | 0.65 | 0.26 | 1 | 0.01 | 0.57 | 0.12 | 0.07 | 0.29 | 0.25 | 84 | 0.80 | 0.47 | 0.49 | 0.35 | 29 | 54 |
| HLA | 3 | 1478 | 0 | 0.06 | -0.48 | 0.30 | 1 | -0.02 | -0.08 | 0.16 | -0.40 | 0.34 | -1.18 | 91 | 0.24 | 0.61 | 0.44 | -0.34 | 29 | 55 |
| HLA | 3 | 1280 | 0 | -0.01 | 0.43 | 0.35 | 1 | 0.00 | 0.39 | 0.17 | 0.04 | 0.39 | 0.11 | 86 | 0.91 | 0.01 | 0.91 | 0.15 | 29 | 56 |
| HLA | 3 | 394 | 0 | 0.21 | -0.48 | 0.12 | 1 | -0.06 | -0.24 | 0.06 | -0.24 | 0.14 | -1.74 | 90 | 0.09 | 0.85 | 0.36 | -0.29 | 29 | 57 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 18 | 0 | 0.01 | -0.84 | 0.31 | 1 | 0.00 | -0.80 | 0.16 | -0.03 | 0.34 | -0.09 | 80 | 0.93 | 0.00 | 1.00 | -0.08 | 29 | 1 |
| HLA | 4 | 389 | 0 | 0.05 | -2.06 | 0.37 | 1 | -0.01 | -1.59 | 0.17 | -0.46 | 0.41 | -1.12 | 75 | 0.27 | 2.28 | 0.13 | -0.93 | 29 | 2 |
| HLA | 4 | 21 | 0 | -0.05 | 0.27 | 0.31 | 1 | 0.01 | -0.06 | 0.16 | 0.33 | 0.35 | 0.95 | 80 | 0.34 | 0.20 | 0.65 | 0.24 | 29 | 3 |
| HLA | 4 | 7 | 0 | -0.01 | -1.79 | 0.35 | 1 | 0.00 | -1.83 | 0.18 | 0.04 | 0.40 | 0.11 | 82 | 0.91 | 0.55 | 0.46 | -0.57 | 29 | 4 |
| HLA | 4 | 12 | 0 | -0.02 | -1.23 | 0.32 | 1 | 0.01 | -1.39 | 0.17 | 0.16 | 0.36 | 0.44 | 82 | 0.66 | 0.24 | 0.62 | 0.32 | 29 | 5 |
| HLA | 4 | 64 | 0 | 0.03 | -1.44 | 0.33 | 1 | -0.01 | -1.20 | 0.16 | -0.24 | 0.37 | -0.66 | 78 | 0.51 | 0.02 | 0.88 | -0.17 | 29 | 6 |
| HLA | 4 | 8 | 0 | 0.04 | -0.93 | 0.31 | 1 | -0.01 | -0.68 | 0.15 | -0.26 | 0.35 | -0.74 | 79 | 0.46 | 0.30 | 0.58 | -0.33 | 29 | 7 |
| HLA | 4 | 9 | 0 | -0.02 | 0.37 | 0.31 | 1 | 0.00 | 0.26 | 0.16 | 0.10 | 0.35 | 0.30 | 81 | 0.77 | 0.08 | 0.78 | 0.22 | 29 | 8 |
| HLA | 4 | 13 | 0 | 0.06 | -2.73 | 0.45 | 1 | -0.02 | -2.06 | 0.19 | -0.67 | 0.49 | -1.36 | 71 | 0.18 | 2.28 | 0.13 | -1.09 | 29 | 9 |
| HLA | 4 | 11 | 0 | -0.02 | 2.05 | 0.45 | 1 | 0.01 | 1.79 | 0.22 | 0.26 | 0.50 | 0.51 | 79 | 0.61 | 2.96 | 0.09 | 2.04 | 29 | 10 |
| HLA | 4 | 1019 | 0 | 0.06 | 0.27 | 0.31 | 1 | -0.02 | 0.66 | 0.17 | -0.39 | 0.35 | -1.11 | 85 | 0.27 | 0.77 | 0.38 | -0.42 | 29 | 11 |
| HLA | 4 | 14 | 0 | 0.06 | -1.67 | 0.34 | 1 | -0.02 | -1.20 | 0.16 | -0.47 | 0.38 | -1.23 | 76 | 0.22 | 0.45 | 0.50 | -0.35 | 29 | 12 |
| HLA | 4 | 16 | 0 | -0.06 | -0.74 | 0.31 | 1 | 0.02 | -1.12 | 0.16 | 0.38 | 0.35 | 1.10 | 83 | 0.28 | 1.24 | 0.27 | 0.56 | 29 | 13 |
| HLA | 4 | 15 | 0 | 0.00 | -0.47 | 0.30 | 1 | 0.00 | -0.44 | 0.15 | -0.02 | 0.34 | -0.07 | 80 | 0.95 | 0.01 | 0.91 | 0.12 | 29 | 14 |
| HLA | 4 | 17 | 0 | -0.03 | -0.01 | 0.30 | 1 | 0.01 | -0.18 | 0.15 | 0.17 | 0.34 | 0.49 | 80 | 0.62 | 0.02 | 0.88 | 0.03 | 29 | 15 |
| HLA | 4 | 65 | 0 | 0.00 | -1.66 | 0.34 | 1 | 0.00 | -1.66 | 0.18 | 0.00 | 0.39 | 0.00 | 81 | 1.00 | 0.01 | 0.93 | -0.14 | 29 | 16 |
| HLA | 4 | 20 | 0 | -0.09 | -0.93 | 0.31 | 1 | 0.02 | -1.56 | 0.17 | 0.63 | 0.35 | 1.78 | 86 | 0.08 | 1.10 | 0.30 | 0.59 | 29 | 17 |
| HLA | 4 | 22 | 0 | -0.01 | 0.37 | 0.31 | 1 | 0.00 | 0.30 | 0.16 | 0.06 | 0.35 | 0.18 | 81 | 0.86 | 0.64 | 0.42 | -0.36 | 29 | 18 |
| HLA | 4 | 23 | 0 | -0.03 | 0.18 | 0.31 | 1 | 0.01 | -0.01 | 0.16 | 0.19 | 0.34 | 0.54 | 80 | 0.59 | 0.15 | 0.69 | 0.20 | 29 | 19 |
| HLA | 4 | 30 | 0 | -0.05 | 0.08 | 0.31 | 1 | 0.01 | -0.25 | 0.15 | 0.33 | 0.34 | 0.97 | 80 | 0.33 | 0.07 | 0.79 | 0.16 | 29 | 20 |
| HLA | 4 | 34 | 0 | -0.06 | -0.19 | 0.30 | 1 | 0.02 | -0.56 | 0.15 | 0.36 | 0.34 | 1.07 | 81 | 0.29 | 0.31 | 0.58 | 0.28 | 29 | 21 |
| HLA | 4 | 35 | 0 | 0.12 | 1.17 | 0.24 | 1 | -0.03 | 1.76 | 0.17 | -0.59 | 0.30 | -1.97 | 106 | 0.05 | 3.05 | 0.08 | -0.89 | 29 | 22 |
| HLA | 4 | 24 | 0 | 0.01 | 0.57 | 0.32 | 1 | 0.00 | 0.66 | 0.17 | -0.10 | 0.36 | -0.27 | 83 | 0.79 | 0.14 | 0.71 | -0.20 | 29 | 23 |
| HLA | 4 | 36 | 0 | 0.04 | -0.10 | 0.30 | 1 | -0.01 | 0.14 | 0.16 | -0.24 | 0.34 | -0.70 | 82 | 0.49 | 0.02 | 0.90 | 0.11 | 29 | 24 |
| HLA | 4 | 1291 | 0 | -0.03 | 1.00 | 0.34 | 1 | 0.01 | 0.81 | 0.17 | 0.19 | 0.38 | 0.50 | 80 | 0.62 | 0.59 | 0.44 | 0.48 | 29 | 25 |
| HLA | 4 | 26 | 0 | 0.00 | -0.01 | 0.30 | 1 | 0.00 | -0.01 | 0.16 | 0.00 | 0.34 | 0.00 | 81 | 1.00 | 0.04 | 0.85 | -0.15 | 29 | 26 |
| HLA | 4 | 27 | 0 | -0.05 | -0.47 | 0.30 | 1 | 0.01 | -0.80 | 0.16 | 0.33 | 0.34 | 0.97 | 81 | 0.33 | 1.00 | 0.32 | 0.47 | 29 | 27 |
| HLA | 4 | 37 | 0 | 0.08 | -0.19 | 0.30 | 1 | -0.02 | 0.29 | 0.16 | -0.48 | 0.34 | -1.41 | 83 | 0.16 | 0.41 | 0.52 | -0.27 | 29 | 28 |
| HLA | 4 | 38 | 0 | -0.10 | -0.74 | 0.31 | 1 | 0.03 | -1.39 | 0.17 | 0.65 | 0.35 | 1.86 | 85 | 0.07 | 1.87 | 0.17 | 0.65 | 29 | 29 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 4 | 31 | 0 | 0.07 | -0.47 | 0.30 | 1 | -0.02 | -0.01 | 0.16 | -0.46 | 0.34 | -1.34 | 81 | 0.18 | 0.19 | 0.66 | -0.25 | 29 | 30 |
| HLA | 4 | 25 | 0 | -0.08 | 1.25 | 0.36 | 1 | 0.02 | 0.64 | 0.17 | 0.61 | 0.40 | 1.54 | 75 | 0.13 | 1.52 | 0.22 | 0.66 | 29 | 31 |
| HLA | 4 | 54 | 0 | 0.11 | -0.84 | 0.31 | 1 | -0.03 | -0.15 | 0.15 | -0.68 | 0.34 | -1.98 | 80 | 0.05 | 1.52 | 0.22 | -0.65 | 29 | 32 |
| HLA | 4 | 40 | 0 | -0.01 | 0.27 | 0.31 | 1 | 0.00 | 0.22 | 0.16 | 0.05 | 0.35 | 0.13 | 81 | 0.89 | 0.02 | 0.88 | 0.14 | 29 | 33 |
| HLA | 4 | 55 | 0 | -0.05 | 0.57 | 0.32 | 1 | 0.01 | 0.24 | 0.16 | 0.33 | 0.36 | 0.93 | 79 | 0.36 | 0.00 | 0.98 | 0.07 | 29 | 34 |
| HLA | 4 | 41 | 0 | 0.05 | 0.67 | 0.32 | 1 | -0.01 | 1.03 | 0.18 | -0.36 | 0.37 | -0.97 | 87 | 0.34 | 0.05 | 0.82 | -0.18 | 29 | 35 |
| HLA | 4 | 56 | 0 | 0.03 | 0.89 | 0.34 | 1 | -0.01 | 1.10 | 0.18 | -0.21 | 0.38 | -0.55 | 86 | 0.59 | 0.00 | 0.96 | -0.08 | 29 | 36 |
| HLA | 4 | 57 | 0 | -0.05 | 1.38 | 0.37 | 1 | 0.01 | 0.97 | 0.18 | 0.42 | 0.41 | 1.01 | 77 | 0.31 | 0.11 | 0.74 | 0.23 | 29 | 37 |
| HLA | 4 | 42 | 0 | -0.15 | 1.23 | 0.21 | 1 | 0.04 | 0.83 | 0.10 | 0.40 | 0.23 | 1.72 | 77 | 0.09 | 4.69 | 0.03 | 0.96 | 29 | 38 |
| HLA | 4 | 387 | 0 | 0.10 | -0.47 | 0.30 | 1 | -0.03 | 0.14 | 0.16 | -0.60 | 0.34 | -1.77 | 82 | 0.08 | 3.76 | 0.05 | -0.86 | 29 | 39 |
| HLA | 4 | 46 | 0 | 0.12 | -0.38 | 0.30 | 1 | -0.03 | 0.36 | 0.16 | -0.74 | 0.34 | -2.16 | 84 | 0.03 | 5.00 | 0.03 | -0.94 | 29 | 40 |
| HLA | 4 | 47 | 0 | 0.05 | -0.47 | 0.30 | 1 | -0.01 | -0.18 | 0.15 | -0.29 | 0.34 | -0.85 | 81 | 0.40 | 0.01 | 0.94 | -0.04 | 29 | 41 |
| HLA | 4 | 48 | 0 | 0.01 | -1.23 | 0.32 | 1 | 0.00 | -1.18 | 0.16 | -0.04 | 0.36 | -0.12 | 80 | 0.90 | 0.08 | 0.78 | -0.22 | 29 | 42 |
| HLA | 4 | 50 | 0 | 0.05 | -0.38 | 0.30 | 1 | -0.01 | -0.08 | 0.16 | -0.29 | 0.34 | -0.87 | 81 | 0.39 | 0.27 | 0.61 | -0.31 | 29 | 43 |
| HLA | 4 | 49 | 0 | 0.02 | -1.23 | 0.32 | 1 | -0.01 | -1.10 | 0.16 | -0.13 | 0.36 | -0.37 | 79 | 0.71 | 0.00 | 0.96 | -0.07 | 29 | 44 |
| HLA | 4 | 51 | 0 | 0.01 | -0.01 | 0.30 | 1 | 0.00 | 0.03 | 0.16 | -0.04 | 0.34 | -0.11 | 81 | 0.91 | 0.02 | 0.88 | 0.02 | 29 | 45 |
| HLA | 4 | 62 | 0 | -0.01 | 0.08 | 0.31 | 1 | 0.00 | 0.03 | 0.16 | 0.05 | 0.34 | 0.16 | 81 | 0.88 | 0.49 | 0.49 | 0.31 | 29 | 46 |
| HLA | 4 | 60 | 0 | 0.06 | -1.33 | 0.33 | 1 | -0.02 | -0.92 | 0.16 | -0.41 | 0.36 | -1.15 | 78 | 0.25 | 0.46 | 0.50 | -0.40 | 29 | 47 |
| HLA | 4 | 61 | 0 | -0.04 | 0.37 | 0.31 | 1 | 0.01 | 0.09 | 0.16 | 0.28 | 0.35 | 0.80 | 80 | 0.42 | 0.13 | 0.72 | 0.20 | 29 | 48 |
| HLA | 4 | 63 | 0 | -0.02 | 1.68 | 0.40 | 1 | 0.01 | 1.47 | 0.20 | 0.21 | 0.45 | 0.47 | 80 | 0.64 | 0.02 | 0.90 | 0.06 | 29 | 49 |
| HLA | 4 | 1016 | 0 | 0.00 | 0.67 | 0.32 | 1 | 0.00 | 0.67 | 0.17 | 0.00 | 0.37 | 0.00 | 82 | 1.00 | 0.01 | 0.92 | -0.12 | 29 | 50 |
| HLA | 4 | 1017 | 0 | 0.00 | 4.01 | 1.01 | 1 | 0.00 | 3.84 | 0.51 | 0.17 | 1.14 | 0.15 | 80 | 0.88 | 0.70 | 0.40 | | 29 | 51 |
| HLA | 4 | 1015 | 0 | 0.00 | -0.11 | 0.30 | 1 | 0.00 | -0.11 | 0.15 | 0.00 | 0.34 | 0.00 | 81 | 1.00 | 0.00 | 0.96 | -0.05 | 29 | 52 |
| HLA | 4 | 1014 | 0 | 0.00 | 2.05 | 0.45 | 1 | 0.00 | 2.01 | 0.24 | 0.03 | 0.51 | 0.07 | 83 | 0.95 | 0.65 | 0.42 | 0.90 | 29 | 53 |
| HLA | 4 | 1011 | 0 | 0.06 | 0.27 | 0.31 | 1 | -0.02 | 0.69 | 0.17 | -0.42 | 0.35 | -1.19 | 85 | 0.24 | 0.90 | 0.34 | -0.47 | 29 | 54 |
| HLA | 4 | 1012 | 0 | -0.04 | 1.12 | 0.35 | 1 | 0.01 | 0.84 | 0.17 | 0.28 | 0.39 | 0.72 | 79 | 0.47 | 0.00 | 1.00 | 0.16 | 29 | 55 |
| HLA | 4 | 1013 | 0 | -0.13 | 0.83 | 0.18 | 1 | 0.04 | 0.56 | 0.09 | 0.27 | 0.20 | 1.34 | 79 | 0.18 | 2.33 | 0.13 | 0.75 | 29 | 56 |
| HLA | 4 | 395 | 0 | -0.09 | 0.51 | 0.14 | 1 | 0.03 | 0.39 | 0.07 | 0.12 | 0.15 | 0.75 | 81 | 0.45 | 0.04 | 0.85 | 0.06 | 29 | 57 |
| HLA | 5 | 642 | 0 | 0.05 | 0.24 | 0.30 | 1 | -0.02 | 0.66 | 0.18 | -0.42 | 0.35 | -1.20 | 117 | 0.23 | 2.30 | 0.13 | -0.70 | 37 | 1 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 644 | 0 | -0.07 | -2.06 | 0.30 | 1 | 0.03 | -2.75 | 0.23 | 0.69 | 0.38 | 1.80 | 148 | 0.07 | 1.64 | 0.20 | 0.76 | 37 | 2 |
| HLA | 5 | 636 | 0 | -0.10 | -0.01 | 0.28 | 1 | 0.04 | -0.70 | 0.16 | 0.68 | 0.33 | 2.09 | 110 | 0.04 | 2.23 | 0.14 | 0.59 | 37 | 3 |
| HLA | 5 | 716 | 0 | 0.09 | -0.32 | 0.27 | 1 | -0.03 | 0.28 | 0.17 | -0.61 | 0.32 | -1.88 | 119 | 0.06 | 0.75 | 0.39 | -0.34 | 37 | 4 |
| HLA | 5 | 633 | 0 | 0.06 | -0.25 | 0.28 | 1 | -0.02 | 0.20 | 0.17 | -0.45 | 0.32 | -1.37 | 117 | 0.17 | 0.91 | 0.34 | -0.38 | 37 | 5 |
| HLA | 5 | 723 | 0 | -0.02 | 1.19 | 0.37 | 1 | 0.01 | 0.97 | 0.19 | 0.22 | 0.42 | 0.54 | 102 | 0.59 | 0.40 | 0.53 | 0.51 | 37 | 6 |
| HLA | 5 | 1072 | 0 | 0.02 | 0.51 | 0.31 | 1 | -0.01 | 0.66 | 0.18 | -0.14 | 0.36 | -0.39 | 111 | 0.70 | 0.01 | 0.93 | -0.10 | 37 | 7 |
| HLA | 5 | 711 | 0 | 0.02 | 0.33 | 0.30 | 1 | -0.01 | 0.53 | 0.18 | -0.20 | 0.35 | -0.57 | 113 | 0.57 | 0.02 | 0.89 | -0.01 | 37 | 8 |
| HLA | 5 | 690 | 0 | 0.01 | -0.32 | 0.27 | 1 | 0.00 | -0.29 | 0.16 | -0.04 | 0.32 | -0.12 | 114 | 0.90 | 0.61 | 0.44 | -0.37 | 37 | 9 |
| HLA | 5 | 1074 | 0 | 0.02 | -2.68 | 0.35 | 1 | -0.01 | -2.45 | 0.21 | -0.23 | 0.41 | -0.56 | 117 | 0.58 | 0.59 | 0.44 | -0.40 | 37 | 10 |
| HLA | 5 | 713 | 0 | -0.04 | 0.72 | 0.33 | 1 | 0.02 | 0.34 | 0.17 | 0.37 | 0.37 | 1.01 | 103 | 0.31 | 0.47 | 0.49 | 0.46 | 37 | 11 |
| HLA | 5 | 721 | 0 | -0.03 | -1.12 | 0.27 | 1 | 0.01 | -1.30 | 0.17 | 0.18 | 0.32 | 0.56 | 120 | 0.58 | 0.00 | 0.99 | 0.08 | 37 | 12 |
| HLA | 5 | 726 | 0 | 0.07 | -0.40 | 0.27 | 1 | -0.03 | 0.08 | 0.17 | -0.48 | 0.32 | -1.51 | 117 | 0.13 | 1.27 | 0.26 | -0.43 | 37 | 13 |
| HLA | 5 | 724 | 0 | -0.05 | -0.17 | 0.28 | 1 | 0.02 | -0.49 | 0.16 | 0.31 | 0.32 | 0.97 | 112 | 0.33 | 2.31 | 0.13 | 0.56 | 37 | 14 |
| HLA | 5 | 725 | 0 | 0.04 | -0.32 | 0.27 | 1 | -0.01 | -0.08 | 0.17 | -0.24 | 0.32 | -0.75 | 115 | 0.45 | 0.93 | 0.34 | -0.40 | 37 | 15 |
| HLA | 5 | 627 | 0 | -0.07 | -0.09 | 0.28 | 1 | 0.03 | -0.59 | 0.16 | 0.50 | 0.33 | 1.53 | 111 | 0.13 | 2.46 | 0.12 | 0.63 | 37 | 16 |
| HLA | 5 | 722 | 0 | 0.07 | 0.74 | 0.18 | 1 | -0.02 | 0.93 | 0.11 | -0.19 | 0.21 | -0.92 | 114 | 0.36 | 2.36 | 0.12 | -0.52 | 37 | 17 |
| HLA | 5 | 1215 | 0 | 0.11 | -0.09 | 0.28 | 1 | -0.04 | 0.79 | 0.19 | -0.88 | 0.34 | -2.62 | 125 | 0.01 | 1.38 | 0.24 | -0.42 | 37 | 18 |
| HLA | 5 | 672 | 0 | 0.12 | -1.49 | 0.28 | 1 | -0.04 | -0.70 | 0.16 | -0.79 | 0.32 | -2.48 | 113 | 0.01 | 2.74 | 0.10 | -0.60 | 37 | 19 |
| HLA | 5 | 1183 | 0 | -0.02 | 0.24 | 0.30 | 1 | 0.01 | 0.06 | 0.17 | 0.18 | 0.34 | 0.54 | 109 | 0.59 | 0.34 | 0.56 | 0.27 | 37 | 20 |
| HLA | 5 | 681 | 0 | 0.00 | 1.33 | 0.38 | 1 | 0.00 | 1.33 | 0.21 | 0.00 | 0.44 | 0.00 | 106 | 1.00 | 0.11 | 0.74 | 0.25 | 37 | 21 |
| HLA | 5 | 673 | 0 | 0.02 | 1.49 | 0.40 | 1 | -0.01 | 1.73 | 0.24 | -0.24 | 0.47 | -0.52 | 112 | 0.61 | 0.06 | 0.81 | 0.00 | 37 | 22 |
| HLA | 5 | 1186 | 0 | 0.02 | -0.55 | 0.27 | 1 | -0.01 | -0.43 | 0.16 | -0.11 | 0.32 | -0.36 | 115 | 0.72 | 0.01 | 0.93 | -0.03 | 37 | 23 |
| HLA | 5 | 729 | 0 | 0.08 | -1.98 | 0.29 | 1 | -0.03 | -1.39 | 0.17 | -0.59 | 0.34 | -1.72 | 111 | 0.09 | 0.85 | 0.36 | -0.37 | 37 | 24 |
| HLA | 5 | 640 | 0 | -0.01 | 1.49 | 0.40 | 1 | 0.00 | 1.38 | 0.21 | 0.11 | 0.45 | 0.24 | 103 | 0.81 | 0.03 | 0.87 | -0.04 | 37 | 25 |
| HLA | 5 | 718 | 0 | 0.08 | 0.61 | 0.32 | 1 | -0.03 | 1.47 | 0.22 | -0.86 | 0.39 | -2.22 | 130 | 0.03 | 2.26 | 0.13 | -0.65 | 37 | 26 |
| HLA | 5 | 1193 | 0 | 0.02 | -0.01 | 0.28 | 1 | -0.01 | 0.17 | 0.17 | -0.18 | 0.33 | -0.55 | 113 | 0.59 | 0.04 | 0.85 | -0.13 | 37 | 27 |
| HLA | 5 | 689 | 0 | -0.03 | -0.98 | 0.27 | 1 | 0.01 | -1.16 | 0.17 | 0.18 | 0.32 | 0.57 | 119 | 0.57 | 0.01 | 0.94 | 0.09 | 37 | 28 |
| HLA | 5 | 631 | 0 | -0.02 | -0.09 | 0.28 | 1 | 0.01 | -0.22 | 0.16 | 0.13 | 0.33 | 0.39 | 111 | 0.70 | 0.22 | 0.64 | 0.22 | 37 | 29 |
| HLA | 5 | 648 | 0 | -0.07 | -0.25 | 0.28 | 1 | 0.02 | -0.70 | 0.16 | 0.45 | 0.32 | 1.40 | 113 | 0.17 | 2.66 | 0.10 | 0.58 | 37 | 30 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 5 | 1222 | 0 | -0.09 | -1.34 | 0.27 | 1 | 0.03 | -2.00 | 0.19 | 0.66 | 0.33 | 1.99 | 133 | 0.05 | 2.13 | 0.14 | 0.75 | 37 | 31 |
| HLA | 5 | 629 | 0 | 0.07 | -0.17 | 0.28 | 1 | -0.03 | 0.34 | 0.17 | -0.51 | 0.33 | -1.57 | 118 | 0.12 | 2.42 | 0.12 | -0.65 | 37 | 32 |
| HLA | 5 | 728 | 0 | -0.03 | -0.47 | 0.27 | 1 | 0.01 | -0.64 | 0.16 | 0.17 | 0.32 | 0.54 | 114 | 0.59 | 0.67 | 0.41 | 0.34 | 37 | 33 |
| HLA | 5 | 693 | 0 | 0.05 | 0.33 | 0.30 | 1 | -0.02 | 0.76 | 0.18 | -0.43 | 0.35 | -1.21 | 117 | 0.23 | 0.38 | 0.54 | -0.31 | 37 | 34 |
| HLA | 5 | 677 | 0 | -0.04 | 2.66 | 0.61 | 1 | 0.01 | 1.79 | 0.24 | 0.88 | 0.66 | 1.33 | 85 | 0.19 | 0.90 | 0.34 | 1.22 | 37 | 35 |
| HLA | 5 | 625 | 0 | -0.14 | -0.17 | 0.28 | 1 | 0.05 | -1.07 | 0.17 | 0.90 | 0.32 | 2.78 | 114 | 0.01 | 4.06 | 0.04 | 0.62 | 37 | 36 |
| HLA | 5 | 702 | 0 | -0.02 | 0.33 | 0.30 | 1 | 0.01 | 0.14 | 0.17 | 0.19 | 0.34 | 0.55 | 108 | 0.59 | 0.03 | 0.85 | 0.14 | 37 | 37 |
| HLA | 5 | 730 | 0 | 0.01 | 0.33 | 0.30 | 1 | 0.00 | 0.39 | 0.17 | -0.06 | 0.35 | -0.17 | 111 | 0.87 | 0.01 | 0.94 | 0.04 | 37 | 38 |
| HLA | 5 | 709 | 0 | -0.03 | -0.76 | 0.27 | 1 | 0.01 | -0.99 | 0.17 | 0.23 | 0.31 | 0.73 | 117 | 0.47 | 0.36 | 0.55 | 0.25 | 37 | 39 |
| HLA | 5 | 646 | 0 | 0.01 | -0.76 | 0.27 | 1 | -0.01 | -0.67 | 0.16 | -0.09 | 0.31 | -0.30 | 116 | 0.77 | 0.30 | 0.58 | -0.22 | 37 | 40 |
| HLA | 5 | 696 | 0 | 0.02 | -0.69 | 0.27 | 1 | -0.01 | -0.56 | 0.16 | -0.13 | 0.31 | -0.41 | 115 | 0.69 | 0.29 | 0.59 | -0.23 | 37 | 41 |
| HLA | 5 | 637 | 0 | -0.02 | 1.19 | 0.37 | 1 | 0.01 | 0.97 | 0.19 | 0.22 | 0.42 | 0.54 | 102 | 0.59 | 0.05 | 0.81 | 0.22 | 37 | 42 |
| HLA | 5 | 708 | 0 | 0.05 | 0.51 | 0.31 | 1 | -0.02 | 1.01 | 0.19 | -0.49 | 0.37 | -1.34 | 119 | 0.18 | 1.85 | 0.17 | -0.67 | 37 | 43 |
| HLA | 5 | 712 | 0 | -0.05 | 1.41 | 0.17 | 1 | 0.02 | 1.30 | 0.09 | 0.11 | 0.19 | 0.59 | 103 | 0.56 | 0.85 | 0.36 | 0.35 | 37 | 44 |
| HLA | 5 | 720 | 0 | 0.02 | -0.17 | 0.28 | 1 | -0.01 | -0.06 | 0.17 | -0.12 | 0.32 | -0.36 | 113 | 0.72 | 0.57 | 0.45 | -0.34 | 37 | 45 |
| HLA | 5 | 714 | 0 | -0.10 | 0.72 | 0.33 | 1 | 0.04 | -0.08 | 0.17 | 0.80 | 0.37 | 2.19 | 100 | 0.03 | 4.06 | 0.04 | 1.06 | 37 | 46 |
| HLA | 5 | 630 | 0 | -0.04 | 0.42 | 0.31 | 1 | 0.01 | 0.11 | 0.17 | 0.31 | 0.35 | 0.88 | 106 | 0.38 | 0.64 | 0.42 | 0.33 | 37 | 47 |
| HLA | 5 | 727 | 0 | -0.01 | 0.51 | 0.31 | 1 | 0.00 | 0.40 | 0.17 | 0.11 | 0.36 | 0.31 | 108 | 0.76 | 0.03 | 0.87 | 0.02 | 37 | 48 |
| HLA | 5 | 684 | 0 | -0.11 | 0.24 | 0.30 | 1 | 0.04 | -0.51 | 0.16 | 0.75 | 0.34 | 2.22 | 106 | 0.03 | 2.35 | 0.13 | 0.72 | 37 | 49 |
| HLA | 5 | 699 | 0 | 0.06 | -1.49 | 0.28 | 1 | -0.02 | -1.07 | 0.17 | -0.42 | 0.32 | -1.30 | 115 | 0.20 | 0.90 | 0.34 | -0.40 | 37 | 50 |
| HLA | 5 | 707 | 0 | 0.05 | 1.33 | 0.38 | 1 | -0.02 | 2.11 | 0.27 | -0.77 | 0.47 | -1.65 | 132 | 0.10 | 3.06 | 0.08 | -1.07 | 37 | 51 |
| HLA | 5 | 706 | 0 | -0.02 | 3.03 | 0.58 | 1 | 0.01 | 2.50 | 0.24 | 0.53 | 0.63 | 0.84 | 88 | 0.40 | 0.95 | 0.33 | 1.17 | 37 | 52 |
| HLA | 5 | 626 | 0 | -0.09 | -0.98 | 0.27 | 1 | 0.03 | -1.57 | 0.18 | 0.59 | 0.32 | 1.84 | 124 | 0.07 | 3.27 | 0.07 | 0.67 | 37 | 53 |
| HLA | 5 | 634 | 0 | -0.03 | -1.05 | 0.27 | 1 | 0.01 | -1.24 | 0.17 | 0.19 | 0.32 | 0.61 | 119 | 0.55 | 0.24 | 0.63 | 0.20 | 37 | 54 |
| HLA | 5 | 719 | 0 | -0.04 | 0.52 | 0.31 | 1 | 0.02 | 0.17 | 0.17 | 0.35 | 0.35 | 0.98 | 105 | 0.33 | 0.00 | 1.00 | 0.11 | 37 | 55 |
| HLA | 5 | 1208 | 0 | 0.09 | -0.01 | 0.28 | 1 | -0.03 | 0.72 | 0.18 | -0.74 | 0.34 | -2.17 | 122 | 0.03 | 1.41 | 0.23 | -0.48 | 37 | 56 |
| HLA | 5 | 1030 | 0 | 0.06 | -0.66 | 0.10 | 1 | -0.02 | -0.62 | 0.06 | -0.04 | 0.11 | -0.33 | 118 | 0.74 | 0.37 | 0.54 | -0.18 | 37 | 57 |
| HLA | 6 | 624 | 0 | 0.06 | -2.11 | 0.32 | 1 | -0.03 | -1.63 | 0.22 | -0.48 | 0.39 | -1.22 | 101 | 0.23 | 0.11 | 0.74 | -0.32 | 28 | 1 |
| HLA | 6 | 635 | 0 | -0.07 | -2.44 | 0.34 | 1 | 0.03 | -3.17 | 0.30 | 0.73 | 0.45 | 1.62 | 125 | 0.11 | 0.93 | 0.34 | 0.63 | 28 | 2 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 638 | 0 | -0.04 | -2.21 | 0.33 | 1 | 0.02 | -2.57 | 0.26 | 0.36 | 0.42 | 0.86 | 113 | 0.39 | 3.00 | 0.08 | 1.07 | 28 | 3 |
| HLA | 6 | 641 | 0 | 0.05 | -0.08 | 0.33 | 1 | -0.03 | 0.39 | 0.24 | -0.47 | 0.41 | -1.15 | 109 | 0.25 | 1.25 | 0.26 | -0.83 | 28 | 4 |
| HLA | 6 | 704 | 0 | -0.06 | -1.05 | 0.30 | 1 | 0.03 | -1.53 | 0.22 | 0.48 | 0.37 | 1.27 | 106 | 0.21 | 2.07 | 0.15 | 0.79 | 28 | 5 |
| HLA | 6 | 703 | 0 | -0.03 | -1.05 | 0.30 | 1 | 0.02 | -1.29 | 0.22 | 0.24 | 0.37 | 0.64 | 105 | 0.52 | 0.02 | 0.89 | -0.13 | 28 | 6 |
| HLA | 6 | 628 | 0 | -0.05 | -1.52 | 0.31 | 1 | 0.03 | -1.93 | 0.23 | 0.41 | 0.38 | 1.09 | 109 | 0.28 | 0.00 | 1.00 | 0.09 | 28 | 7 |
| HLA | 6 | 645 | 0 | -0.06 | -0.08 | 0.33 | 1 | 0.03 | -0.55 | 0.22 | 0.47 | 0.39 | 1.19 | 98 | 0.24 | 0.24 | 0.63 | 0.38 | 28 | 8 |
| HLA | 6 | 660 | 0 | 0.01 | 2.57 | 0.73 | 1 | -0.01 | 3.10 | 0.60 | -0.53 | 0.94 | -0.56 | 118 | 0.58 | 0.26 | 0.61 | 0.12 | 28 | 9 |
| HLA | 6 | 1171 | 0 | -0.02 | -0.08 | 0.33 | 1 | 0.01 | -0.21 | 0.22 | 0.13 | 0.40 | 0.32 | 101 | 0.75 | 0.97 | 0.33 | 0.52 | 28 | 10 |
| HLA | 6 | 661 | 0 | 0.02 | -0.39 | 0.32 | 1 | -0.01 | -0.21 | 0.22 | -0.18 | 0.39 | -0.47 | 104 | 0.64 | 0.10 | 0.75 | -0.24 | 28 | 11 |
| HLA | 6 | 659 | 0 | -0.01 | -0.49 | 0.31 | 1 | 0.01 | -0.60 | 0.22 | 0.11 | 0.38 | 0.28 | 102 | 0.78 | 0.01 | 0.94 | 0.13 | 28 | 12 |
| HLA | 6 | 643 | 0 | -0.19 | -0.52 | 0.17 | 1 | 0.09 | -0.91 | 0.11 | 0.40 | 0.20 | 1.98 | 99 | 0.05 | 0.03 | 0.87 | 0.06 | 28 | 13 |
| HLA | 6 | 665 | 0 | 0.05 | -0.39 | 0.32 | 1 | -0.03 | 0.05 | 0.23 | -0.44 | 0.39 | -1.13 | 107 | 0.26 | 0.95 | 0.33 | -0.69 | 28 | 14 |
| HLA | 6 | 678 | 0 | 0.00 | -0.87 | 0.31 | 1 | 0.00 | -0.87 | 0.22 | 0.00 | 0.37 | 0.00 | 104 | 1.00 | 0.03 | 0.87 | -0.23 | 28 | 15 |
| HLA | 6 | 652 | 0 | 0.07 | -1.52 | 0.31 | 1 | -0.03 | -1.01 | 0.22 | -0.50 | 0.37 | -1.34 | 103 | 0.18 | 1.11 | 0.29 | -0.53 | 28 | 16 |
| HLA | 6 | 639 | 0 | -0.06 | 0.03 | 0.33 | 1 | 0.03 | -0.45 | 0.22 | 0.48 | 0.40 | 1.21 | 97 | 0.23 | 0.03 | 0.86 | 0.03 | 28 | 17 |
| HLA | 6 | 1075 | 0 | -0.09 | 0.26 | 0.35 | 1 | 0.04 | -0.50 | 0.22 | 0.76 | 0.41 | 1.85 | 94 | 0.07 | 1.25 | 0.26 | 0.64 | 28 | 18 |
| HLA | 6 | 662 | 0 | 0.04 | -1.33 | 0.30 | 1 | -0.02 | -1.01 | 0.22 | -0.32 | 0.37 | -0.85 | 104 | 0.40 | 0.88 | 0.35 | -0.50 | 28 | 19 |
| HLA | 6 | 664 | 0 | 0.12 | 0.42 | 0.19 | 1 | -0.06 | 0.78 | 0.14 | -0.35 | 0.24 | -1.48 | 108 | 0.14 | 0.13 | 0.72 | -0.22 | 28 | 20 |
| HLA | 6 | 647 | 0 | -0.02 | 1.12 | 0.43 | 1 | 0.01 | 0.91 | 0.27 | 0.21 | 0.51 | 0.42 | 95 | 0.68 | 0.41 | 0.52 | -0.53 | 28 | 21 |
| HLA | 6 | 691 | 0 | 0.04 | 1.54 | 0.49 | 1 | -0.02 | 2.54 | 0.47 | -1.00 | 0.68 | -1.48 | 136 | 0.14 | 0.12 | 0.73 | -0.56 | 28 | 22 |
| HLA | 6 | 688 | 0 | -0.02 | 0.03 | 0.33 | 1 | 0.01 | -0.16 | 0.23 | 0.19 | 0.40 | 0.46 | 100 | 0.64 | 0.12 | 0.73 | 0.27 | 28 | 23 |
| HLA | 6 | 687 | 0 | -0.03 | 1.80 | 0.54 | 1 | 0.01 | 1.32 | 0.30 | 0.48 | 0.62 | 0.77 | 86 | 0.44 | 0.05 | 0.82 | 0.17 | 28 | 24 |
| HLA | 6 | 1309 | 0 | 0.05 | 0.26 | 0.35 | 1 | -0.02 | 0.77 | 0.26 | -0.51 | 0.43 | -1.18 | 111 | 0.24 | 0.67 | 0.41 | -0.53 | 28 | 25 |
| HLA | 6 | 651 | 0 | 0.01 | 1.12 | 0.43 | 1 | -0.01 | 1.32 | 0.30 | -0.20 | 0.52 | -0.38 | 105 | 0.70 | 0.51 | 0.48 | -0.89 | 28 | 26 |
| HLA | 6 | 683 | 0 | 0.05 | -2.11 | 0.32 | 1 | -0.02 | -1.73 | 0.22 | -0.38 | 0.39 | -0.96 | 102 | 0.34 | 0.32 | 0.57 | -0.40 | 28 | 27 |
| HLA | 6 | 649 | 0 | 0.01 | -0.19 | 0.32 | 1 | 0.00 | -0.11 | 0.23 | -0.08 | 0.39 | -0.20 | 103 | 0.84 | 0.00 | 0.97 | 0.09 | 28 | 28 |
| HLA | 6 | 1173 | 0 | 0.00 | 0.22 | 0.19 | 1 | 0.00 | 0.22 | 0.13 | 0.00 | 0.23 | 0.00 | 101 | 1.00 | 0.24 | 0.62 | -0.23 | 28 | 29 |
| HLA | 6 | 1083 | 0 | -0.02 | -0.29 | 0.32 | 1 | 0.01 | -0.45 | 0.22 | 0.16 | 0.39 | 0.42 | 101 | 0.67 | 0.10 | 0.75 | 0.28 | 28 | 30 |
| HLA | 6 | 653 | 0 | -0.04 | -1.52 | 0.31 | 1 | 0.02 | -1.83 | 0.23 | 0.31 | 0.38 | 0.82 | 108 | 0.42 | 0.09 | 0.77 | -0.20 | 28 | 31 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 6 | 682 | 0 | 0.09 | -0.78 | 0.31 | 1 | -0.04 | -0.11 | 0.23 | -0.67 | 0.38 | -1.76 | 108 | 0.08 | 0.85 | 0.36 | -0.55 | 28 | 32 |
| HLA | 6 | 698 | 0 | 0.00 | 1.80 | 0.54 | 1 | 0.00 | 1.87 | 0.36 | -0.07 | 0.65 | -0.11 | 100 | 0.91 | 0.09 | 0.76 | -0.05 | 28 | 33 |
| HLA | 6 | 1172 | 0 | -0.10 | -1.24 | 0.30 | 1 | 0.05 | -1.98 | 0.23 | 0.75 | 0.38 | 1.96 | 111 | 0.05 | 2.09 | 0.15 | 0.65 | 28 | 34 |
| HLA | 6 | 632 | 0 | -0.01 | -0.39 | 0.32 | 1 | 0.00 | -0.45 | 0.22 | 0.06 | 0.38 | 0.16 | 102 | 0.87 | 0.02 | 0.88 | -0.03 | 28 | 35 |
| HLA | 6 | 657 | 0 | -0.04 | -0.49 | 0.31 | 1 | 0.02 | -0.78 | 0.22 | 0.29 | 0.38 | 0.77 | 102 | 0.44 | 0.34 | 0.56 | 0.40 | 28 | 36 |
| HLA | 6 | 680 | 0 | 0.05 | -0.58 | 0.15 | 1 | -0.03 | -0.49 | 0.10 | -0.09 | 0.18 | -0.50 | 104 | 0.62 | 0.14 | 0.71 | -0.16 | 28 | 37 |
| HLA | 6 | 675 | 0 | 0.01 | 0.14 | 0.34 | 1 | 0.00 | 0.21 | 0.24 | -0.07 | 0.41 | -0.18 | 103 | 0.86 | 0.25 | 0.62 | 0.35 | 28 | 38 |
| HLA | 6 | 674 | 0 | -0.01 | 3.30 | 1.02 | 1 | 0.01 | 2.54 | 0.47 | 0.76 | 1.12 | 0.68 | 74 | 0.50 | 0.02 | 0.90 | | 28 | 39 |
| HLA | 6 | 667 | 0 | -0.01 | -1.05 | 0.30 | 1 | 0.00 | -1.09 | 0.22 | 0.04 | 0.37 | 0.09 | 104 | 0.92 | 0.01 | 0.94 | -0.13 | 28 | 40 |
| HLA | 6 | 1170 | 0 | -0.01 | 2.57 | 0.73 | 1 | 0.00 | 2.34 | 0.43 | 0.23 | 0.85 | 0.27 | 89 | 0.79 | 0.12 | 0.73 | 0.81 | 28 | 41 |
| HLA | 6 | 692 | 0 | 0.07 | 0.14 | 0.34 | 1 | -0.04 | 0.91 | 0.27 | -0.77 | 0.43 | -1.78 | 117 | 0.08 | 1.18 | 0.28 | -0.59 | 28 | 42 |
| HLA | 6 | 679 | 0 | -0.04 | 0.51 | 0.36 | 1 | 0.02 | 0.16 | 0.23 | 0.35 | 0.43 | 0.81 | 96 | 0.42 | 0.11 | 0.74 | 0.27 | 28 | 43 |
| HLA | 6 | 666 | 0 | -0.07 | 0.83 | 0.19 | 1 | 0.04 | 0.62 | 0.13 | 0.21 | 0.23 | 0.89 | 96 | 0.37 | 1.40 | 0.24 | 0.56 | 28 | 44 |
| HLA | 6 | 701 | 0 | -0.01 | 3.30 | 1.02 | 1 | 0.01 | 2.54 | 0.47 | 0.76 | 1.12 | 0.68 | 74 | 0.50 | 0.06 | 0.80 | | 28 | 45 |
| HLA | 6 | 700 | 0 | 0.04 | -1.52 | 0.31 | 1 | -0.02 | -1.20 | 0.22 | -0.32 | 0.37 | -0.85 | 104 | 0.40 | 0.63 | 0.43 | -0.48 | 28 | 46 |
| HLA | 6 | 697 | 0 | 0.09 | -0.87 | 0.31 | 1 | -0.05 | -0.16 | 0.23 | -0.71 | 0.38 | -1.88 | 108 | 0.06 | 0.57 | 0.45 | -0.41 | 28 | 47 |
| HLA | 6 | 694 | 0 | -0.03 | 1.82 | 0.34 | 1 | 0.01 | 1.59 | 0.22 | 0.23 | 0.41 | 0.56 | 96 | 0.58 | 0.02 | 0.90 | 0.09 | 28 | 48 |
| HLA | 6 | 676 | 0 | 0.01 | 2.57 | 0.73 | 1 | -0.01 | 3.10 | 0.60 | -0.53 | 0.94 | -0.56 | 118 | 0.58 | 0.05 | 0.82 | 0.42 | 28 | 49 |
| HLA | 6 | 668 | 0 | 0.04 | 0.79 | 0.39 | 1 | -0.02 | 1.32 | 0.30 | -0.53 | 0.49 | -1.08 | 114 | 0.28 | 0.70 | 0.40 | -1.13 | 28 | 50 |
| HLA | 6 | 650 | 0 | -0.05 | 0.65 | 0.38 | 1 | 0.02 | 0.16 | 0.23 | 0.49 | 0.44 | 1.10 | 93 | 0.27 | 1.58 | 0.21 | 0.78 | 28 | 51 |
| HLA | 6 | 1169 | 0 | 0.06 | -0.08 | 0.33 | 1 | -0.03 | 0.45 | 0.25 | -0.53 | 0.41 | -1.29 | 110 | 0.20 | 0.51 | 0.47 | -0.40 | 28 | 52 |
| HLA | 6 | 669 | 0 | 0.09 | -0.78 | 0.31 | 1 | -0.05 | -0.06 | 0.23 | -0.72 | 0.38 | -1.89 | 109 | 0.06 | 0.07 | 0.79 | -0.18 | 28 | 53 |
| HLA | 6 | 663 | 0 | 0.04 | 1.80 | 0.54 | 1 | -0.02 | 3.52 | 0.72 | -1.72 | 0.90 | -1.92 | 158 | 0.06 | 0.51 | 0.48 | -0.92 | 28 | 54 |
| HLA | 6 | 656 | 0 | -0.03 | -0.08 | 0.33 | 1 | 0.01 | -0.31 | 0.22 | 0.23 | 0.40 | 0.57 | 100 | 0.57 | 0.27 | 0.60 | 0.35 | 28 | 55 |
| HLA | 6 | 655 | 0 | -0.05 | -1.24 | 0.30 | 1 | 0.02 | -1.58 | 0.22 | 0.34 | 0.38 | 0.91 | 106 | 0.37 | 0.92 | 0.34 | 0.58 | 28 | 56 |
| HLA | 6 | 1031 | 0 | 0.07 | -0.81 | 0.12 | 1 | -0.04 | -0.72 | 0.09 | -0.09 | 0.15 | -0.59 | 105 | 0.56 | 0.00 | 0.98 | -0.01 | 28 | 57 |
| HLA | 7 | 1118 | 0 | 0.03 | -2.24 | 0.28 | 1 | -0.03 | -1.90 | 0.26 | -0.35 | 0.38 | -0.90 | 156 | 0.37 | 0.00 | 0.96 | -0.12 | 26 | 1 |
| HLA | 7 | 784 | 0 | 0.02 | -1.81 | 0.26 | 1 | -0.02 | -1.63 | 0.25 | -0.18 | 0.36 | -0.50 | 157 | 0.62 | 0.08 | 0.78 | -0.23 | 26 | 2 |
| HLA | 7 | 888 | 0 | 0.04 | -2.58 | 0.30 | 1 | -0.04 | -2.04 | 0.27 | -0.54 | 0.41 | -1.34 | 154 | 0.18 | 0.28 | 0.60 | -0.36 | 26 | 3 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 7 | 883 | 0 | 0.04 | 0.75 | 0.31 | 1 | -0.04 | 1.39 | 0.36 | -0.65 | 0.47 | -1.37 | 155 | 0.17 | 0.04 | 0.85 | -0.34 | 26 | 4 |
| HLA | 7 | 885 | 0 | 0.02 | -2.32 | 0.28 | 1 | -0.02 | -2.04 | 0.27 | -0.28 | 0.39 | -0.73 | 156 | 0.47 | 0.01 | 0.91 | -0.05 | 26 | 5 |
| HLA | 7 | 886 | 0 | -0.02 | 2.54 | 0.60 | 1 | 0.02 | 1.83 | 0.41 | 0.71 | 0.73 | 0.98 | 138 | 0.33 | 0.93 | 0.33 | 1.30 | 26 | 6 |
| HLA | 7 | 882 | 0 | 0.02 | -2.02 | 0.27 | 1 | -0.02 | -1.76 | 0.26 | -0.26 | 0.37 | -0.69 | 157 | 0.49 | 1.59 | 0.21 | -0.58 | 26 | 7 |
| HLA | 7 | 763 | 0 | 0.00 | -1.75 | 0.26 | 1 | 0.00 | -1.75 | 0.26 | 0.00 | 0.36 | 0.00 | 157 | 1.00 | 0.14 | 0.71 | -0.26 | 26 | 8 |
| HLA | 7 | 762 | 0 | 0.04 | -1.01 | 0.24 | 1 | -0.04 | -0.67 | 0.24 | -0.35 | 0.34 | -1.01 | 157 | 0.32 | 0.15 | 0.69 | -0.25 | 26 | 9 |
| HLA | 7 | 1098 | 0 | 0.05 | 0.17 | 0.27 | 1 | -0.05 | 0.86 | 0.30 | -0.68 | 0.41 | -1.68 | 156 | 0.09 | 0.01 | 0.91 | -0.15 | 26 | 10 |
| HLA | 7 | 1175 | 0 | 0.02 | -0.60 | 0.24 | 1 | -0.02 | -0.43 | 0.25 | -0.17 | 0.35 | -0.50 | 157 | 0.62 | 0.32 | 0.57 | -0.41 | 26 | 11 |
| HLA | 7 | 871 | 0 | 0.01 | -2.09 | 0.27 | 1 | -0.01 | -1.97 | 0.27 | -0.12 | 0.38 | -0.33 | 157 | 0.74 | 0.01 | 0.92 | -0.06 | 26 | 12 |
| HLA | 7 | 790 | 0 | -0.03 | -1.74 | 0.26 | 1 | 0.03 | -2.04 | 0.27 | 0.29 | 0.37 | 0.79 | 157 | 0.43 | 0.63 | 0.43 | 0.56 | 26 | 13 |
| HLA | 7 | 774 | 0 | -0.03 | 1.31 | 0.37 | 1 | 0.02 | 0.86 | 0.30 | 0.45 | 0.48 | 0.94 | 151 | 0.35 | 0.01 | 0.92 | -0.27 | 26 | 14 |
| HLA | 7 | 1097 | 0 | 0.00 | -0.69 | 0.14 | 1 | 0.00 | -0.69 | 0.14 | 0.00 | 0.19 | 0.00 | 157 | 1.00 | 0.00 | 0.95 | 0.02 | 26 | 15 |
| HLA | 7 | 1099 | 0 | 0.03 | -0.95 | 0.24 | 1 | -0.03 | -0.67 | 0.24 | -0.29 | 0.34 | -0.84 | 157 | 0.40 | 1.05 | 0.31 | -0.57 | 26 | 16 |
| HLA | 7 | 1089 | 0 | 0.02 | 1.45 | 0.38 | 1 | -0.01 | 1.83 | 0.41 | -0.39 | 0.56 | -0.68 | 157 | 0.50 | 0.04 | 0.84 | 0.09 | 26 | 17 |
| HLA | 7 | 892 | 0 | 0.04 | -0.03 | 0.26 | 1 | -0.03 | 0.36 | 0.27 | -0.40 | 0.38 | -1.06 | 157 | 0.29 | 1.69 | 0.19 | -0.77 | 26 | 18 |
| HLA | 7 | 843 | 0 | 0.00 | 1.98 | 0.47 | 1 | 0.00 | 1.83 | 0.41 | 0.15 | 0.63 | 0.24 | 154 | 0.81 | 0.07 | 0.80 | 0.64 | 26 | 19 |
| HLA | 7 | 1178 | 0 | 0.01 | 0.75 | 0.31 | 1 | -0.01 | 0.86 | 0.30 | -0.11 | 0.43 | -0.26 | 157 | 0.80 | 0.04 | 0.84 | -0.04 | 26 | 20 |
| HLA | 7 | 806 | 0 | 0.03 | -0.10 | 0.26 | 1 | -0.03 | 0.22 | 0.27 | -0.32 | 0.37 | -0.87 | 157 | 0.39 | 0.57 | 0.45 | -0.37 | 26 | 21 |
| HLA | 7 | 878 | 0 | 0.00 | 0.46 | 0.16 | 1 | 0.00 | 0.46 | 0.15 | 0.00 | 0.21 | 0.00 | 157 | 1.00 | 0.00 | 0.95 | 0.03 | 26 | 22 |
| HLA | 7 | 808 | 0 | 0.03 | -0.46 | 0.11 | 1 | -0.03 | -0.40 | 0.11 | -0.06 | 0.16 | -0.39 | 157 | 0.70 | 0.49 | 0.48 | -0.29 | 26 | 23 |
| HLA | 7 | 1088 | 0 | -0.04 | 0.85 | 0.32 | 1 | 0.03 | 0.36 | 0.27 | 0.48 | 0.42 | 1.15 | 153 | 0.25 | 0.01 | 0.93 | -0.20 | 26 | 24 |
| HLA | 7 | 769 | 0 | 0.02 | -2.02 | 0.27 | 1 | -0.02 | -1.83 | 0.26 | -0.19 | 0.37 | -0.51 | 157 | 0.61 | 0.06 | 0.81 | -0.20 | 26 | 25 |
| HLA | 7 | 803 | 0 | 0.04 | -0.10 | 0.26 | 1 | -0.04 | 0.36 | 0.27 | -0.47 | 0.37 | -1.25 | 157 | 0.21 | 0.35 | 0.55 | -0.37 | 26 | 26 |
| HLA | 7 | 877 | 0 | 0.01 | -1.01 | 0.24 | 1 | -0.01 | -0.90 | 0.24 | -0.11 | 0.34 | -0.32 | 157 | 0.75 | 0.00 | 0.99 | 0.09 | 26 | 27 |
| HLA | 7 | 1185 | 0 | -0.02 | 1.45 | 0.38 | 1 | 0.02 | 1.05 | 0.32 | 0.39 | 0.50 | 0.78 | 151 | 0.43 | 0.82 | 0.36 | 0.99 | 26 | 28 |
| HLA | 7 | 777 | 0 | -0.04 | -0.10 | 0.26 | 1 | 0.04 | -0.49 | 0.25 | 0.38 | 0.36 | 1.08 | 157 | 0.28 | 0.26 | 0.61 | 0.30 | 26 | 29 |
| HLA | 7 | 903 | 0 | -0.02 | 4.91 | | 1 | 0.02 | 2.47 | 0.53 | 2.44 | 1.91 | 1.28 | 89 | 0.21 | 0.33 | 0.56 | | 26 | 30 |
| HLA | 7 | 887 | 0 | -0.03 | -1.61 | 0.25 | 1 | 0.03 | -1.90 | 0.26 | 0.28 | 0.36 | 0.77 | 157 | 0.44 | 0.02 | 0.89 | 0.17 | 26 | 31 |
| HLA | 7 | 930 | 0 | -0.01 | -0.54 | 0.25 | 1 | 0.01 | -0.67 | 0.24 | 0.13 | 0.35 | 0.36 | 157 | 0.72 | 0.19 | 0.66 | 0.24 | 26 | 32 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 7 | 880 | 0 | -0.04 | 1.31 | 0.37 | 1 | 0.04 | 0.60 | 0.29 | 0.71 | 0.46 | 1.52 | 147 | 0.13 | 0.01 | 0.93 | 0.11 | 26 | 33 |
| HLA | 7 | 1096 | 0 | -0.04 | -0.28 | 0.13 | 1 | 0.03 | -0.37 | 0.13 | 0.09 | 0.19 | 0.51 | 157 | 0.61 | 0.46 | 0.50 | 0.26 | 26 | 34 |
| HLA | 7 | 875 | 0 | 0.04 | -1.07 | 0.24 | 1 | -0.04 | -0.72 | 0.24 | -0.35 | 0.34 | -1.01 | 157 | 0.32 | 0.16 | 0.69 | -0.25 | 26 | 35 |
| HLA | 7 | 811 | 0 | 0.06 | -0.29 | 0.25 | 1 | -0.06 | 0.36 | 0.27 | -0.66 | 0.37 | -1.78 | 157 | 0.08 | 0.90 | 0.34 | -0.48 | 26 | 36 |
| HLA | 7 | 869 | 0 | -0.01 | 2.23 | 0.52 | 1 | 0.01 | 1.83 | 0.41 | 0.40 | 0.67 | 0.60 | 148 | 0.55 | 0.34 | 0.56 | 1.28 | 26 | 37 |
| HLA | 7 | 879 | 0 | 0.02 | -0.23 | 0.25 | 1 | -0.02 | 0.02 | 0.26 | -0.25 | 0.36 | -0.68 | 157 | 0.50 | 0.50 | 0.48 | 0.37 | 26 | 38 |
| HLA | 7 | 897 | 0 | 0.01 | -0.84 | 0.24 | 1 | -0.01 | -0.78 | 0.24 | -0.05 | 0.34 | -0.15 | 157 | 0.88 | 0.02 | 0.89 | -0.02 | 26 | 39 |
| HLA | 7 | 1182 | 0 | 0.00 | 0.32 | 0.28 | 1 | 0.00 | 0.34 | 0.27 | -0.02 | 0.39 | -0.06 | 157 | 0.96 | 1.91 | 0.17 | -0.92 | 26 | 40 |
| HLA | 7 | 891 | 0 | -0.02 | 0.48 | 0.29 | 1 | 0.02 | 0.22 | 0.27 | 0.26 | 0.39 | 0.67 | 156 | 0.50 | 0.01 | 0.92 | -0.18 | 26 | 41 |
| HLA | 7 | 874 | 0 | -0.02 | 1.78 | 0.44 | 1 | 0.02 | 1.39 | 0.36 | 0.39 | 0.56 | 0.69 | 150 | 0.49 | 0.04 | 0.85 | 0.40 | 26 | 42 |
| HLA | 7 | 1179 | 0 | -0.06 | 1.78 | 0.44 | 1 | 0.06 | 0.68 | 0.29 | 1.10 | 0.52 | 2.10 | 135 | 0.04 | 0.93 | 0.34 | 1.05 | 26 | 43 |
| HLA | 7 | 870 | 0 | 0.00 | 2.00 | 0.47 | 1 | 0.00 | 2.00 | 0.44 | 0.00 | 0.65 | 0.00 | 156 | 1.00 | 0.01 | 0.92 | -0.39 | 26 | 44 |
| HLA | 7 | 872 | 0 | -0.11 | 0.85 | 0.17 | 1 | 0.11 | 0.47 | 0.13 | 0.38 | 0.22 | 1.76 | 144 | 0.08 | 3.91 | 0.05 | 1.08 | 26 | 45 |
| HLA | 7 | 889 | 0 | 0.04 | 0.25 | 0.15 | 1 | -0.03 | 0.37 | 0.15 | -0.13 | 0.21 | -0.62 | 157 | 0.54 | 0.00 | 0.99 | 0.00 | 26 | 46 |
| HLA | 7 | 829 | 0 | 0.01 | -0.95 | 0.24 | 1 | -0.01 | -0.90 | 0.24 | -0.05 | 0.34 | -0.15 | 157 | 0.88 | 0.00 | 0.96 | -0.09 | 26 | 47 |
| HLA | 7 | 839 | 0 | -0.04 | 0.57 | 0.29 | 1 | 0.04 | 0.08 | 0.26 | 0.49 | 0.39 | 1.24 | 154 | 0.22 | 3.33 | 0.07 | 0.99 | 26 | 48 |
| HLA | 7 | 899 | 0 | -0.01 | -0.66 | 0.24 | 1 | 0.01 | -0.72 | 0.24 | 0.07 | 0.34 | 0.19 | 157 | 0.85 | 0.03 | 0.86 | -0.02 | 26 | 49 |
| HLA | 7 | 876 | 0 | 0.05 | 0.57 | 0.29 | 1 | -0.04 | 1.27 | 0.34 | -0.71 | 0.45 | -1.57 | 155 | 0.12 | 0.60 | 0.44 | -0.52 | 26 | 50 |
| HLA | 7 | 770 | 0 | -0.04 | 0.96 | 0.24 | 1 | 0.04 | 0.65 | 0.20 | 0.31 | 0.32 | 0.98 | 151 | 0.33 | 0.42 | 0.52 | 0.38 | 26 | 51 |
| HLA | 7 | 834 | 0 | 0.01 | -0.66 | 0.24 | 1 | -0.01 | -0.61 | 0.24 | -0.05 | 0.34 | -0.15 | 157 | 0.88 | 0.02 | 0.88 | -0.16 | 26 | 52 |
| HLA | 7 | 884 | 0 | 0.02 | 1.18 | 0.35 | 1 | -0.02 | 1.53 | 0.37 | -0.35 | 0.51 | -0.68 | 157 | 0.50 | 1.80 | 0.18 | -1.63 | 26 | 53 |
| HLA | 7 | 902 | 0 | 0.00 | -0.04 | 0.26 | 1 | 0.00 | -0.04 | 0.26 | 0.00 | 0.36 | 0.00 | 157 | 1.00 | 0.01 | 0.92 | 0.06 | 26 | 54 |
| HLA | 7 | 1104 | 0 | 0.00 | 0.38 | 0.28 | 1 | 0.00 | 0.38 | 0.27 | 0.00 | 0.39 | 0.00 | 157 | 1.00 | 0.01 | 0.91 | -0.05 | 26 | 55 |
| HLA | 7 | 822 | 0 | 0.01 | 1.98 | 0.47 | 1 | -0.01 | 2.22 | 0.48 | -0.24 | 0.67 | -0.36 | 157 | 0.72 | 0.17 | 0.68 | 0.00 | 26 | 56 |
| HLA | 7 | 1032 | 0 | -0.15 | -0.66 | 0.10 | 1 | 0.14 | -0.89 | 0.10 | 0.23 | 0.14 | 1.63 | 156 | 0.10 | 2.83 | 0.09 | 0.61 | 26 | 57 |
| HLA | 8 | 909 | 0 | -0.01 | -2.55 | 0.33 | 1 | 0.00 | -2.63 | 0.37 | 0.08 | 0.50 | 0.16 | 128 | 0.87 | 0.39 | 0.53 | 0.62 | 25 | 1 |
| HLA | 8 | 917 | 0 | -0.03 | -3.03 | 0.37 | 1 | 0.03 | -3.79 | 0.54 | 0.76 | 0.66 | 1.16 | 115 | 0.25 | 1.18 | 0.28 | 1.50 | 25 | 2 |
| HLA | 8 | 894 | 0 | 0.00 | 0.61 | 0.31 | 1 | 0.00 | 0.65 | 0.30 | -0.04 | 0.43 | -0.10 | 132 | 0.92 | 0.00 | 0.98 | -0.17 | 25 | 3 |
| HLA | 8 | 867 | 0 | 0.02 | 0.81 | 0.32 | 1 | -0.02 | 1.04 | 0.32 | -0.23 | 0.46 | -0.51 | 132 | 0.61 | 0.02 | 0.89 | -0.27 | 25 | 4 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 913 | 0 | -0.02 | 1.42 | 0.38 | 1 | 0.02 | 1.15 | 0.33 | 0.27 | 0.51 | 0.54 | 131 | 0.59 | 0.01 | 0.93 | 0.25 | 25 | 5 |
| HLA | 8 | 929 | 0 | 0.01 | -2.17 | 0.30 | 1 | -0.01 | -2.03 | 0.33 | -0.14 | 0.44 | -0.31 | 130 | 0.75 | 0.27 | 0.61 | -0.61 | 25 | 6 |
| HLA | 8 | 904 | 0 | 0.01 | -2.00 | 0.29 | 1 | -0.01 | -1.82 | 0.31 | -0.17 | 0.43 | -0.41 | 130 | 0.68 | 0.66 | 0.42 | -0.62 | 25 | 7 |
| HLA | 8 | 927 | 0 | 0.01 | -1.68 | 0.27 | 1 | -0.01 | -1.54 | 0.30 | -0.14 | 0.41 | -0.35 | 130 | 0.73 | 0.22 | 0.64 | 0.51 | 25 | 8 |
| HLA | 8 | 1127 | 0 | -0.06 | 1.42 | 0.38 | 1 | 0.06 | 0.56 | 0.30 | 0.86 | 0.48 | 1.77 | 127 | 0.08 | 3.97 | 0.05 | 1.55 | 25 | 9 |
| HLA | 8 | 855 | 0 | -0.07 | -0.56 | 0.26 | 1 | 0.07 | -1.28 | 0.29 | 0.71 | 0.39 | 1.81 | 130 | 0.07 | 0.38 | 0.54 | 0.44 | 25 | 10 |
| HLA | 8 | 1126 | 0 | 0.00 | -2.55 | 0.33 | 1 | 0.00 | -2.50 | 0.36 | -0.05 | 0.49 | -0.11 | 130 | 0.91 | 0.22 | 0.64 | 0.58 | 25 | 11 |
| HLA | 8 | 848 | 0 | -0.04 | -2.08 | 0.29 | 1 | 0.04 | -2.63 | 0.37 | 0.55 | 0.48 | 1.17 | 123 | 0.25 | 0.17 | 0.68 | 0.49 | 25 | 12 |
| HLA | 8 | 802 | 0 | 0.00 | 3.19 | 0.74 | 1 | 0.00 | 2.94 | 0.60 | 0.25 | 0.95 | 0.27 | 129 | 0.79 | 0.00 | 1.00 | -0.69 | 25 | 13 |
| HLA | 8 | 771 | 0 | -0.02 | 0.52 | 0.30 | 1 | 0.03 | 0.23 | 0.29 | 0.29 | 0.42 | 0.70 | 132 | 0.48 | 0.09 | 0.77 | 0.42 | 25 | 14 |
| HLA | 8 | 785 | 0 | -0.01 | -0.49 | 0.26 | 1 | 0.01 | -0.56 | 0.28 | 0.06 | 0.38 | 0.16 | 131 | 0.87 | 0.02 | 0.89 | 0.18 | 25 | 15 |
| HLA | 8 | 767 | 0 | 0.00 | -0.34 | 0.17 | 1 | 0.00 | -0.34 | 0.17 | 0.00 | 0.24 | 0.00 | 132 | 1.00 | 0.01 | 0.93 | -0.04 | 25 | 16 |
| HLA | 8 | 914 | 0 | 0.00 | 0.41 | 0.30 | 1 | 0.00 | 0.41 | 0.29 | 0.00 | 0.42 | 0.00 | 132 | 1.00 | 0.02 | 0.88 | -0.20 | 25 | 17 |
| HLA | 8 | 921 | 0 | 0.02 | -1.04 | 0.26 | 1 | -0.03 | -0.79 | 0.28 | -0.25 | 0.38 | -0.66 | 131 | 0.51 | 0.14 | 0.71 | -0.39 | 25 | 18 |
| HLA | 8 | 911 | 0 | 0.02 | 0.53 | 0.20 | 1 | -0.02 | 0.63 | 0.20 | -0.10 | 0.28 | -0.35 | 132 | 0.73 | 0.41 | 0.52 | -0.32 | 25 | 19 |
| HLA | 8 | 833 | 0 | -0.01 | -1.16 | 0.26 | 1 | 0.01 | -1.28 | 0.29 | 0.11 | 0.39 | 0.28 | 129 | 0.78 | 0.02 | 0.88 | 0.30 | 25 | 20 |
| HLA | 8 | 912 | 0 | 0.02 | -0.10 | 0.28 | 1 | -0.02 | 0.14 | 0.28 | -0.25 | 0.40 | -0.62 | 131 | 0.54 | 0.11 | 0.73 | -0.31 | 25 | 21 |
| HLA | 8 | 916 | 0 | 0.05 | 0.48 | 0.30 | 1 | -0.05 | 1.15 | 0.33 | -0.67 | 0.45 | -1.49 | 130 | 0.14 | 0.02 | 0.88 | 0.19 | 25 | 22 |
| HLA | 8 | 796 | 0 | 0.00 | 0.06 | 0.28 | 1 | 0.00 | 0.06 | 0.28 | 0.00 | 0.40 | 0.00 | 131 | 1.00 | 0.19 | 0.66 | -0.41 | 25 | 23 |
| HLA | 8 | 793 | 0 | 0.02 | 3.16 | 0.73 | 1 | -0.02 | 5.32 | | -2.16 | 1.98 | -1.09 | 84 | 0.28 | | | | 25 | 24 |
| HLA | 8 | 772 | 0 | -0.05 | 2.13 | 0.49 | 1 | 0.06 | 1.04 | 0.32 | 1.09 | 0.59 | 1.85 | 116 | 0.07 | 0.02 | 0.88 | 0.51 | 25 | 25 |
| HLA | 8 | 810 | 0 | 0.00 | 3.17 | 0.74 | 1 | 0.00 | 2.94 | 0.60 | 0.23 | 0.95 | 0.24 | 128 | 0.81 | 0.86 | 0.35 | | 25 | 26 |
| HLA | 8 | 1079 | 0 | -0.01 | -0.47 | 0.27 | 1 | 0.01 | -0.56 | 0.28 | 0.09 | 0.39 | 0.23 | 131 | 0.82 | 2.10 | 0.15 | 0.91 | 25 | 27 |
| HLA | 8 | 761 | 0 | 0.00 | 0.57 | 0.31 | 1 | 0.00 | 0.57 | 0.30 | 0.00 | 0.43 | 0.00 | 131 | 1.00 | 0.00 | 1.00 | -0.20 | 25 | 28 |
| HLA | 8 | 910 | 0 | -0.06 | -0.89 | 0.26 | 1 | 0.06 | -1.54 | 0.30 | 0.65 | 0.40 | 1.63 | 128 | 0.11 | 1.52 | 0.22 | 0.82 | 25 | 29 |
| HLA | 8 | 906 | 0 | -0.01 | -0.40 | 0.27 | 1 | 0.01 | -0.48 | 0.28 | 0.08 | 0.39 | 0.21 | 131 | 0.83 | 0.16 | 0.69 | 0.26 | 25 | 30 |
| HLA | 8 | 922 | 0 | -0.02 | -0.40 | 0.27 | 1 | 0.02 | -0.56 | 0.28 | 0.16 | 0.39 | 0.41 | 131 | 0.68 | 0.87 | 0.35 | -0.73 | 25 | 31 |
| HLA | 8 | 1190 | 0 | 0.04 | -0.89 | 0.26 | 1 | -0.04 | -0.48 | 0.28 | -0.41 | 0.38 | -1.07 | 131 | 0.29 | 2.29 | 0.13 | -0.89 | 25 | 32 |
| HLA | 8 | 1105 | 0 | -0.01 | 0.30 | 0.29 | 1 | 0.01 | 0.23 | 0.29 | 0.08 | 0.41 | 0.19 | 131 | 0.85 | 0.41 | 0.52 | -0.39 | 25 | 33 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| HLA | 8 | 893 | 0 | 0.07 | 0.05 | 0.28 | 1 | -0.08 | 0.94 | 0.32 | -0.89 | 0.42 | -2.09 | 129 | 0.04 | 0.02 | 0.90 | -0.22 | 25 | 34 |
| HLA | 8 | 1078 | 0 | -0.06 | 0.67 | 0.32 | 1 | 0.06 | -0.01 | 0.28 | 0.69 | 0.42 | 1.63 | 130 | 0.11 | 3.08 | 0.08 | 1.44 | 25 | 35 |
| HLA | 8 | 926 | 0 | 0.01 | -0.10 | 0.28 | 1 | -0.01 | -0.01 | 0.28 | -0.09 | 0.39 | -0.22 | 131 | 0.83 | 0.18 | 0.67 | 0.35 | 25 | 36 |
| HLA | 8 | 1210 | 0 | 0.02 | -0.18 | 0.27 | 1 | -0.02 | -0.01 | 0.28 | -0.16 | 0.39 | -0.41 | 131 | 0.68 | 0.88 | 0.35 | -0.64 | 25 | 37 |
| HLA | 8 | 820 | 0 | -0.05 | 0.73 | 0.16 | 1 | 0.05 | 0.59 | 0.14 | 0.15 | 0.22 | 0.69 | 131 | 0.49 | 0.05 | 0.83 | 0.10 | 25 | 38 |
| HLA | 8 | 780 | 0 | 0.09 | 0.85 | 0.15 | 1 | -0.10 | 1.16 | 0.16 | -0.31 | 0.22 | -1.41 | 131 | 0.16 | 0.79 | 0.38 | -0.43 | 25 | 39 |
| HLA | 8 | 1212 | 0 | 0.04 | -0.96 | 0.26 | 1 | -0.04 | -0.56 | 0.28 | -0.40 | 0.38 | -1.05 | 131 | 0.30 | 1.90 | 0.17 | -0.78 | 25 | 40 |
| HLA | 8 | 925 | 0 | 0.03 | -0.96 | 0.26 | 1 | -0.03 | -0.63 | 0.28 | -0.32 | 0.38 | -0.84 | 130 | 0.40 | 0.03 | 0.86 | 0.05 | 25 | 41 |
| HLA | 8 | 905 | 0 | 0.07 | -0.25 | 0.27 | 1 | -0.07 | 0.48 | 0.29 | -0.73 | 0.40 | -1.82 | 130 | 0.07 | 0.28 | 0.60 | -0.41 | 25 | 42 |
| HLA | 8 | 1214 | 0 | -0.06 | 0.32 | 0.14 | 1 | 0.06 | 0.18 | 0.13 | 0.14 | 0.19 | 0.76 | 130 | 0.45 | 0.65 | 0.42 | 0.42 | 25 | 43 |
| HLA | 8 | 1192 | 0 | -0.02 | -1.52 | 0.27 | 1 | 0.02 | -1.72 | 0.31 | 0.20 | 0.41 | 0.50 | 128 | 0.62 | 0.05 | 0.83 | 0.02 | 25 | 44 |
| HLA | 8 | 1199 | 0 | -0.02 | -0.40 | 0.27 | 1 | 0.02 | -0.56 | 0.28 | 0.16 | 0.39 | 0.41 | 131 | 0.68 | 1.67 | 0.20 | -0.98 | 25 | 45 |
| HLA | 8 | 1201 | 0 | -0.02 | 0.30 | 0.29 | 1 | 0.02 | 0.06 | 0.28 | 0.24 | 0.41 | 0.58 | 131 | 0.56 | 1.11 | 0.29 | 0.76 | 25 | 46 |
| HLA | 8 | 901 | 0 | 0.00 | 1.00 | 0.34 | 1 | 0.00 | 0.94 | 0.32 | 0.06 | 0.47 | 0.13 | 131 | 0.90 | 0.13 | 0.71 | -0.59 | 25 | 47 |
| HLA | 8 | 764 | 0 | -0.04 | 1.39 | 0.38 | 1 | 0.04 | 0.75 | 0.31 | 0.65 | 0.49 | 1.32 | 127 | 0.19 | 0.93 | 0.33 | 0.92 | 25 | 48 |
| HLA | 8 | 924 | 0 | 0.00 | 0.78 | 0.32 | 1 | 0.00 | 0.84 | 0.31 | -0.06 | 0.45 | -0.14 | 131 | 0.89 | 0.04 | 0.85 | 0.29 | 25 | 49 |
| HLA | 8 | 805 | 0 | 0.01 | -0.54 | 0.27 | 1 | -0.01 | -0.40 | 0.28 | -0.14 | 0.38 | -0.36 | 131 | 0.72 | 1.20 | 0.27 | -0.64 | 25 | 50 |
| HLA | 8 | 1092 | 0 | -0.02 | 1.91 | 0.45 | 1 | 0.02 | 1.51 | 0.36 | 0.40 | 0.58 | 0.68 | 127 | 0.50 | 1.20 | 0.27 | 0.85 | 25 | 51 |
| HLA | 8 | 920 | 0 | 0.02 | -0.10 | 0.28 | 1 | -0.02 | 0.06 | 0.28 | -0.17 | 0.39 | -0.42 | 131 | 0.68 | 0.00 | 0.95 | 0.10 | 25 | 52 |
| HLA | 8 | 766 | 0 | -0.03 | 3.17 | 0.74 | 1 | 0.03 | 1.96 | 0.42 | 1.21 | 0.85 | 1.42 | 106 | 0.16 | 0.19 | 0.66 | 0.09 | 25 | 53 |
| HLA | 8 | 826 | 0 | 0.06 | -0.32 | 0.27 | 1 | -0.06 | 0.31 | 0.29 | -0.63 | 0.39 | -1.60 | 130 | 0.11 | 0.43 | 0.51 | -0.40 | 25 | 54 |
| HLA | 8 | 778 | 0 | 0.04 | 0.05 | 0.28 | 1 | -0.04 | 0.48 | 0.29 | -0.42 | 0.41 | -1.04 | 131 | 0.30 | 0.00 | 0.98 | -0.14 | 25 | 55 |
| HLA | 8 | | 0 | 0.04 | -0.61 | 0.11 | 1 | -0.05 | -0.53 | 0.11 | -0.07 | 0.16 | -0.46 | 122 | 0.65 | 0.30 | 0.58 | -0.24 | 24 | 56 |

## Appendix Table I.4:Mathematics: DIF FRL

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 178 | C | 0.00 | -3.68 | 0.30 | D | 0.00 | -3.59 | 0.37 | -0.10 | 0.48 | -0.20 | 248 | 0.84 | 0.21 | 0.65 | -0.48 | 23 | 1 |
| MA | 3 | 182 | C | 0.03 | -0.14 | 0.18 | D | -0.03 | 0.16 | 0.21 | -0.30 | 0.28 | -1.07 | 257 | 0.29 | 1.37 | 0.24 | -0.41 | 23 | 2 |
| MA | 3 | 206 | C | -0.01 | -1.32 | 0.17 | D | 0.02 | -1.45 | 0.20 | 0.13 | 0.27 | 0.50 | 250 | 0.62 | 0.01 | 0.91 | 0.01 | 23 | 3 |
| MA | 3 | 1303 | C | 0.02 | 1.27 | 0.27 | D | -0.02 | 1.77 | 0.31 | -0.50 | 0.41 | -1.23 | 259 | 0.22 | 0.02 | 0.90 | -0.04 | 23 | 4 |
| MA | 3 | 225 | C | 0.03 | 0.00 | 0.19 | D | -0.04 | 0.38 | 0.22 | -0.39 | 0.29 | -1.34 | 256 | 0.18 | 0.27 | 0.60 | -0.21 | 23 | 5 |
| MA | 3 | 215 | C | -0.04 | -2.02 | 0.18 | D | 0.05 | -2.57 | 0.26 | 0.54 | 0.32 | 1.72 | 227 | 0.09 | 1.46 | 0.23 | 0.48 | 23 | 6 |
| MA | 3 | 169 | C | -0.02 | -0.21 | 0.18 | D | 0.03 | -0.46 | 0.20 | 0.25 | 0.27 | 0.93 | 262 | 0.35 | 0.28 | 0.60 | 0.20 | 23 | 7 |
| MA | 3 | 231 | C | 0.06 | -0.50 | 0.18 | D | -0.08 | 0.20 | 0.21 | -0.70 | 0.27 | -2.54 | 250 | 0.01 | 3.92 | 0.05 | -0.65 | 23 | 8 |
| MA | 3 | 219 | C | 0.02 | 1.00 | 0.25 | D | -0.02 | 1.36 | 0.27 | -0.36 | 0.37 | -0.98 | 262 | 0.33 | 0.03 | 0.86 | 0.18 | 23 | 9 |
| MA | 3 | 202 | C | -0.01 | -2.23 | 0.19 | D | 0.02 | -2.44 | 0.25 | 0.20 | 0.31 | 0.65 | 239 | 0.52 | 0.02 | 0.88 | 0.01 | 23 | 10 |
| MA | 3 | 221 | C | -0.02 | 0.39 | 0.21 | D | 0.03 | 0.07 | 0.21 | 0.32 | 0.29 | 1.09 | 269 | 0.28 | 0.00 | 0.99 | 0.06 | 23 | 11 |
| MA | 3 | 992 | C | -0.02 | | 1.84 | D | 0.02 | 2.81 | 0.44 | 2.63 | 1.89 | 1.39 | 169 | 0.17 | 0.07 | 0.78 | | 23 | 12 |
| MA | 3 | 371 | C | -0.02 | 0.94 | 0.24 | D | 0.02 | 0.63 | 0.23 | 0.31 | 0.33 | 0.92 | 272 | 0.36 | 0.49 | 0.49 | 0.35 | 23 | 13 |
| MA | 3 | 173 | C | 0.00 | -0.41 | 0.18 | D | 0.00 | -0.41 | 0.20 | 0.00 | 0.27 | 0.00 | 259 | 1.00 | 0.02 | 0.90 | 0.00 | 23 | 14 |
| MA | 3 | 226 | C | 0.03 | 0.35 | 0.21 | D | -0.04 | 0.85 | 0.24 | -0.50 | 0.31 | -1.59 | 255 | 0.11 | 0.12 | 0.73 | -0.18 | 23 | 15 |
| MA | 3 | 233 | C | 0.01 | 2.24 | 0.50 | D | -0.01 | 2.82 | 0.44 | -0.59 | 0.67 | -0.88 | 273 | 0.38 | 1.24 | 0.27 | -1.14 | 23 | 16 |
| MA | 3 | 174 | C | -0.03 | -0.34 | 0.18 | D | 0.04 | -0.66 | 0.20 | 0.32 | 0.27 | 1.18 | 261 | 0.24 | 0.01 | 0.94 | -0.03 | 23 | 17 |
| MA | 3 | 1036 | C | 0.01 | 1.81 | 0.33 | D | -0.02 | 2.33 | 0.37 | -0.52 | 0.50 | -1.05 | 261 | 0.30 | 0.17 | 0.68 | -0.59 | 23 | 18 |
| MA | 3 | 210 | C | 0.03 | 0.30 | 0.20 | D | -0.04 | 0.74 | 0.23 | -0.43 | 0.31 | -1.40 | 257 | 0.16 | 0.57 | 0.45 | -0.35 | 23 | 19 |
| MA | 3 | 207 | C | -0.02 | -0.91 | 0.17 | D | 0.03 | -1.12 | 0.20 | 0.21 | 0.26 | 0.80 | 254 | 0.42 | 0.03 | 0.87 | 0.09 | 23 | 20 |
| MA | 3 | 212 | C | -0.05 | 0.34 | 0.21 | D | 0.06 | -0.29 | 0.20 | 0.63 | 0.29 | 2.18 | 268 | 0.03 | 0.84 | 0.36 | 0.38 | 23 | 21 |
| MA | 3 | 172 | C | -0.02 | 0.47 | 0.21 | D | 0.03 | 0.13 | 0.21 | 0.34 | 0.30 | 1.13 | 268 | 0.26 | 0.28 | 0.60 | 0.28 | 23 | 22 |
| MA | 3 | 198 | C | 0.00 | -2.15 | 0.19 | D | 0.00 | -2.15 | 0.23 | 0.00 | 0.30 | 0.00 | 245 | 1.00 | 0.03 | 0.87 | 0.00 | 23 | 23 |
| MA | 3 | 368 | C | -0.07 | 1.42 | 0.29 | D | 0.08 | 0.27 | 0.21 | 1.15 | 0.36 | 3.20 | 263 | 0.00 | 3.79 | 0.05 | 0.92 | 23 | 24 |
| MA | 3 | 191 | C | 0.01 | 0.51 | 0.22 | D | -0.02 | 0.72 | 0.23 | -0.21 | 0.32 | -0.67 | 260 | 0.51 | 0.23 | 0.63 | -0.26 | 23 | 25 |
| MA | 3 | 193 | C | 0.04 | -1.38 | 0.17 | D | -0.06 | -0.92 | 0.20 | -0.46 | 0.26 | -1.76 | 253 | 0.08 | 1.08 | 0.30 | -0.33 | 23 | 26 |
| MA | 3 | 189 | C | -0.01 | -1.84 | 0.18 | D | 0.01 | -1.94 | 0.22 | 0.10 | 0.29 | 0.36 | 244 | 0.72 | 0.00 | 0.99 | 0.05 | 23 | 27 |
| MA | 3 | 995 | C | 0.04 | 0.42 | 0.21 | D | -0.05 | 1.07 | 0.25 | -0.65 | 0.33 | -1.99 | 248 | 0.05 | 0.95 | 0.33 | -0.39 | 23 | 28 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 229 | C | 0.01 | -0.58 | 0.18 | D | -0.01 | -0.53 | 0.20 | -0.06 | 0.26 | -0.21 | 255 | 0.83 | 0.00 | 0.99 | 0.04 | 23 | 29 |
| MA | 3 | 374 | C | 0.06 | -0.16 | 0.19 | D | -0.07 | 0.56 | 0.23 | -0.72 | 0.29 | -2.48 | 246 | 0.01 | 0.61 | 0.43 | -0.30 | 23 | 30 |
| MA | 3 | 184 | C | 0.00 | -2.25 | 0.19 | D | 0.01 | -2.31 | 0.24 | 0.06 | 0.31 | 0.20 | 243 | 0.85 | 0.01 | 0.91 | -0.02 | 23 | 31 |
| MA | 3 | 186 | C | -0.03 | -0.13 | 0.19 | D | 0.04 | -0.45 | 0.20 | 0.32 | 0.27 | 1.17 | 261 | 0.24 | 0.96 | 0.33 | 0.33 | 23 | 32 |
| MA | 3 | 1035 | C | 0.02 | 0.25 | 0.20 | D | -0.03 | 0.56 | 0.23 | -0.31 | 0.30 | -1.04 | 256 | 0.30 | 0.41 | 0.52 | -0.28 | 23 | 33 |
| MA | 3 | 201 | C | -0.04 | -1.32 | 0.17 | D | 0.05 | -1.75 | 0.21 | 0.43 | 0.27 | 1.56 | 242 | 0.12 | 0.29 | 0.59 | 0.21 | 23 | 34 |
| MA | 3 | 211 | C | 0.01 | 0.55 | 0.22 | D | -0.02 | 0.77 | 0.24 | -0.22 | 0.32 | -0.68 | 260 | 0.49 | 0.07 | 0.79 | 0.16 | 23 | 35 |
| MA | 3 | 234 | C | -0.01 | 2.25 | 0.50 | D | 0.02 | 1.69 | 0.25 | 0.56 | 0.56 | 1.01 | 217 | 0.31 | 2.23 | 0.14 | 2.34 | 23 | 36 |
| MA | 3 | 216 | C | -0.04 | -0.36 | 0.18 | D | 0.06 | -0.84 | 0.20 | 0.48 | 0.27 | 1.78 | 258 | 0.08 | 1.12 | 0.29 | 0.35 | 23 | 37 |
| MA | 3 | 235 | C | 0.00 | 2.18 | 0.33 | D | 0.00 | 2.18 | 0.27 | 0.00 | 0.43 | 0.00 | 268 | 1.00 | 0.45 | 0.50 | -0.57 | 23 | 38 |
| MA | 3 | 209 | C | 0.06 | -0.09 | 0.19 | D | -0.08 | 0.77 | 0.24 | -0.87 | 0.30 | -2.87 | 242 | 0.00 | 5.13 | 0.02 | -0.88 | 23 | 39 |
| MA | 3 | 213 | C | 0.00 | 0.55 | 0.22 | D | 0.00 | 0.51 | 0.22 | 0.04 | 0.31 | 0.14 | 265 | 0.89 | 0.13 | 0.72 | -0.20 | 23 | 40 |
| MA | 3 | 224 | C | 0.03 | -0.23 | 0.18 | D | -0.04 | 0.18 | 0.21 | -0.41 | 0.28 | -1.46 | 253 | 0.14 | 0.04 | 0.83 | -0.11 | 23 | 41 |
| MA | 3 | 204 | C | 0.00 | -0.35 | 0.18 | D | 0.00 | -0.35 | 0.20 | 0.00 | 0.27 | 0.00 | 257 | 1.00 | 0.55 | 0.46 | -0.30 | 23 | 42 |
| MA | 3 | 230 | C | 0.00 | 0.37 | 0.21 | D | 0.00 | 0.37 | 0.22 | 0.00 | 0.30 | 0.00 | 263 | 1.00 | 0.00 | 0.98 | 0.06 | 23 | 43 |
| MA | 3 | 190 | C | -0.03 | -1.17 | 0.17 | D | 0.03 | -1.44 | 0.21 | 0.27 | 0.27 | 1.00 | 248 | 0.32 | 1.90 | 0.17 | 0.45 | 23 | 44 |
| MA | 3 | 180 | C | 0.00 | -0.45 | 0.18 | D | 0.00 | -0.45 | 0.20 | 0.00 | 0.27 | 0.00 | 256 | 1.00 | 0.01 | 0.92 | -0.07 | 23 | 45 |
| MA | 3 | 188 | C | -0.04 | -0.61 | 0.17 | D | 0.05 | -1.04 | 0.20 | 0.42 | 0.26 | 1.60 | 255 | 0.11 | 0.61 | 0.43 | 0.29 | 23 | 46 |
| MA | 3 | 214 | C | -0.03 | 0.09 | 0.19 | D | 0.04 | -0.25 | 0.20 | 0.34 | 0.28 | 1.20 | 264 | 0.23 | 1.22 | 0.27 | 0.42 | 23 | 47 |
| MA | 3 | 223 | C | -0.02 | -0.16 | 0.19 | D | 0.03 | -0.41 | 0.20 | 0.24 | 0.27 | 0.90 | 260 | 0.37 | 2.29 | 0.13 | 0.50 | 23 | 48 |
| MA | 3 | 205 | C | 0.01 | -0.16 | 0.19 | D | -0.01 | -0.04 | 0.21 | -0.12 | 0.28 | -0.45 | 257 | 0.65 | 0.05 | 0.83 | 0.11 | 23 | 49 |
| MA | 3 | 217 | C | 0.03 | 0.46 | 0.21 | D | -0.04 | 0.95 | 0.25 | -0.49 | 0.32 | -1.50 | 253 | 0.14 | 0.37 | 0.54 | -0.29 | 23 | 50 |
| MA | 3 | 1305 | C | 0.00 | 2.55 | 0.46 | D | 0.01 | 2.32 | 0.37 | 0.23 | 0.59 | 0.39 | 266 | 0.69 | 0.01 | 0.91 | 0.28 | 23 | 51 |
| MA | 3 | 187 | C | -0.04 | -1.32 | 0.17 | D | 0.05 | -1.79 | 0.22 | 0.48 | 0.28 | 1.73 | 241 | 0.09 | 0.39 | 0.53 | 0.22 | 23 | 52 |
| MA | 3 | 208 | C | -0.03 | 0.13 | 0.20 | D | 0.04 | -0.25 | 0.20 | 0.37 | 0.28 | 1.33 | 264 | 0.19 | 2.53 | 0.11 | 0.63 | 23 | 53 |
| MA | 3 | 218 | C | 0.06 | 0.29 | 0.20 | D | -0.07 | 1.20 | 0.26 | -0.92 | 0.33 | -2.76 | 239 | 0.01 | 5.07 | 0.02 | -0.95 | 23 | 54 |
| MA | 3 | 185 | C | 0.03 | 1.25 | 0.27 | D | -0.04 | 2.19 | 0.35 | -0.93 | 0.45 | -2.09 | 238 | 0.04 | 2.18 | 0.14 | -0.92 | 23 | 55 |
| MA | 4 | 135 | C | 0.00 | -1.10 | 0.17 | D | 0.00 | -1.10 | 0.21 | 0.00 | 0.27 | 0.00 | 228 | 1.00 | 0.66 | 0.42 | -0.30 | 27 | 1 |
| MA | 4 | 140 | C | -0.04 | -1.19 | 0.17 | D | 0.05 | -1.58 | 0.22 | 0.39 | 0.28 | 1.39 | 221 | 0.16 | 1.10 | 0.29 | 0.38 | 27 | 2 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 109 | C | -0.07 | -0.58 | 0.18 | D | 0.10 | -1.35 | 0.21 | 0.77 | 0.28 | 2.79 | 227 | 0.01 | 5.37 | 0.02 | 0.76 | 27 | 3 |
| MA | 4 | 257 | C | -0.01 | 0.38 | 0.21 | D | 0.01 | 0.29 | 0.22 | 0.10 | 0.30 | 0.31 | 240 | 0.75 | 0.14 | 0.71 | 0.18 | 27 | 4 |
| MA | 4 | 157 | C | -0.02 | -0.09 | 0.19 | D | 0.02 | -0.26 | 0.21 | 0.17 | 0.28 | 0.61 | 237 | 0.54 | 0.00 | 0.96 | -0.03 | 27 | 5 |
| MA | 4 | 236 | C | -0.01 | -0.05 | 0.19 | D | 0.01 | -0.17 | 0.21 | 0.12 | 0.28 | 0.43 | 237 | 0.67 | 0.01 | 0.91 | 0.02 | 27 | 6 |
| MA | 4 | 170 | C | -0.01 | -0.61 | 0.18 | D | 0.01 | -0.72 | 0.20 | 0.10 | 0.27 | 0.38 | 231 | 0.71 | 0.52 | 0.47 | 0.26 | 27 | 7 |
| MA | 4 | 1009 | C | -0.04 | 0.52 | 0.22 | D | 0.05 | 0.05 | 0.21 | 0.47 | 0.30 | 1.53 | 246 | 0.13 | 0.01 | 0.92 | -0.09 | 27 | 8 |
| MA | 4 | 262 | C | 0.04 | -1.04 | 0.12 | D | -0.05 | -0.86 | 0.14 | -0.17 | 0.18 | -0.98 | 228 | 0.33 | 3.20 | 0.07 | -0.50 | 27 | 9 |
| MA | 4 | 238 | C | 0.01 | -0.36 | 0.18 | D | -0.01 | -0.26 | 0.21 | -0.10 | 0.28 | -0.37 | 232 | 0.71 | 0.00 | 0.97 | -0.03 | 27 | 10 |
| MA | 4 | 268 | C | 0.03 | -1.41 | 0.18 | D | -0.03 | -1.14 | 0.21 | -0.28 | 0.27 | -1.01 | 230 | 0.31 | 0.00 | 0.96 | -0.05 | 27 | 11 |
| MA | 4 | 276 | C | 0.00 | 0.27 | 0.20 | D | 0.00 | 0.27 | 0.22 | 0.00 | 0.30 | 0.00 | 237 | 1.00 | 0.38 | 0.54 | 0.28 | 27 | 12 |
| MA | 4 | 244 | C | 0.01 | 2.80 | 0.51 | D | -0.02 | | 1.84 | -2.76 | 1.91 | -1.45 | 124 | 0.15 | 1.44 | 0.23 | | 27 | 13 |
| MA | 4 | 166 | C | 0.01 | 0.34 | 0.21 | D | -0.01 | 0.49 | 0.23 | -0.15 | 0.31 | -0.49 | 235 | 0.63 | 0.39 | 0.53 | -0.29 | 27 | 14 |
| MA | 4 | 247 | C | 0.01 | -0.09 | 0.19 | D | -0.02 | 0.05 | 0.21 | -0.14 | 0.29 | -0.49 | 234 | 0.63 | 0.03 | 0.87 | -0.10 | 27 | 15 |
| MA | 4 | 171 | C | -0.04 | -0.09 | 0.19 | D | 0.05 | -0.51 | 0.20 | 0.42 | 0.28 | 1.52 | 238 | 0.13 | 1.99 | 0.16 | 0.49 | 27 | 16 |
| MA | 4 | 1005 | C | -0.09 | -0.52 | 0.18 | D | 0.11 | -1.44 | 0.21 | 0.92 | 0.28 | 3.32 | 226 | 0.00 | 10.25 | 0.00 | 1.10 | 27 | 17 |
| MA | 4 | 254 | C | 0.03 | -0.09 | 0.19 | D | -0.04 | 0.24 | 0.22 | -0.33 | 0.29 | -1.13 | 230 | 0.26 | 0.01 | 0.93 | 0.02 | 27 | 18 |
| MA | 4 | 239 | C | -0.03 | 2.81 | 0.51 | D | 0.04 | 1.57 | 0.31 | 1.23 | 0.60 | 2.07 | 223 | 0.04 | 0.57 | 0.45 | 0.80 | 27 | 19 |
| MA | 4 | 165 | C | -0.02 | -0.39 | 0.18 | D | 0.02 | -0.59 | 0.20 | 0.20 | 0.27 | 0.74 | 234 | 0.46 | 0.02 | 0.88 | 0.08 | 27 | 20 |
| MA | 4 | 265 | C | 0.03 | -1.13 | 0.17 | D | -0.04 | -0.84 | 0.20 | -0.29 | 0.27 | -1.09 | 230 | 0.28 | 0.00 | 0.96 | -0.03 | 27 | 21 |
| MA | 4 | 259 | C | 0.06 | -0.01 | 0.19 | D | -0.07 | 0.71 | 0.24 | -0.73 | 0.31 | -2.36 | 220 | 0.02 | 3.34 | 0.07 | -0.70 | 27 | 22 |
| MA | 4 | 256 | C | 0.02 | -0.05 | 0.19 | D | -0.02 | 0.15 | 0.22 | -0.20 | 0.29 | -0.68 | 233 | 0.50 | 1.35 | 0.25 | -0.42 | 27 | 23 |
| MA | 4 | 250 | C | -0.02 | -0.12 | 0.19 | D | 0.02 | -0.30 | 0.21 | 0.18 | 0.28 | 0.64 | 237 | 0.52 | 0.54 | 0.46 | 0.30 | 27 | 24 |
| MA | 4 | 164 | C | 0.03 | -0.12 | 0.19 | D | -0.03 | 0.19 | 0.22 | -0.31 | 0.29 | -1.09 | 231 | 0.28 | 0.29 | 0.59 | -0.22 | 27 | 25 |
| MA | 4 | 1006 | C | 0.04 | 0.06 | 0.19 | D | -0.05 | 0.55 | 0.23 | -0.48 | 0.30 | -1.60 | 227 | 0.11 | 0.42 | 0.51 | -0.24 | 27 | 26 |
| MA | 4 | 263 | C | 0.05 | -0.74 | 0.18 | D | -0.07 | -0.17 | 0.21 | -0.57 | 0.27 | -2.09 | 227 | 0.04 | 3.87 | 0.05 | -0.64 | 27 | 27 |
| MA | 4 | 261 | C | 0.03 | 0.26 | 0.20 | D | -0.03 | 0.60 | 0.23 | -0.34 | 0.31 | -1.10 | 231 | 0.27 | 1.08 | 0.30 | -0.42 | 27 | 28 |
| MA | 4 | 168 | C | -0.01 | 0.06 | 0.19 | D | 0.01 | -0.04 | 0.21 | 0.10 | 0.29 | 0.34 | 238 | 0.73 | 0.10 | 0.75 | -0.16 | 27 | 29 |
| MA | 4 | 163 | C | -0.01 | -1.35 | 0.18 | D | 0.02 | -1.49 | 0.22 | 0.14 | 0.28 | 0.51 | 224 | 0.61 | 0.00 | 0.99 | -0.04 | 27 | 30 |
| MA | 4 | 103 | C | -0.04 | 0.34 | 0.21 | D | 0.05 | -0.13 | 0.21 | 0.47 | 0.29 | 1.59 | 244 | 0.11 | 0.11 | 0.74 | 0.16 | 27 | 31 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 245 | C | -0.02 | -0.12 | 0.19 | D | 0.02 | -0.30 | 0.21 | 0.18 | 0.28 | 0.64 | 237 | 0.52 | 0.26 | 0.61 | 0.20 | 27 | 32 |
| MA | 4 | 167 | C | 0.01 | -0.86 | 0.17 | D | -0.02 | -0.72 | 0.20 | -0.14 | 0.27 | -0.54 | 230 | 0.59 | 0.00 | 0.99 | 0.04 | 27 | 33 |
| MA | 4 | 1010 | C | -0.01 | 4.23 | 1.01 | D | 0.01 | 2.90 | 0.52 | 1.33 | 1.13 | 1.17 | 207 | 0.24 | 0.00 | 0.99 | 0.71 | 27 | 34 |
| MA | 4 | 277 | C | -0.03 | -0.05 | 0.19 | D | 0.03 | -0.34 | 0.21 | 0.29 | 0.28 | 1.04 | 238 | 0.30 | 0.05 | 0.82 | 0.12 | 27 | 35 |
| MA | 4 | 240 | C | 0.00 | 2.57 | 0.46 | D | 0.00 | 2.46 | 0.43 | 0.10 | 0.63 | 0.17 | 249 | 0.87 | 0.00 | 0.96 | -0.24 | 27 | 36 |
| MA | 4 | 264 | C | 0.04 | -0.22 | 0.18 | D | -0.06 | 0.29 | 0.22 | -0.51 | 0.29 | -1.78 | 227 | 0.08 | 0.02 | 0.89 | 0.00 | 27 | 37 |
| MA | 4 | 154 | C | -0.04 | -0.58 | 0.18 | D | 0.06 | -1.05 | 0.21 | 0.47 | 0.27 | 1.72 | 230 | 0.09 | 0.80 | 0.37 | 0.32 | 27 | 38 |
| MA | 4 | 271 | C | -0.01 | -0.61 | 0.18 | D | 0.01 | -0.72 | 0.20 | 0.10 | 0.27 | 0.38 | 231 | 0.71 | 0.02 | 0.90 | -0.01 | 27 | 39 |
| MA | 4 | 253 | C | 0.02 | 0.43 | 0.21 | D | -0.03 | 0.71 | 0.24 | -0.28 | 0.32 | -0.89 | 233 | 0.38 | 0.24 | 0.62 | -0.26 | 27 | 40 |
| MA | 4 | 375 | C | 0.06 | 0.05 | 0.14 | D | -0.08 | 0.47 | 0.16 | -0.42 | 0.22 | -1.94 | 229 | 0.05 | 5.30 | 0.02 | -0.75 | 27 | 41 |
| MA | 4 | 267 | C | -0.03 | -1.01 | 0.17 | D | 0.04 | -1.35 | 0.21 | 0.34 | 0.27 | 1.25 | 225 | 0.21 | 0.01 | 0.90 | 0.10 | 27 | 42 |
| MA | 4 | 242 | C | -0.03 | -2.52 | 0.22 | D | 0.04 | -3.26 | 0.35 | 0.74 | 0.42 | 1.77 | 185 | 0.08 | 3.92 | 0.05 | 0.92 | 27 | 43 |
| MA | 4 | 274 | C | -0.01 | -0.29 | 0.18 | D | 0.01 | -0.38 | 0.21 | 0.09 | 0.28 | 0.33 | 234 | 0.74 | 0.16 | 0.69 | 0.15 | 27 | 44 |
| MA | 4 | 246 | C | 0.03 | 0.26 | 0.20 | D | -0.04 | 0.66 | 0.24 | -0.40 | 0.31 | -1.28 | 229 | 0.20 | 1.23 | 0.27 | -0.43 | 27 | 45 |
| MA | 4 | 373 | C | 0.03 | 0.02 | 0.19 | D | -0.03 | 0.34 | 0.22 | -0.31 | 0.29 | -1.07 | 231 | 0.29 | 0.06 | 0.81 | -0.12 | 27 | 46 |
| MA | 4 | 278 | C | 0.03 | 0.26 | 0.20 | D | -0.03 | 0.60 | 0.23 | -0.34 | 0.31 | -1.10 | 231 | 0.27 | 0.21 | 0.65 | -0.21 | 27 | 47 |
| MA | 4 | 1007 | C | 0.01 | 0.18 | 0.20 | D | -0.02 | 0.34 | 0.22 | -0.16 | 0.30 | -0.54 | 234 | 0.59 | 0.59 | 0.44 | 0.29 | 27 | 48 |
| MA | 4 | 377 | C | -0.05 | 0.18 | 0.20 | D | 0.06 | -0.38 | 0.21 | 0.56 | 0.29 | 1.96 | 243 | 0.05 | 3.63 | 0.06 | 0.64 | 27 | 49 |
| MA | 4 | 243 | C | 0.01 | 0.02 | 0.19 | D | -0.02 | 0.19 | 0.22 | -0.17 | 0.29 | -0.58 | 234 | 0.56 | 0.04 | 0.84 | -0.11 | 27 | 50 |
| MA | 4 | 378 | C | -0.03 | -0.19 | 0.19 | D | 0.04 | -0.51 | 0.20 | 0.32 | 0.28 | 1.15 | 237 | 0.25 | 0.81 | 0.37 | 0.38 | 27 | 51 |
| MA | 4 | 241 | C | 0.03 | 0.18 | 0.20 | D | -0.04 | 0.60 | 0.23 | -0.42 | 0.31 | -1.37 | 229 | 0.17 | 0.18 | 0.67 | -0.19 | 27 | 52 |
| MA | 4 | 252 | C | 0.00 | 2.81 | 0.51 | D | -0.01 | 3.21 | 0.59 | -0.40 | 0.78 | -0.51 | 231 | 0.61 | 0.00 | 0.95 | -0.46 | 27 | 53 |
| MA | 4 | 258 | C | 0.04 | -0.65 | 0.18 | D | -0.05 | -0.21 | 0.21 | -0.43 | 0.27 | -1.59 | 229 | 0.11 | 1.23 | 0.27 | -0.35 | 27 | 54 |
| MA | 4 | 249 | C | -0.01 | -0.09 | 0.19 | D | 0.01 | -0.21 | 0.21 | 0.13 | 0.28 | 0.45 | 237 | 0.65 | 0.26 | 0.61 | 0.20 | 27 | 55 |
| MA | 5 | 422 | C | 0.00 | -0.51 | 0.18 | D | 0.00 | -0.51 | 0.20 | 0.00 | 0.27 | 0.00 | 241 | 1.00 | 0.04 | 0.84 | -0.11 | 24 | 1 |
| MA | 5 | 1128 | C | -0.04 | -1.16 | 0.18 | D | 0.05 | -1.56 | 0.21 | 0.40 | 0.28 | 1.45 | 233 | 0.15 | 1.00 | 0.32 | 0.35 | 24 | 2 |
| MA | 5 | 459 | C | 0.00 | 0.81 | 0.24 | D | 0.00 | 0.81 | 0.24 | 0.00 | 0.35 | 0.00 | 245 | 1.00 | 0.02 | 0.90 | -0.03 | 24 | 3 |
| MA | 5 | 455 | C | -0.01 | -0.30 | 0.19 | D | 0.01 | -0.35 | 0.20 | 0.06 | 0.28 | 0.21 | 242 | 0.83 | 0.15 | 0.70 | 0.17 | 24 | 4 |
| MA | 5 | 1217 | C | 0.03 | 1.07 | 0.27 | D | -0.03 | 1.74 | 0.33 | -0.67 | 0.42 | -1.58 | 228 | 0.12 | 1.50 | 0.22 | -0.75 | 24 | 5 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 434 | C | -0.01 | -0.33 | 0.19 | D | 0.02 | -0.47 | 0.20 | 0.14 | 0.27 | 0.52 | 242 | 0.60 | 0.28 | 0.60 | 0.20 | 24 | 6 |
| MA | 5 | 432 | C | 0.00 | 0.44 | 0.22 | D | 0.00 | 0.48 | 0.23 | -0.05 | 0.31 | -0.14 | 243 | 0.89 | 0.45 | 0.50 | 0.27 | 24 | 7 |
| MA | 5 | 417 | C | -0.02 | 1.94 | 0.37 | D | 0.03 | 1.29 | 0.28 | 0.65 | 0.46 | 1.40 | 238 | 0.16 | 0.17 | 0.68 | 0.40 | 24 | 8 |
| MA | 5 | 424 | C | -0.02 | -0.47 | 0.18 | D | 0.03 | -0.71 | 0.20 | 0.24 | 0.27 | 0.88 | 241 | 0.38 | 1.30 | 0.25 | 0.36 | 24 | 9 |
| MA | 5 | 441 | C | 0.02 | -1.42 | 0.18 | D | -0.02 | -1.26 | 0.20 | -0.16 | 0.27 | -0.58 | 238 | 0.57 | 1.47 | 0.23 | -0.44 | 24 | 10 |
| MA | 5 | 1136 | C | 0.09 | -0.51 | 0.18 | D | -0.11 | 0.53 | 0.23 | -1.04 | 0.29 | -3.55 | 227 | 0.00 | 5.28 | 0.02 | -0.79 | 24 | 11 |
| MA | 5 | 431 | C | 0.01 | -0.61 | 0.18 | D | -0.01 | -0.51 | 0.20 | -0.09 | 0.27 | -0.35 | 240 | 0.73 | 0.35 | 0.55 | -0.25 | 24 | 12 |
| MA | 5 | 1223 | C | 0.01 | 0.94 | 0.25 | D | -0.01 | 1.07 | 0.26 | -0.13 | 0.37 | -0.35 | 243 | 0.72 | 0.01 | 0.91 | -0.12 | 24 | 13 |
| MA | 5 | 463 | C | -0.01 | 0.84 | 0.19 | D | 0.02 | 0.72 | 0.17 | 0.12 | 0.26 | 0.45 | 246 | 0.65 | 0.41 | 0.52 | 0.32 | 24 | 14 |
| MA | 5 | 413 | C | -0.01 | -1.16 | 0.18 | D | 0.02 | -1.30 | 0.20 | 0.14 | 0.27 | 0.53 | 236 | 0.59 | 0.01 | 0.92 | 0.02 | 24 | 15 |
| MA | 5 | 442 | C | 0.01 | 0.17 | 0.21 | D | -0.01 | 0.24 | 0.22 | -0.07 | 0.30 | -0.25 | 242 | 0.80 | 0.02 | 0.89 | 0.09 | 24 | 16 |
| MA | 5 | 450 | C | 0.03 | -0.19 | 0.19 | D | -0.03 | 0.11 | 0.21 | -0.29 | 0.29 | -1.03 | 239 | 0.31 | 0.43 | 0.51 | -0.27 | 24 | 17 |
| MA | 5 | 1202 | C | -0.03 | 0.59 | 0.23 | D | 0.04 | 0.15 | 0.21 | 0.44 | 0.31 | 1.41 | 246 | 0.16 | 2.05 | 0.15 | 0.62 | 24 | 18 |
| MA | 5 | 1130 | C | -0.03 | -0.44 | 0.19 | D | 0.03 | -0.71 | 0.20 | 0.27 | 0.27 | 1.00 | 241 | 0.32 | 0.24 | 0.62 | -0.21 | 24 | 19 |
| MA | 5 | 414 | C | 0.05 | -0.39 | 0.09 | D | -0.05 | -0.29 | 0.09 | -0.10 | 0.13 | -0.78 | 243 | 0.43 | 0.01 | 0.91 | -0.04 | 24 | 20 |
| MA | 5 | 444 | C | 0.07 | -1.25 | 0.18 | D | -0.08 | -0.57 | 0.20 | -0.68 | 0.27 | -2.55 | 237 | 0.01 | 3.21 | 0.07 | -0.56 | 24 | 21 |
| MA | 5 | 460 | C | -0.07 | -1.29 | 0.18 | D | 0.08 | -2.03 | 0.23 | 0.74 | 0.29 | 2.53 | 221 | 0.01 | 2.80 | 0.09 | 0.59 | 24 | 22 |
| MA | 5 | 1232 | C | 0.02 | 0.81 | 0.24 | D | -0.03 | 1.20 | 0.27 | -0.39 | 0.37 | -1.05 | 236 | 0.29 | 2.37 | 0.12 | -0.79 | 24 | 23 |
| MA | 5 | 420 | C | 0.02 | 2.25 | 0.42 | D | -0.02 | 4.30 | 1.01 | -2.05 | 1.10 | -1.87 | 150 | 0.06 | 2.83 | 0.09 | | 24 | 24 |
| MA | 5 | 462 | C | -0.03 | 0.59 | 0.23 | D | 0.04 | 0.14 | 0.21 | 0.45 | 0.31 | 1.45 | 245 | 0.15 | 2.44 | 0.12 | 0.59 | 24 | 25 |
| MA | 5 | 436 | C | 0.00 | 0.13 | 0.20 | D | -0.01 | 0.18 | 0.21 | -0.06 | 0.30 | -0.19 | 241 | 0.85 | 0.00 | 0.99 | 0.06 | 24 | 26 |
| MA | 5 | 1229 | C | -0.02 | 1.48 | 0.31 | D | 0.02 | 1.06 | 0.26 | 0.43 | 0.41 | 1.05 | 244 | 0.29 | 0.46 | 0.50 | -0.60 | 24 | 27 |
| MA | 5 | 457 | C | 0.02 | -0.77 | 0.18 | D | -0.02 | -0.61 | 0.20 | -0.16 | 0.27 | -0.60 | 237 | 0.55 | 0.00 | 0.97 | -0.05 | 24 | 28 |
| MA | 5 | 439 | C | 0.02 | -0.04 | 0.20 | D | -0.02 | 0.18 | 0.21 | -0.22 | 0.29 | -0.74 | 239 | 0.46 | 0.14 | 0.71 | -0.19 | 24 | 29 |
| MA | 5 | 440 | C | 0.04 | 0.94 | 0.25 | D | -0.04 | 1.73 | 0.33 | -0.79 | 0.41 | -1.91 | 221 | 0.06 | 0.65 | 0.42 | -0.49 | 24 | 30 |
| MA | 5 | 415 | C | 0.05 | -0.80 | 0.18 | D | -0.06 | -0.33 | 0.20 | -0.47 | 0.27 | -1.75 | 236 | 0.08 | 1.02 | 0.31 | -0.36 | 24 | 31 |
| MA | 5 | 429 | C | 0.02 | 0.30 | 0.21 | D | -0.02 | 0.57 | 0.23 | -0.28 | 0.31 | -0.88 | 238 | 0.38 | 0.19 | 0.67 | -0.25 | 24 | 32 |
| MA | 5 | 445 | C | -0.01 | 0.54 | 0.23 | D | 0.01 | 0.42 | 0.22 | 0.12 | 0.32 | 0.37 | 244 | 0.71 | 0.01 | 0.94 | -0.10 | 24 | 33 |
| MA | 5 | 412 | C | -0.02 | 0.59 | 0.23 | D | 0.03 | 0.27 | 0.22 | 0.31 | 0.32 | 1.00 | 245 | 0.32 | 0.03 | 0.85 | 0.02 | 24 | 34 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 426 | C | 0.00 | 0.00 | 0.20 | D | 0.00 | -0.04 | 0.21 | 0.04 | 0.29 | 0.15 | 241 | 0.88 | 0.03 | 0.87 | 0.11 | 24 | 35 |
| MA | 5 | 448 | C | 0.03 | -0.54 | 0.18 | D | -0.03 | -0.25 | 0.20 | -0.29 | 0.27 | -1.06 | 237 | 0.29 | 1.03 | 0.31 | -0.35 | 24 | 36 |
| MA | 5 | 421 | C | -0.01 | -1.32 | 0.18 | D | 0.02 | -1.46 | 0.21 | 0.14 | 0.28 | 0.50 | 233 | 0.62 | 0.00 | 0.95 | 0.03 | 24 | 37 |
| MA | 5 | 446 | C | 0.02 | -0.93 | 0.18 | D | -0.03 | -0.73 | 0.20 | -0.20 | 0.27 | -0.77 | 237 | 0.44 | 0.27 | 0.60 | -0.19 | 24 | 38 |
| MA | 5 | 1093 | C | 0.01 | 1.39 | 0.29 | D | -0.01 | 1.66 | 0.29 | -0.26 | 0.41 | -0.65 | 243 | 0.52 | 0.24 | 0.63 | 0.35 | 24 | 39 |
| MA | 5 | 443 | C | 0.05 | 0.13 | 0.20 | D | -0.06 | 0.86 | 0.25 | -0.74 | 0.32 | -2.29 | 227 | 0.02 | 2.82 | 0.09 | -0.67 | 24 | 40 |
| MA | 5 | 454 | C | -0.01 | 0.04 | 0.20 | D | 0.01 | -0.04 | 0.21 | 0.08 | 0.29 | 0.29 | 242 | 0.77 | 0.19 | 0.66 | -0.23 | 24 | 41 |
| MA | 5 | 425 | C | -0.01 | -0.20 | 0.19 | D | 0.01 | -0.29 | 0.20 | 0.09 | 0.28 | 0.31 | 240 | 0.76 | 0.01 | 0.92 | 0.02 | 24 | 42 |
| MA | 5 | 419 | C | -0.02 | 0.68 | 0.24 | D | 0.02 | 0.42 | 0.22 | 0.26 | 0.33 | 0.81 | 243 | 0.42 | 4.31 | 0.04 | 0.85 | 24 | 43 |
| MA | 5 | 433 | C | -0.01 | -1.87 | 0.19 | D | 0.01 | -1.97 | 0.23 | 0.10 | 0.30 | 0.34 | 230 | 0.74 | 0.00 | 0.96 | -0.05 | 24 | 44 |
| MA | 5 | 458 | C | 0.00 | -2.19 | 0.21 | D | 0.00 | -2.19 | 0.24 | 0.00 | 0.32 | 0.00 | 230 | 1.00 | 0.48 | 0.49 | 0.31 | 24 | 45 |
| MA | 5 | 416 | C | 0.02 | -0.63 | 0.18 | D | -0.03 | -0.41 | 0.20 | -0.21 | 0.27 | -0.79 | 237 | 0.43 | 1.14 | 0.28 | -0.41 | 24 | 46 |
| MA | 5 | 456 | C | -0.04 | -0.20 | 0.19 | D | 0.05 | -0.61 | 0.20 | 0.41 | 0.28 | 1.47 | 241 | 0.14 | 0.13 | 0.71 | 0.16 | 24 | 47 |
| MA | 5 | 449 | C | 0.01 | 0.63 | 0.23 | D | -0.01 | 0.80 | 0.24 | -0.17 | 0.34 | -0.51 | 239 | 0.61 | 0.59 | 0.44 | -0.39 | 24 | 48 |
| MA | 5 | 435 | C | -0.09 | 0.31 | 0.12 | D | 0.10 | 0.01 | 0.11 | 0.30 | 0.16 | 1.84 | 243 | 0.07 | 4.64 | 0.03 | 0.68 | 24 | 49 |
| MA | 5 | 452 | C | 0.03 | -0.59 | 0.18 | D | -0.04 | -0.25 | 0.20 | -0.34 | 0.27 | -1.25 | 236 | 0.21 | 1.30 | 0.25 | -0.38 | 24 | 50 |
| MA | 5 | 1187 | C | -0.02 | -0.24 | 0.19 | D | 0.02 | -0.41 | 0.20 | 0.17 | 0.28 | 0.61 | 240 | 0.54 | 0.00 | 0.96 | 0.06 | 24 | 51 |
| MA | 5 | 451 | C | -0.04 | -0.09 | 0.20 | D | 0.05 | -0.53 | 0.20 | 0.44 | 0.28 | 1.57 | 241 | 0.12 | 0.18 | 0.67 | 0.19 | 24 | 52 |
| MA | 5 | 1058 | C | -0.03 | 0.11 | 0.20 | D | 0.03 | -0.17 | 0.20 | 0.28 | 0.29 | 0.96 | 242 | 0.34 | 0.50 | 0.48 | 0.27 | 24 | 53 |
| MA | 5 | 464 | C | -0.03 | 1.15 | 0.20 | D | 0.03 | 0.91 | 0.18 | 0.24 | 0.27 | 0.91 | 243 | 0.36 | 0.09 | 0.76 | 0.12 | 24 | 54 |
| MA | 5 | 437 | C | -0.03 | 0.11 | 0.20 | D | 0.03 | -0.21 | 0.20 | 0.32 | 0.29 | 1.11 | 242 | 0.27 | 3.00 | 0.08 | 0.59 | 24 | 55 |
| MA | 5 | 1121 | C | 0.00 | -0.23 | 0.19 | D | 0.00 | -0.23 | 0.20 | 0.00 | 0.28 | 0.00 | 239 | 1.00 | 0.35 | 0.55 | 0.23 | 24 | 56 |
| MA | 5 | 453 | C | 0.00 | 0.80 | 0.25 | D | 0.00 | 0.80 | 0.24 | 0.00 | 0.35 | 0.00 | 242 | 1.00 | 0.19 | 0.66 | -0.31 | 24 | 57 |
| MA | 5 | 428 | C | 0.00 | 0.28 | 0.21 | D | 0.01 | 0.23 | 0.22 | 0.06 | 0.30 | 0.19 | 241 | 0.85 | 0.14 | 0.71 | 0.18 | 24 | 58 |
| MA | 6 | 581 | C | -0.04 | 0.37 | 0.30 | D | 0.04 | -0.16 | 0.28 | 0.53 | 0.41 | 1.29 | 159 | 0.20 | 0.41 | 0.52 | 0.50 | 20 | 1 |
| MA | 6 | 568 | C | 0.03 | -1.26 | 0.23 | D | -0.03 | -0.98 | 0.25 | -0.28 | 0.34 | -0.83 | 154 | 0.41 | 0.53 | 0.47 | -0.34 | 20 | 2 |
| MA | 6 | 579 | C | -0.04 | -0.24 | 0.26 | D | 0.04 | -0.65 | 0.26 | 0.41 | 0.36 | 1.12 | 159 | 0.26 | 0.40 | 0.53 | 0.33 | 20 | 3 |
| MA | 6 | 470 | C | 0.00 | 0.67 | 0.33 | D | -0.01 | 0.76 | 0.34 | -0.09 | 0.47 | -0.19 | 158 | 0.85 | 0.07 | 0.79 | -0.28 | 20 | 4 |
| MA | 6 | 468 | C | 0.00 | -0.78 | 0.24 | D | 0.00 | -0.78 | 0.26 | 0.00 | 0.35 | 0.00 | 156 | 1.00 | 0.05 | 0.82 | -0.20 | 20 | 5 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 1200 | C | -0.01 | -0.37 | 0.25 | D | 0.01 | -0.52 | 0.26 | 0.14 | 0.36 | 0.40 | 157 | 0.69 | 0.00 | 0.96 | 0.06 | 20 | 6 |
| MA | 6 | 551 | C | 0.03 | -0.50 | 0.25 | D | -0.03 | -0.16 | 0.28 | -0.34 | 0.37 | -0.92 | 154 | 0.36 | 1.35 | 0.25 | -0.59 | 20 | 7 |
| MA | 6 | 480 | C | 0.04 | -0.37 | 0.25 | D | -0.04 | 0.08 | 0.29 | -0.46 | 0.38 | -1.19 | 152 | 0.23 | 0.50 | 0.48 | -0.42 | 20 | 8 |
| MA | 6 | 469 | C | -0.06 | -0.08 | 0.13 | D | 0.08 | -0.27 | 0.13 | 0.19 | 0.18 | 1.02 | 159 | 0.31 | 0.60 | 0.44 | 0.29 | 20 | 9 |
| MA | 6 | 585 | C | 0.01 | 2.13 | 0.59 | D | -0.01 | 2.89 | 0.73 | -0.76 | 0.94 | -0.81 | 148 | 0.42 | 0.92 | 0.34 | | 20 | 10 |
| MA | 6 | 578 | C | -0.04 | -0.18 | 0.26 | D | 0.05 | -0.65 | 0.26 | 0.48 | 0.37 | 1.30 | 159 | 0.20 | 0.50 | 0.48 | 0.42 | 20 | 11 |
| MA | 6 | 1251 | C | 0.00 | 1.37 | 0.43 | D | 0.00 | 1.46 | 0.42 | -0.09 | 0.60 | -0.15 | 159 | 0.88 | 0.01 | 0.91 | -0.51 | 20 | 12 |
| MA | 6 | 490 | C | 0.03 | -0.56 | 0.24 | D | -0.04 | -0.16 | 0.28 | -0.40 | 0.37 | -1.09 | 153 | 0.28 | 1.21 | 0.27 | -0.55 | 20 | 13 |
| MA | 6 | 1256 | C | 0.02 | 0.12 | 0.28 | D | -0.02 | 0.35 | 0.31 | -0.23 | 0.42 | -0.56 | 156 | 0.58 | 0.07 | 0.80 | -0.23 | 20 | 14 |
| MA | 6 | 502 | C | -0.05 | 0.75 | 0.23 | D | 0.06 | 0.28 | 0.21 | 0.47 | 0.32 | 1.48 | 159 | 0.14 | 1.35 | 0.25 | 0.57 | 20 | 15 |
| MA | 6 | 484 | C | -0.02 | 0.79 | 0.35 | D | 0.02 | 0.44 | 0.31 | 0.34 | 0.47 | 0.73 | 159 | 0.46 | 0.02 | 0.89 | -0.22 | 20 | 16 |
| MA | 6 | 1131 | C | 0.07 | -0.12 | 0.13 | D | -0.08 | 0.09 | 0.14 | -0.21 | 0.19 | -1.12 | 154 | 0.27 | 0.01 | 0.91 | 0.05 | 20 | 17 |
| MA | 6 | 1062 | C | -0.04 | 0.71 | 0.22 | D | 0.05 | 0.43 | 0.18 | 0.27 | 0.29 | 0.95 | 158 | 0.34 | 1.92 | 0.17 | 1.12 | 20 | 18 |
| MA | 6 | 537 | C | -0.01 | -1.05 | 0.23 | D | 0.01 | -1.10 | 0.25 | 0.05 | 0.34 | 0.15 | 155 | 0.88 | 0.03 | 0.87 | -0.01 | 20 | 19 |
| MA | 6 | 567 | C | -0.04 | -0.44 | 0.25 | D | 0.04 | -0.85 | 0.25 | 0.41 | 0.36 | 1.17 | 158 | 0.25 | 0.27 | 0.60 | 0.29 | 20 | 20 |
| MA | 6 | 577 | C | 0.02 | 0.79 | 0.35 | D | -0.02 | 1.15 | 0.38 | -0.36 | 0.51 | -0.70 | 155 | 0.48 | 0.03 | 0.86 | -0.26 | 20 | 21 |
| MA | 6 | 1142 | C | 0.01 | -1.05 | 0.23 | D | -0.02 | -0.91 | 0.25 | -0.14 | 0.34 | -0.41 | 155 | 0.69 | 0.06 | 0.81 | -0.15 | 20 | 22 |
| MA | 6 | 487 | C | 0.00 | 0.10 | 0.28 | D | 0.00 | 0.10 | 0.29 | 0.00 | 0.40 | 0.00 | 158 | 1.00 | 0.32 | 0.57 | 0.37 | 20 | 23 |
| MA | 6 | 580 | C | 0.06 | -0.31 | 0.25 | D | -0.07 | 0.55 | 0.32 | -0.85 | 0.41 | -2.09 | 146 | 0.04 | 3.69 | 0.05 | -1.10 | 20 | 24 |
| MA | 6 | 526 | C | 0.02 | -0.84 | 0.23 | D | -0.03 | -0.59 | 0.26 | -0.25 | 0.35 | -0.72 | 154 | 0.47 | 0.76 | 0.38 | -0.44 | 20 | 25 |
| MA | 6 | 1253 | C | 0.01 | 0.20 | 0.29 | D | -0.01 | 0.35 | 0.31 | -0.15 | 0.42 | -0.36 | 157 | 0.72 | 1.21 | 0.27 | -0.71 | 20 | 26 |
| MA | 6 | 534 | C | -0.01 | 0.47 | 0.31 | D | 0.01 | 0.35 | 0.31 | 0.12 | 0.44 | 0.27 | 159 | 0.79 | 0.00 | 0.97 | -0.14 | 20 | 27 |
| MA | 6 | 1225 | C | 0.04 | 1.20 | 0.40 | D | -0.04 | 2.89 | 0.73 | -1.68 | 0.84 | -2.02 | 116 | 0.05 | 0.03 | 0.87 | | 20 | 28 |
| MA | 6 | 520 | C | -0.01 | 0.12 | 0.28 | D | 0.01 | 0.00 | 0.28 | 0.12 | 0.40 | 0.29 | 158 | 0.77 | 0.00 | 0.98 | 0.08 | 20 | 29 |
| MA | 6 | 499 | C | 0.01 | 0.12 | 0.28 | D | -0.01 | 0.26 | 0.30 | -0.14 | 0.41 | -0.34 | 156 | 0.73 | 0.05 | 0.83 | 0.01 | 20 | 30 |
| MA | 6 | 535 | C | -0.05 | -0.89 | 0.23 | D | 0.06 | -1.42 | 0.25 | 0.52 | 0.34 | 1.53 | 156 | 0.13 | 1.37 | 0.24 | 0.54 | 20 | 31 |
| MA | 6 | 571 | C | 0.01 | -2.03 | 0.23 | D | -0.01 | -1.93 | 0.26 | -0.10 | 0.35 | -0.30 | 154 | 0.77 | 0.02 | 0.90 | -0.04 | 20 | 32 |
| MA | 6 | 553 | C | -0.06 | 0.20 | 0.29 | D | 0.06 | -0.52 | 0.26 | 0.72 | 0.39 | 1.84 | 159 | 0.07 | 1.20 | 0.27 | 0.60 | 20 | 33 |
| MA | 6 | 563 | C | 0.02 | -0.73 | 0.24 | D | -0.02 | -0.52 | 0.26 | -0.21 | 0.35 | -0.60 | 155 | 0.55 | 0.08 | 0.77 | -0.21 | 20 | 34 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 550 | C | 0.01 | -0.84 | 0.23 | D | -0.01 | -0.72 | 0.26 | -0.12 | 0.35 | -0.34 | 155 | 0.73 | 0.43 | 0.51 | -0.40 | 20 | 35 |
| MA | 6 | 515 | C | -0.03 | -0.56 | 0.24 | D | 0.04 | -0.91 | 0.25 | 0.36 | 0.35 | 1.02 | 157 | 0.31 | 2.68 | 0.10 | 0.78 | 20 | 36 |
| MA | 6 | 509 | C | 0.01 | -1.00 | 0.23 | D | -0.01 | -0.91 | 0.25 | -0.09 | 0.34 | -0.25 | 155 | 0.80 | 0.07 | 0.79 | -0.18 | 20 | 37 |
| MA | 6 | 495 | C | -0.02 | -0.67 | 0.24 | D | 0.03 | -0.91 | 0.25 | 0.24 | 0.35 | 0.70 | 157 | 0.49 | 1.18 | 0.28 | 0.47 | 20 | 38 |
| MA | 6 | 574 | C | -0.04 | -0.24 | 0.26 | D | 0.05 | -0.72 | 0.26 | 0.48 | 0.36 | 1.31 | 159 | 0.19 | 0.21 | 0.65 | 0.28 | 20 | 39 |
| MA | 6 | 478 | C | -0.03 | -0.50 | 0.25 | D | 0.04 | -0.85 | 0.25 | 0.35 | 0.35 | 1.00 | 158 | 0.32 | 0.11 | 0.74 | 0.24 | 20 | 40 |
| MA | 6 | 575 | C | 0.01 | 1.58 | 0.47 | D | -0.01 | 1.87 | 0.48 | -0.29 | 0.67 | -0.43 | 158 | 0.67 | 0.22 | 0.64 | 0.34 | 20 | 41 |
| MA | 6 | 491 | C | 0.03 | 0.17 | 0.16 | D | -0.03 | 0.29 | 0.17 | -0.12 | 0.24 | -0.52 | 156 | 0.60 | 0.01 | 0.92 | -0.04 | 20 | 42 |
| MA | 6 | 512 | C | 0.04 | 0.12 | 0.28 | D | -0.05 | 0.88 | 0.35 | -0.76 | 0.45 | -1.70 | 147 | 0.09 | 1.61 | 0.20 | -0.72 | 20 | 43 |
| MA | 6 | 521 | C | 0.03 | 0.04 | 0.28 | D | -0.03 | 0.44 | 0.31 | -0.41 | 0.42 | -0.97 | 153 | 0.33 | 0.06 | 0.80 | 0.20 | 20 | 44 |
| MA | 6 | 1101 | C | 0.00 | -0.90 | 0.23 | D | 0.00 | -0.90 | 0.25 | 0.00 | 0.34 | 0.00 | 155 | 1.00 | 0.13 | 0.72 | 0.21 | 20 | 45 |
| MA | 6 | 572 | C | -0.01 | -0.24 | 0.26 | D | 0.01 | -0.31 | 0.27 | 0.06 | 0.37 | 0.16 | 157 | 0.87 | 0.01 | 0.92 | 0.05 | 20 | 46 |
| MA | 6 | 476 | C | 0.01 | 0.91 | 0.36 | D | -0.01 | 1.15 | 0.38 | -0.23 | 0.52 | -0.45 | 157 | 0.65 | 0.07 | 0.80 | 0.02 | 20 | 47 |
| MA | 6 | 1203 | C | 0.01 | -1.10 | 0.23 | D | -0.01 | -1.04 | 0.25 | -0.06 | 0.34 | -0.19 | 155 | 0.85 | 0.00 | 0.99 | 0.07 | 20 | 48 |
| MA | 6 | 524 | C | 0.01 | 1.58 | 0.47 | D | -0.01 | 1.87 | 0.48 | -0.29 | 0.67 | -0.43 | 158 | 0.67 | 0.04 | 0.85 | -0.66 | 20 | 49 |
| MA | 6 | 514 | C | 0.04 | -1.16 | 0.23 | D | -0.04 | -0.78 | 0.26 | -0.37 | 0.34 | -1.09 | 154 | 0.28 | 0.32 | 0.57 | -0.29 | 20 | 50 |
| MA | 6 | 1063 | C | 0.04 | -1.10 | 0.23 | D | -0.05 | -0.65 | 0.26 | -0.45 | 0.34 | -1.31 | 153 | 0.19 | 1.76 | 0.18 | -0.66 | 20 | 51 |
| MA | 6 | 570 | C | 0.00 | 1.82 | 0.52 | D | 0.00 | 1.87 | 0.48 | -0.05 | 0.71 | -0.07 | 159 | 0.95 | 0.24 | 0.63 | 0.41 | 20 | 52 |
| MA | 6 | 545 | C | -0.04 | 0.20 | 0.29 | D | 0.04 | -0.31 | 0.27 | 0.50 | 0.39 | 1.28 | 159 | 0.20 | 0.05 | 0.82 | 0.22 | 20 | 53 |
| MA | 6 | 517 | C | 0.02 | -0.37 | 0.25 | D | -0.03 | -0.08 | 0.28 | -0.29 | 0.38 | -0.78 | 154 | 0.43 | 0.53 | 0.47 | -0.49 | 20 | 54 |
| MA | 6 | 466 | C | 0.01 | 0.91 | 0.36 | D | -0.01 | 1.15 | 0.38 | -0.23 | 0.52 | -0.45 | 157 | 0.65 | 0.00 | 1.00 | 0.17 | 20 | 55 |
| MA | 6 | 482 | C | -0.01 | 3.26 | 1.01 | D | 0.01 | 2.45 | 0.61 | 0.82 | 1.18 | 0.69 | 138 | 0.49 | 0.37 | 0.54 | 0.13 | 20 | 56 |
| MA | 6 | 1254 | C | -0.03 | -0.89 | 0.23 | D | 0.04 | -1.23 | 0.25 | 0.34 | 0.34 | 0.98 | 156 | 0.33 | 1.71 | 0.19 | 0.58 | 20 | 57 |
| MA | 7 | 475 | C | -0.03 | 0.72 | 0.35 | D | 0.05 | 0.02 | 0.32 | 0.70 | 0.48 | 1.46 | 158 | 0.15 | 2.12 | 0.14 | 0.87 | 16 | 1 |
| MA | 7 | 564 | C | 0.01 | -0.24 | 0.26 | D | -0.02 | -0.08 | 0.31 | -0.17 | 0.41 | -0.41 | 137 | 0.68 | 0.00 | 0.98 | -0.09 | 16 | 2 |
| MA | 7 | 505 | C | -0.01 | -0.76 | 0.23 | D | 0.02 | -0.90 | 0.27 | 0.13 | 0.35 | 0.38 | 140 | 0.71 | 0.30 | 0.58 | 0.25 | 16 | 3 |
| MA | 7 | 516 | C | -0.01 | 0.85 | 0.37 | D | 0.01 | 0.64 | 0.39 | 0.21 | 0.54 | 0.39 | 150 | 0.70 | 0.07 | 0.80 | -0.05 | 16 | 4 |
| MA | 7 | 508 | C | 0.05 | -1.90 | 0.21 | D | -0.07 | -1.38 | 0.26 | -0.52 | 0.33 | -1.58 | 136 | 0.12 | 5.01 | 0.03 | -1.03 | 16 | 5 |
| MA | 7 | 525 | C | 0.00 | -0.85 | 0.22 | D | -0.01 | -0.82 | 0.27 | -0.02 | 0.35 | -0.07 | 138 | 0.94 | 0.00 | 0.98 | 0.08 | 16 | 6 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 1134 | C | 0.02 | -1.38 | 0.21 | D | -0.03 | -1.17 | 0.26 | -0.20 | 0.34 | -0.60 | 136 | 0.55 | 0.01 | 0.93 | -0.09 | 16 | 7 |
| MA | 7 | 1066 | C | 0.01 | 1.61 | 0.51 | D | -0.02 | 2.94 | 1.02 | -1.33 | 1.14 | -1.17 | 96 | 0.25 | 0.07 | 0.79 | | 16 | 8 |
| MA | 7 | 488 | C | -0.02 | -0.11 | 0.27 | D | 0.02 | -0.35 | 0.29 | 0.25 | 0.40 | 0.62 | 146 | 0.54 | 0.01 | 0.92 | 0.14 | 16 | 9 |
| MA | 7 | 477 | C | 0.00 | 0.39 | 0.31 | D | -0.01 | 0.50 | 0.37 | -0.11 | 0.49 | -0.22 | 140 | 0.82 | 0.03 | 0.86 | -0.04 | 16 | 10 |
| MA | 7 | 494 | C | -0.02 | -0.60 | 0.23 | D | 0.03 | -0.82 | 0.27 | 0.22 | 0.36 | 0.62 | 142 | 0.54 | 0.51 | 0.47 | 0.40 | 16 | 11 |
| MA | 7 | 506 | C | 0.03 | -0.55 | 0.24 | D | -0.04 | -0.17 | 0.31 | -0.37 | 0.39 | -0.97 | 132 | 0.34 | 0.02 | 0.90 | 0.03 | 16 | 12 |
| MA | 7 | 496 | C | 0.03 | -1.01 | 0.22 | D | -0.05 | -0.60 | 0.28 | -0.41 | 0.35 | -1.17 | 132 | 0.25 | 1.03 | 0.31 | -0.47 | 16 | 13 |
| MA | 7 | 479 | C | -0.01 | 0.30 | 0.30 | D | 0.02 | 0.02 | 0.32 | 0.27 | 0.44 | 0.61 | 149 | 0.54 | 0.00 | 0.96 | 0.09 | 16 | 14 |
| MA | 7 | 483 | C | 0.02 | -0.03 | 0.27 | D | -0.03 | 0.37 | 0.36 | -0.40 | 0.45 | -0.89 | 130 | 0.37 | 0.19 | 0.66 | -0.32 | 16 | 15 |
| MA | 7 | 559 | C | -0.03 | -0.24 | 0.26 | D | 0.04 | -0.60 | 0.28 | 0.35 | 0.38 | 0.93 | 147 | 0.35 | 1.44 | 0.23 | 0.46 | 16 | 16 |
| MA | 7 | 486 | C | 0.03 | -0.71 | 0.23 | D | -0.05 | -0.26 | 0.30 | -0.45 | 0.38 | -1.18 | 131 | 0.24 | 0.44 | 0.51 | -0.36 | 16 | 17 |
| MA | 7 | 1234 | C | 0.06 | -0.76 | 0.23 | D | -0.08 | 0.02 | 0.32 | -0.79 | 0.39 | -2.00 | 123 | 0.05 | 1.04 | 0.31 | -0.55 | 16 | 18 |
| MA | 7 | 1247 | C | 0.00 | 1.91 | 0.59 | D | -0.01 | 2.21 | 0.73 | -0.30 | 0.94 | -0.32 | 136 | 0.75 | 0.17 | 0.68 | 0.07 | 16 | 19 |
| MA | 7 | 481 | C | 0.04 | -0.70 | 0.15 | D | -0.06 | -0.48 | 0.19 | -0.22 | 0.24 | -0.91 | 135 | 0.36 | 1.17 | 0.28 | -0.45 | 16 | 20 |
| MA | 7 | 498 | C | -0.01 | -0.86 | 0.22 | D | 0.02 | -1.04 | 0.26 | 0.17 | 0.35 | 0.50 | 140 | 0.62 | 0.02 | 0.90 | 0.04 | 16 | 21 |
| MA | 7 | 485 | C | -0.01 | -0.18 | 0.26 | D | 0.01 | -0.26 | 0.30 | 0.09 | 0.40 | 0.22 | 143 | 0.83 | 0.32 | 0.57 | 0.30 | 16 | 22 |
| MA | 7 | 1237 | C | -0.02 | 0.85 | 0.37 | D | 0.04 | 0.24 | 0.34 | 0.61 | 0.51 | 1.20 | 157 | 0.23 | 1.26 | 0.26 | 0.78 | 16 | 23 |
| MA | 7 | 555 | C | 0.00 | 3.04 | 1.01 | D | -0.01 | | 1.84 | -1.13 | 2.10 | -0.54 | 102 | 0.59 | 0.13 | 0.72 | | 16 | 24 |
| MA | 7 | 557 | C | 0.07 | -1.55 | 0.21 | D | -0.11 | -0.75 | 0.27 | -0.80 | 0.34 | -2.34 | 130 | 0.02 | 2.24 | 0.13 | -0.63 | 16 | 25 |
| MA | 7 | 552 | C | -0.01 | 1.00 | 0.40 | D | 0.01 | 0.81 | 0.41 | 0.20 | 0.57 | 0.35 | 150 | 0.73 | 0.00 | 0.97 | -0.24 | 16 | 26 |
| MA | 7 | 536 | C | -0.02 | -1.38 | 0.21 | D | 0.03 | -1.58 | 0.26 | 0.20 | 0.33 | 0.60 | 136 | 0.55 | 0.12 | 0.73 | 0.20 | 16 | 27 |
| MA | 7 | 549 | C | 0.02 | -0.24 | 0.26 | D | -0.02 | 0.02 | 0.32 | -0.27 | 0.41 | -0.65 | 134 | 0.52 | 0.14 | 0.71 | 0.29 | 16 | 28 |
| MA | 7 | 541 | C | 0.01 | -1.38 | 0.21 | D | -0.01 | -1.31 | 0.26 | -0.07 | 0.33 | -0.20 | 136 | 0.84 | 0.52 | 0.47 | -0.36 | 16 | 29 |
| MA | 7 | 501 | C | 0.01 | 1.91 | 0.59 | D | -0.01 | 2.94 | 1.02 | -1.03 | 1.18 | -0.87 | 106 | 0.38 | 0.45 | 0.50 | | 16 | 30 |
| MA | 7 | 547 | C | 0.00 | -0.03 | 0.16 | D | 0.01 | -0.03 | 0.18 | 0.00 | 0.24 | 0.00 | 146 | 1.00 | 0.06 | 0.81 | -0.11 | 16 | 31 |
| MA | 7 | 513 | C | -0.02 | | 1.83 | D | 0.02 | 1.77 | 0.60 | 2.48 | 1.93 | 1.29 | 115 | 0.20 | | | | 16 | 32 |
| MA | 7 | 503 | C | -0.01 | -0.60 | 0.23 | D | 0.02 | -0.75 | 0.27 | 0.15 | 0.36 | 0.41 | 141 | 0.68 | 0.53 | 0.47 | 0.40 | 16 | 33 |
| MA | 7 | 1252 | C | 0.00 | 3.03 | 1.01 | D | 0.00 | 2.94 | 1.02 | 0.09 | 1.43 | 0.07 | 152 | 0.95 | 0.16 | 0.69 | | 16 | 34 |
| MA | 7 | 493 | C | -0.02 | -0.24 | 0.26 | D | 0.03 | -0.52 | 0.28 | 0.27 | 0.38 | 0.72 | 146 | 0.47 | 0.04 | 0.84 | 0.15 | 16 | 35 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 561 | C | 0.01 | -0.31 | 0.25 | D | -0.01 | -0.17 | 0.31 | -0.14 | 0.40 | -0.34 | 138 | 0.73 | 0.10 | 0.75 | -0.24 | 16 | 36 |
| MA | 7 | 492 | C | -0.06 | 0.30 | 0.30 | D | 0.08 | -0.60 | 0.28 | 0.89 | 0.41 | 2.16 | 157 | 0.03 | 1.76 | 0.18 | 0.76 | 16 | 37 |
| MA | 7 | 511 | C | -0.01 | -0.18 | 0.26 | D | 0.01 | -0.26 | 0.30 | 0.09 | 0.40 | 0.22 | 143 | 0.83 | 0.00 | 0.97 | 0.10 | 16 | 38 |
| MA | 7 | 616 | C | -0.03 | -1.33 | 0.21 | D | 0.04 | -1.61 | 0.26 | 0.27 | 0.34 | 0.82 | 134 | 0.42 | 2.51 | 0.11 | 0.60 | 16 | 39 |
| MA | 7 | 562 | C | -0.02 | -0.78 | 0.16 | D | 0.03 | -0.91 | 0.19 | 0.13 | 0.24 | 0.52 | 138 | 0.61 | 0.04 | 0.85 | 0.07 | 16 | 40 |
| MA | 7 | 533 | C | 0.00 | -0.54 | 0.24 | D | 0.00 | -0.54 | 0.28 | 0.00 | 0.37 | 0.00 | 137 | 1.00 | 0.02 | 0.88 | -0.16 | 16 | 41 |
| MA | 7 | 467 | C | 0.02 | 0.39 | 0.31 | D | -0.02 | 0.79 | 0.41 | -0.40 | 0.52 | -0.78 | 128 | 0.44 | 0.35 | 0.55 | -0.54 | 16 | 42 |
| MA | 7 | 471 | C | 0.00 | 1.37 | 0.46 | D | 0.01 | 1.19 | 0.48 | 0.18 | 0.67 | 0.27 | 149 | 0.79 | 0.02 | 0.89 | 0.27 | 16 | 43 |
| MA | 7 | 543 | C | 0.00 | 0.37 | 0.31 | D | 0.00 | 0.35 | 0.36 | 0.02 | 0.47 | 0.04 | 142 | 0.97 | 0.00 | 0.95 | 0.18 | 16 | 44 |
| MA | 7 | 474 | C | 0.00 | 0.29 | 0.30 | D | 0.00 | 0.35 | 0.36 | -0.06 | 0.47 | -0.13 | 139 | 0.90 | 0.01 | 0.91 | -0.08 | 16 | 45 |
| MA | 7 | 565 | C | 0.02 | -0.81 | 0.23 | D | -0.02 | -0.62 | 0.28 | -0.20 | 0.36 | -0.55 | 133 | 0.58 | 0.22 | 0.64 | -0.25 | 16 | 46 |
| MA | 7 | 522 | C | 0.01 | 0.30 | 0.30 | D | -0.01 | 0.49 | 0.37 | -0.19 | 0.48 | -0.40 | 135 | 0.69 | 0.03 | 0.87 | -0.28 | 16 | 47 |
| MA | 7 | 489 | C | 0.03 | -0.96 | 0.22 | D | -0.04 | -0.62 | 0.28 | -0.35 | 0.36 | -0.97 | 131 | 0.33 | 1.13 | 0.29 | -0.57 | 16 | 48 |
| MA | 7 | 540 | C | 0.02 | -0.60 | 0.23 | D | -0.04 | -0.28 | 0.30 | -0.32 | 0.38 | -0.85 | 131 | 0.40 | 1.69 | 0.19 | -0.63 | 16 | 49 |
| MA | 7 | 523 | C | -0.09 | -0.86 | 0.22 | D | 0.14 | -1.88 | 0.26 | 1.02 | 0.35 | 2.94 | 138 | 0.00 | 4.45 | 0.04 | 0.98 | 16 | 50 |
| MA | 7 | 527 | C | -0.07 | 0.30 | 0.30 | D | 0.10 | -0.77 | 0.27 | 1.06 | 0.41 | 2.60 | 157 | 0.01 | 2.08 | 0.15 | 0.75 | 16 | 51 |
| MA | 7 | 1241 | C | -0.04 | -0.71 | 0.23 | D | 0.05 | -1.13 | 0.26 | 0.42 | 0.35 | 1.19 | 141 | 0.23 | 2.43 | 0.12 | 0.67 | 16 | 52 |
| MA | 7 | 1244 | C | 0.02 | 0.39 | 0.31 | D | -0.03 | 0.98 | 0.44 | -0.59 | 0.54 | -1.08 | 122 | 0.28 | 0.50 | 0.48 | -0.60 | 16 | 53 |
| MA | 7 | 1264 | C | 0.02 | 1.37 | 0.46 | D | -0.04 | | 1.85 | -2.81 | 1.91 | -1.47 | 70 | 0.15 | 0.98 | 0.32 | | 16 | 54 |
| MA | 7 | 1259 | C | -0.02 | -0.03 | 0.27 | D | 0.02 | -0.28 | 0.30 | 0.25 | 0.41 | 0.61 | 145 | 0.55 | 1.52 | 0.22 | 0.63 | 16 | 55 |
| MA | 7 | 1065 | C | 0.00 | -1.11 | 0.22 | D | 0.00 | -1.11 | 0.26 | 0.00 | 0.34 | 0.00 | 135 | 1.00 | 0.05 | 0.82 | -0.16 | 16 | 56 |
| MA | 8 | 602 | C | -0.01 | 0.16 | 0.32 | D | 0.01 | 0.02 | 0.33 | 0.14 | 0.46 | 0.30 | 131 | 0.77 | 0.02 | 0.90 | 0.18 | 18 | 1 |
| MA | 8 | 594 | C | 0.00 | -0.86 | 0.25 | D | 0.00 | -0.86 | 0.28 | 0.00 | 0.37 | 0.00 | 128 | 1.00 | 0.01 | 0.94 | -0.12 | 18 | 2 |
| MA | 8 | 593 | C | -0.01 | -0.45 | 0.27 | D | 0.01 | -0.53 | 0.29 | 0.08 | 0.40 | 0.20 | 129 | 0.84 | 0.03 | 0.86 | 0.16 | 18 | 3 |
| MA | 8 | 583 | C | -0.06 | 0.65 | 0.24 | D | 0.08 | 0.09 | 0.24 | 0.56 | 0.34 | 1.64 | 132 | 0.10 | 0.96 | 0.33 | 0.44 | 18 | 4 |
| MA | 8 | 544 | C | 0.00 | -0.13 | 0.30 | D | 0.00 | -0.18 | 0.31 | 0.05 | 0.43 | 0.12 | 129 | 0.91 | 0.01 | 0.92 | -0.06 | 18 | 5 |
| MA | 8 | 604 | C | 0.00 | -0.61 | 0.27 | D | 0.00 | -0.61 | 0.28 | 0.00 | 0.39 | 0.00 | 128 | 1.00 | 0.01 | 0.94 | -0.06 | 18 | 6 |
| MA | 8 | 597 | C | -0.01 | -0.87 | 0.25 | D | 0.02 | -1.00 | 0.27 | 0.13 | 0.37 | 0.36 | 128 | 0.72 | 0.02 | 0.88 | 0.04 | 18 | 7 |
| MA | 8 | 1236 | C | -0.03 | 0.16 | 0.32 | D | 0.04 | -0.27 | 0.30 | 0.43 | 0.44 | 0.97 | 132 | 0.33 | 2.83 | 0.09 | 0.85 | 18 | 8 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 569 | C | 0.04 | -0.30 | 0.28 | D | -0.06 | 0.37 | 0.36 | -0.67 | 0.46 | -1.46 | 118 | 0.15 | 2.29 | 0.13 | -0.94 | 18 | 9 |
| MA | 8 | 1230 | C | -0.05 | -0.04 | 0.30 | D | 0.06 | -0.62 | 0.28 | 0.58 | 0.42 | 1.39 | 132 | 0.17 | 0.81 | 0.37 | 0.51 | 18 | 10 |
| MA | 8 | 1135 | C | -0.03 | 0.15 | 0.26 | D | 0.04 | -0.10 | 0.23 | 0.25 | 0.35 | 0.72 | 132 | 0.47 | 2.72 | 0.10 | 1.40 | 18 | 11 |
| MA | 8 | 590 | C | -0.01 | 0.97 | 0.43 | D | 0.02 | 0.65 | 0.39 | 0.32 | 0.58 | 0.55 | 132 | 0.58 | 0.26 | 0.61 | -0.85 | 18 | 12 |
| MA | 8 | 573 | C | -0.01 | -0.13 | 0.30 | D | 0.01 | -0.27 | 0.30 | 0.14 | 0.42 | 0.34 | 130 | 0.74 | 0.19 | 0.66 | 0.31 | 18 | 13 |
| MA | 8 | 596 | C | 0.01 | -1.06 | 0.25 | D | -0.01 | -1.00 | 0.27 | -0.06 | 0.37 | -0.15 | 127 | 0.88 | 0.03 | 0.87 | -0.02 | 18 | 14 |
| MA | 8 | 615 | C | 0.03 | 0.27 | 0.33 | D | -0.03 | 0.81 | 0.41 | -0.55 | 0.53 | -1.03 | 120 | 0.31 | 0.55 | 0.46 | -0.61 | 18 | 15 |
| MA | 8 | 531 | C | -0.05 | 0.65 | 0.38 | D | 0.06 | -0.18 | 0.31 | 0.82 | 0.49 | 1.68 | 131 | 0.10 | 0.88 | 0.35 | 0.67 | 18 | 16 |
| MA | 8 | 601 | C | 0.05 | -0.22 | 0.29 | D | -0.06 | 0.65 | 0.39 | -0.87 | 0.49 | -1.78 | 114 | 0.08 | 2.61 | 0.11 | -1.10 | 18 | 17 |
| MA | 8 | 618 | C | -0.06 | -1.82 | 0.24 | D | 0.07 | -2.44 | 0.30 | 0.62 | 0.38 | 1.63 | 119 | 0.11 | 2.75 | 0.10 | 0.77 | 18 | 18 |
| MA | 8 | 1138 | C | 0.00 | 1.47 | 0.63 | D | 0.00 | 1.36 | 0.52 | 0.11 | 0.81 | 0.13 | 132 | 0.89 | 1.12 | 0.29 | | 18 | 19 |
| MA | 8 | 620 | C | 0.00 | 2.87 | 1.01 | D | 0.00 | 2.95 | 1.02 | -0.08 | 1.43 | -0.06 | 131 | 0.95 | 0.20 | 0.66 | -0.51 | 18 | 20 |
| MA | 8 | 607 | C | 0.04 | -0.67 | 0.26 | D | -0.05 | -0.18 | 0.31 | -0.49 | 0.41 | -1.21 | 123 | 0.23 | 0.01 | 0.94 | -0.08 | 18 | 21 |
| MA | 8 | 1270 | C | -0.02 | 0.06 | 0.31 | D | 0.02 | -0.18 | 0.31 | 0.24 | 0.44 | 0.53 | 131 | 0.59 | 0.14 | 0.71 | 0.36 | 18 | 22 |
| MA | 8 | 1273 | C | -0.04 | 0.51 | 0.36 | D | 0.05 | -0.18 | 0.31 | 0.69 | 0.48 | 1.44 | 132 | 0.15 | 0.60 | 0.44 | 0.58 | 18 | 23 |
| MA | 8 | 576 | C | -0.01 | 1.18 | 0.47 | D | 0.01 | 1.00 | 0.44 | 0.18 | 0.65 | 0.28 | 132 | 0.78 | 0.07 | 0.79 | 0.44 | 18 | 24 |
| MA | 8 | 1269 | C | -0.06 | -0.45 | 0.27 | D | 0.08 | -1.15 | 0.27 | 0.69 | 0.38 | 1.80 | 131 | 0.07 | 1.04 | 0.31 | 0.58 | 18 | 25 |
| MA | 8 | 582 | C | 0.03 | 1.01 | 0.27 | D | -0.03 | 1.33 | 0.31 | -0.33 | 0.42 | -0.78 | 125 | 0.44 | 0.33 | 0.57 | -0.32 | 18 | 26 |
| MA | 8 | 548 | C | -0.02 | 2.86 | 1.01 | D | 0.02 | 1.46 | 0.53 | 1.40 | 1.14 | 1.23 | 109 | 0.22 | 2.06 | 0.15 | | 18 | 27 |
| MA | 8 | 598 | C | 0.02 | -0.87 | 0.25 | D | -0.02 | -0.70 | 0.28 | -0.17 | 0.38 | -0.46 | 127 | 0.65 | 0.06 | 0.80 | 0.19 | 18 | 28 |
| MA | 8 | 617 | C | -0.02 | 0.06 | 0.31 | D | 0.02 | -0.18 | 0.31 | 0.24 | 0.44 | 0.53 | 131 | 0.59 | 0.40 | 0.53 | 0.39 | 18 | 29 |
| MA | 8 | 591 | C | 0.02 | 0.97 | 0.43 | D | -0.03 | 1.78 | 0.60 | -0.81 | 0.74 | -1.09 | 111 | 0.28 | 0.02 | 0.88 | -0.80 | 18 | 30 |
| MA | 8 | 613 | C | -0.03 | 0.23 | 0.20 | D | 0.03 | 0.07 | 0.20 | 0.16 | 0.29 | 0.56 | 131 | 0.57 | 0.85 | 0.36 | 0.43 | 18 | 31 |
| MA | 8 | 592 | C | 0.00 | -0.45 | 0.27 | D | 0.00 | -0.45 | 0.29 | 0.00 | 0.40 | 0.00 | 128 | 1.00 | 0.00 | 0.96 | 0.08 | 18 | 32 |
| MA | 8 | 621 | C | 0.05 | -1.70 | 0.24 | D | -0.06 | -1.22 | 0.27 | -0.48 | 0.36 | -1.34 | 126 | 0.18 | 0.64 | 0.43 | -0.39 | 18 | 33 |
| MA | 8 | 1218 | C | -0.01 | 2.86 | 1.01 | D | 0.02 | 1.78 | 0.60 | 1.08 | 1.18 | 0.92 | 117 | 0.36 | 0.00 | 1.00 | 0.69 | 18 | 34 |
| MA | 8 | 529 | C | -0.01 | 0.27 | 0.33 | D | 0.02 | 0.02 | 0.33 | 0.24 | 0.47 | 0.52 | 132 | 0.60 | 0.01 | 0.94 | 0.10 | 18 | 35 |
| MA | 8 | 1141 | C | -0.01 | -0.93 | 0.25 | D | 0.02 | -1.07 | 0.27 | 0.14 | 0.37 | 0.38 | 128 | 0.70 | 0.03 | 0.85 | 0.02 | 18 | 36 |
| MA | 8 | 584 | C | -0.04 | -0.21 | 0.29 | D | 0.05 | -0.70 | 0.28 | 0.48 | 0.40 | 1.19 | 132 | 0.24 | 0.09 | 0.76 | 0.24 | 18 | 37 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 566 | C | 0.02 | -0.38 | 0.28 | D | -0.03 | -0.08 | 0.32 | -0.30 | 0.42 | -0.70 | 125 | 0.48 | 0.67 | 0.41 | -0.56 | 18 | 38 |
| MA | 8 | 1268 | C | 0.01 | 1.73 | 0.59 | D | -0.01 | 2.22 | 0.73 | -0.50 | 0.94 | -0.53 | 120 | 0.60 | 0.14 | 0.71 | -1.78 | 18 | 39 |
| MA | 8 | 1228 | C | 0.07 | -0.87 | 0.25 | D | -0.09 | 0.02 | 0.33 | -0.89 | 0.41 | -2.16 | 117 | 0.03 | 0.52 | 0.47 | -0.45 | 18 | 40 |
| MA | 8 | 588 | C | 0.01 | 1.42 | 0.52 | D | -0.02 | 2.22 | 0.73 | -0.80 | 0.90 | -0.90 | 111 | 0.37 | 0.02 | 0.90 | -0.89 | 18 | 41 |
| MA | 8 | 612 | C | 0.02 | -0.21 | 0.29 | D | -0.03 | 0.13 | 0.33 | -0.35 | 0.44 | -0.78 | 124 | 0.44 | 0.37 | 0.54 | -0.51 | 18 | 42 |
| MA | 8 | 542 | C | 0.03 | 1.18 | 0.47 | D | -0.03 | 2.95 | 1.02 | -1.78 | 1.12 | -1.58 | 83 | 0.12 | 0.53 | 0.47 | -2.11 | 18 | 43 |
| MA | 8 | 1274 | C | -0.02 | -0.04 | 0.30 | D | 0.03 | -0.36 | 0.30 | 0.32 | 0.43 | 0.76 | 131 | 0.45 | 0.07 | 0.79 | 0.00 | 18 | 44 |
| MA | 8 | 600 | C | -0.02 | -1.30 | 0.24 | D | 0.03 | -1.51 | 0.27 | 0.21 | 0.36 | 0.58 | 127 | 0.56 | 0.01 | 0.93 | 0.05 | 18 | 45 |
| MA | 8 | 614 | C | 0.03 | -1.12 | 0.25 | D | -0.03 | -0.85 | 0.28 | -0.27 | 0.37 | -0.72 | 126 | 0.47 | 0.79 | 0.37 | -0.49 | 18 | 46 |
| MA | 8 | 586 | C | 0.09 | -0.99 | 0.25 | D | -0.12 | 0.13 | 0.33 | -1.13 | 0.42 | -2.70 | 114 | 0.01 | 3.13 | 0.08 | -0.96 | 18 | 47 |
| MA | 8 | 608 | C | 0.04 | -1.24 | 0.24 | D | -0.05 | -0.85 | 0.28 | -0.39 | 0.37 | -1.05 | 125 | 0.30 | 1.90 | 0.17 | -0.55 | 18 | 48 |
| MA | 8 | 611 | C | -0.03 | -1.47 | 0.24 | D | 0.04 | -1.80 | 0.27 | 0.33 | 0.36 | 0.90 | 125 | 0.37 | 0.53 | 0.46 | 0.37 | 18 | 49 |
| MA | 8 | 556 | C | 0.05 | 0.06 | 0.31 | D | -0.07 | 1.21 | 0.48 | -1.15 | 0.57 | -2.01 | 104 | 0.05 | 1.40 | 0.24 | -0.91 | 18 | 50 |
| MA | 8 | 532 | C | 0.05 | -0.67 | 0.26 | D | -0.07 | 0.02 | 0.33 | -0.69 | 0.42 | -1.66 | 120 | 0.10 | 3.47 | 0.06 | -1.08 | 18 | 51 |
| MA | 8 | 530 | C | -0.02 | -0.67 | 0.26 | D | 0.03 | -0.93 | 0.27 | 0.26 | 0.38 | 0.68 | 129 | 0.50 | 1.17 | 0.28 | 0.51 | 18 | 52 |
| MA | 8 | 603 | C | -0.02 | -1.30 | 0.24 | D | 0.03 | -1.51 | 0.27 | 0.21 | 0.36 | 0.58 | 127 | 0.56 | 0.00 | 0.98 | -0.09 | 18 | 53 |
| MA | 8 | 599 | C | 0.00 | -0.13 | 0.30 | D | 0.00 | -0.18 | 0.31 | 0.05 | 0.43 | 0.12 | 129 | 0.91 | 0.04 | 0.85 | 0.03 | 18 | 54 |
| MA | 8 | 589 | C | -0.01 | -0.93 | 0.25 | D | 0.01 | -1.00 | 0.27 | 0.07 | 0.37 | 0.18 | 128 | 0.85 | 0.01 | 0.94 | -0.05 | 18 | 55 |
| MA | 8 | 1140 | C | 0.02 | 1.42 | 0.52 | D | -0.03 | 2.95 | 1.02 | -1.53 | 1.14 | -1.34 | 88 | 0.18 | 2.81 | 0.09 | | 18 | 56 |

## Appendix Table I.5:Mathematics: DIF Gender

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 178 | F | 0.01 | -3.88 | 0.35 | M | -0.02 | -3.40 | 0.32 | -0.48 | 0.47 | -1.02 | 271 | 0.31 | 1.04 | 0.31 | -0.62 | 26 | 1 |
| MA | 3 | 182 | F | 0.06 | -0.31 | 0.18 | M | -0.08 | 0.44 | 0.23 | -0.75 | 0.29 | -2.55 | 233 | 0.01 | 5.26 | 0.02 | -0.76 | 26 | 2 |
| MA | 3 | 206 | F | -0.02 | -1.27 | 0.17 | M | 0.03 | -1.50 | 0.20 | 0.23 | 0.26 | 0.86 | 253 | 0.39 | 0.63 | 0.43 | 0.27 | 26 | 3 |
| MA | 3 | 1303 | F | -0.02 | 1.80 | 0.29 | M | 0.03 | 1.16 | 0.29 | 0.64 | 0.41 | 1.56 | 268 | 0.12 | 0.34 | 0.56 | 0.34 | 26 | 4 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 225 | F | -0.07 | 0.59 | 0.21 | M | 0.09 | -0.30 | 0.20 | 0.89 | 0.29 | 3.09 | 268 | 0.00 | 4.72 | 0.03 | 0.64 | 26 | 5 |
| MA | 3 | 215 | F | -0.02 | -2.09 | 0.19 | M | 0.03 | -2.39 | 0.23 | 0.30 | 0.30 | 0.99 | 246 | 0.32 | 0.73 | 0.39 | 0.33 | 26 | 6 |
| MA | 3 | 169 | F | 0.05 | -0.56 | 0.17 | M | -0.06 | 0.00 | 0.21 | -0.55 | 0.27 | -2.01 | 244 | 0.05 | 5.05 | 0.02 | -0.75 | 26 | 7 |
| MA | 3 | 231 | F | 0.02 | -0.31 | 0.18 | M | -0.03 | -0.05 | 0.21 | -0.26 | 0.28 | -0.95 | 248 | 0.35 | 0.00 | 0.95 | -0.02 | 26 | 8 |
| MA | 3 | 219 | F | -0.02 | 1.36 | 0.25 | M | 0.03 | 0.93 | 0.27 | 0.43 | 0.37 | 1.16 | 262 | 0.25 | 0.01 | 0.93 | -0.04 | 26 | 9 |
| MA | 3 | 202 | F | -0.01 | -2.25 | 0.20 | M | 0.01 | -2.39 | 0.23 | 0.15 | 0.31 | 0.47 | 251 | 0.64 | 0.56 | 0.45 | 0.31 | 26 | 10 |
| MA | 3 | 221 | F | 0.04 | 0.02 | 0.19 | M | -0.05 | 0.55 | 0.24 | -0.53 | 0.30 | -1.75 | 235 | 0.08 | 1.05 | 0.31 | -0.40 | 26 | 11 |
| MA | 3 | 992 | F | 0.00 | 3.37 | 0.52 | M | 0.00 | 3.39 | 0.72 | -0.02 | 0.89 | -0.03 | 226 | 0.98 | 0.84 | 0.36 | | 26 | 12 |
| MA | 3 | 371 | F | -0.02 | 0.91 | 0.22 | M | 0.02 | 0.61 | 0.24 | 0.30 | 0.33 | 0.91 | 259 | 0.36 | 0.40 | 0.53 | 0.29 | 26 | 13 |
| MA | 3 | 173 | F | 0.00 | -0.43 | 0.18 | M | -0.01 | -0.39 | 0.20 | -0.05 | 0.27 | -0.18 | 253 | 0.86 | 0.06 | 0.81 | -0.10 | 26 | 14 |
| MA | 3 | 226 | F | -0.02 | 0.72 | 0.21 | M | 0.03 | 0.39 | 0.23 | 0.34 | 0.31 | 1.07 | 260 | 0.28 | 0.10 | 0.75 | 0.15 | 26 | 15 |
| MA | 3 | 233 | F | 0.00 | 2.51 | 0.37 | M | -0.01 | 3.03 | 0.89 | -0.52 | 0.96 | -0.54 | 158 | 0.59 | 0.76 | 0.38 | -1.07 | 26 | 16 |
| MA | 3 | 174 | F | -0.01 | -0.43 | 0.18 | M | 0.01 | -0.54 | 0.20 | 0.11 | 0.26 | 0.42 | 255 | 0.68 | 0.25 | 0.62 | 0.21 | 26 | 17 |
| MA | 3 | 1036 | F | 0.02 | 1.80 | 0.29 | M | -0.02 | 2.66 | 0.52 | -0.86 | 0.59 | -1.46 | 188 | 0.15 | 1.79 | 0.18 | -0.98 | 26 | 18 |
| MA | 3 | 210 | F | -0.03 | 0.72 | 0.21 | M | 0.04 | 0.23 | 0.22 | 0.49 | 0.31 | 1.59 | 263 | 0.11 | 2.07 | 0.15 | 0.57 | 26 | 19 |
| MA | 3 | 207 | F | -0.06 | -0.74 | 0.17 | M | 0.08 | -1.34 | 0.20 | 0.61 | 0.26 | 2.32 | 254 | 0.02 | 3.41 | 0.06 | 0.57 | 26 | 20 |
| MA | 3 | 212 | F | 0.01 | 0.00 | 0.19 | M | -0.01 | 0.09 | 0.22 | -0.09 | 0.29 | -0.32 | 250 | 0.75 | 0.02 | 0.88 | -0.01 | 26 | 21 |
| MA | 3 | 172 | F | -0.05 | 0.66 | 0.21 | M | 0.07 | -0.09 | 0.21 | 0.75 | 0.30 | 2.52 | 266 | 0.01 | 9.59 | 0.00 | 1.27 | 26 | 22 |
| MA | 3 | 198 | F | 0.03 | -2.36 | 0.21 | M | -0.04 | -1.91 | 0.21 | -0.45 | 0.29 | -1.51 | 264 | 0.13 | 2.55 | 0.11 | -0.54 | 26 | 23 |
| MA | 3 | 368 | F | 0.01 | 0.70 | 0.21 | M | -0.01 | 0.86 | 0.26 | -0.16 | 0.34 | -0.48 | 242 | 0.63 | 0.04 | 0.85 | -0.16 | 26 | 24 |
| MA | 3 | 191 | F | -0.01 | 0.66 | 0.21 | M | 0.01 | 0.54 | 0.24 | 0.12 | 0.32 | 0.37 | 251 | 0.71 | 0.01 | 0.93 | 0.10 | 26 | 25 |
| MA | 3 | 193 | F | 0.04 | -1.37 | 0.18 | M | -0.05 | -0.95 | 0.19 | -0.42 | 0.26 | -1.61 | 254 | 0.11 | 2.22 | 0.14 | -0.43 | 26 | 26 |
| MA | 3 | 189 | F | -0.02 | -1.79 | 0.18 | M | 0.02 | -1.99 | 0.21 | 0.20 | 0.28 | 0.71 | 249 | 0.48 | 0.14 | 0.71 | 0.16 | 26 | 27 |
| MA | 3 | 995 | F | -0.02 | 0.84 | 0.22 | M | 0.02 | 0.54 | 0.24 | 0.30 | 0.33 | 0.93 | 256 | 0.35 | 0.33 | 0.56 | 0.28 | 26 | 28 |
| MA | 3 | 229 | F | 0.02 | -0.65 | 0.17 | M | -0.02 | -0.44 | 0.20 | -0.20 | 0.27 | -0.76 | 250 | 0.45 | 0.03 | 0.87 | -0.08 | 26 | 29 |
| MA | 3 | 374 | F | -0.02 | 0.25 | 0.19 | M | 0.02 | 0.03 | 0.21 | 0.22 | 0.29 | 0.77 | 254 | 0.44 | 0.05 | 0.82 | 0.11 | 26 | 30 |
| MA | 3 | 184 | F | 0.01 | -2.36 | 0.21 | M | -0.02 | -2.18 | 0.22 | -0.18 | 0.30 | -0.58 | 258 | 0.56 | 0.01 | 0.92 | -0.08 | 26 | 31 |
| MA | 3 | 186 | F | 0.03 | -0.40 | 0.18 | M | -0.03 | -0.11 | 0.21 | -0.29 | 0.27 | -1.06 | 246 | 0.29 | 1.60 | 0.21 | -0.39 | 26 | 32 |
| MA | 3 | 1035 | F | 0.00 | 0.39 | 0.20 | M | 0.00 | 0.39 | 0.23 | 0.00 | 0.31 | 0.00 | 249 | 1.00 | 0.39 | 0.53 | -0.26 | 26 | 33 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 201 | F | 0.01 | -1.56 | 0.18 | M | -0.02 | -1.41 | 0.20 | -0.15 | 0.27 | -0.58 | 255 | 0.57 | 0.10 | 0.75 | -0.14 | 26 | 34 |
| MA | 3 | 211 | F | -0.02 | 0.80 | 0.22 | M | 0.03 | 0.48 | 0.24 | 0.31 | 0.32 | 0.97 | 257 | 0.33 | 0.01 | 0.93 | 0.03 | 26 | 35 |
| MA | 3 | 234 | F | -0.01 | 1.91 | 0.28 | M | 0.01 | 1.72 | 0.35 | 0.19 | 0.44 | 0.43 | 236 | 0.67 | 1.16 | 0.28 | 0.90 | 26 | 36 |
| MA | 3 | 216 | F | 0.00 | -0.55 | 0.18 | M | 0.01 | -0.60 | 0.20 | 0.05 | 0.26 | 0.18 | 252 | 0.86 | 0.02 | 0.89 | 0.08 | 26 | 37 |
| MA | 3 | 235 | F | -0.02 | 2.40 | 0.29 | M | 0.02 | 1.88 | 0.30 | 0.52 | 0.42 | 1.25 | 260 | 0.21 | 0.93 | 0.33 | 0.60 | 26 | 38 |
| MA | 3 | 209 | F | 0.02 | 0.14 | 0.19 | M | -0.03 | 0.48 | 0.24 | -0.34 | 0.30 | -1.13 | 239 | 0.26 | 1.07 | 0.30 | -0.38 | 26 | 39 |
| MA | 3 | 213 | F | 0.01 | 0.49 | 0.20 | M | -0.01 | 0.60 | 0.24 | -0.11 | 0.32 | -0.35 | 244 | 0.72 | 0.03 | 0.86 | 0.00 | 26 | 40 |
| MA | 3 | 224 | F | -0.03 | 0.10 | 0.19 | M | 0.04 | -0.24 | 0.21 | 0.34 | 0.28 | 1.21 | 256 | 0.23 | 1.11 | 0.29 | 0.35 | 26 | 41 |
| MA | 3 | 204 | F | 0.03 | -0.49 | 0.18 | M | -0.04 | -0.15 | 0.21 | -0.34 | 0.27 | -1.25 | 246 | 0.21 | 0.81 | 0.37 | -0.34 | 26 | 42 |
| MA | 3 | 230 | F | -0.02 | 0.49 | 0.20 | M | 0.02 | 0.22 | 0.22 | 0.27 | 0.30 | 0.88 | 255 | 0.38 | 0.26 | 0.61 | 0.21 | 26 | 43 |
| MA | 3 | 190 | F | 0.02 | -1.40 | 0.18 | M | -0.03 | -1.14 | 0.20 | -0.26 | 0.26 | -1.01 | 254 | 0.31 | 0.02 | 0.90 | 0.00 | 26 | 44 |
| MA | 3 | 180 | F | 0.03 | -0.59 | 0.18 | M | -0.04 | -0.28 | 0.20 | -0.31 | 0.27 | -1.14 | 247 | 0.26 | 0.75 | 0.39 | -0.28 | 26 | 45 |
| MA | 3 | 188 | F | 0.01 | -0.83 | 0.17 | M | -0.01 | -0.76 | 0.20 | -0.07 | 0.26 | -0.27 | 252 | 0.79 | 0.00 | 0.97 | -0.06 | 26 | 46 |
| MA | 3 | 214 | F | -0.02 | 0.03 | 0.19 | M | 0.02 | -0.19 | 0.21 | 0.23 | 0.28 | 0.81 | 254 | 0.42 | 0.48 | 0.49 | 0.24 | 26 | 47 |
| MA | 3 | 223 | F | 0.02 | -0.37 | 0.18 | M | -0.02 | -0.15 | 0.21 | -0.22 | 0.27 | -0.79 | 247 | 0.43 | 0.73 | 0.39 | -0.28 | 26 | 48 |
| MA | 3 | 205 | F | -0.01 | -0.04 | 0.19 | M | 0.02 | -0.19 | 0.21 | 0.16 | 0.28 | 0.56 | 253 | 0.57 | 0.14 | 0.70 | 0.15 | 26 | 49 |
| MA | 3 | 217 | F | 0.02 | 0.53 | 0.21 | M | -0.03 | 0.92 | 0.27 | -0.40 | 0.34 | -1.17 | 232 | 0.24 | 0.33 | 0.57 | -0.25 | 26 | 50 |
| MA | 3 | 1305 | F | 0.00 | 2.41 | 0.36 | M | 0.00 | 2.41 | 0.47 | 0.00 | 0.59 | 0.00 | 234 | 1.00 | 0.01 | 0.93 | -0.21 | 26 | 51 |
| MA | 3 | 187 | F | -0.04 | -1.31 | 0.18 | M | 0.05 | -1.77 | 0.21 | 0.46 | 0.27 | 1.71 | 247 | 0.09 | 3.66 | 0.06 | 0.63 | 26 | 52 |
| MA | 3 | 208 | F | 0.03 | -0.21 | 0.18 | M | -0.04 | 0.17 | 0.22 | -0.38 | 0.29 | -1.31 | 242 | 0.19 | 0.13 | 0.72 | -0.16 | 26 | 53 |
| MA | 3 | 218 | F | 0.03 | 0.49 | 0.20 | M | -0.04 | 1.00 | 0.27 | -0.51 | 0.34 | -1.50 | 227 | 0.14 | 2.69 | 0.10 | -0.64 | 26 | 54 |
| MA | 3 | 185 | F | 0.00 | 1.70 | 0.28 | M | 0.00 | 1.64 | 0.34 | 0.06 | 0.44 | 0.14 | 244 | 0.89 | 0.01 | 0.92 | 0.14 | 26 | 55 |
| MA | 4 | 135 | F | -0.01 | -1.08 | 0.19 | M | 0.01 | -1.12 | 0.19 | 0.05 | 0.27 | 0.18 | 248 | 0.86 | 0.29 | 0.59 | 0.20 | 28 | 1 |
| MA | 4 | 140 | F | -0.05 | -1.11 | 0.19 | M | 0.06 | -1.61 | 0.20 | 0.50 | 0.27 | 1.83 | 247 | 0.07 | 4.14 | 0.04 | 0.63 | 28 | 2 |
| MA | 4 | 109 | F | -0.05 | -0.70 | 0.18 | M | 0.05 | -1.12 | 0.19 | 0.42 | 0.27 | 1.60 | 248 | 0.11 | 2.67 | 0.10 | 0.52 | 28 | 3 |
| MA | 4 | 257 | F | -0.03 | 0.51 | 0.21 | M | 0.03 | 0.15 | 0.21 | 0.36 | 0.30 | 1.18 | 249 | 0.24 | 0.93 | 0.33 | 0.33 | 28 | 4 |
| MA | 4 | 157 | F | -0.03 | -0.02 | 0.19 | M | 0.03 | -0.31 | 0.20 | 0.29 | 0.28 | 1.03 | 248 | 0.31 | 1.19 | 0.28 | 0.35 | 28 | 5 |
| MA | 4 | 236 | F | 0.02 | -0.21 | 0.19 | M | -0.02 | 0.02 | 0.21 | -0.23 | 0.28 | -0.81 | 245 | 0.42 | 0.73 | 0.39 | -0.31 | 28 | 6 |
| MA | 4 | 170 | F | -0.01 | -0.63 | 0.19 | M | 0.01 | -0.69 | 0.19 | 0.06 | 0.27 | 0.21 | 248 | 0.83 | 0.01 | 0.92 | -0.06 | 28 | 7 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 1009 | F | 0.01 | 0.25 | 0.20 | M | -0.01 | 0.35 | 0.22 | -0.10 | 0.30 | -0.32 | 244 | 0.75 | 0.02 | 0.90 | -0.01 | 28 | 8 |
| MA | 4 | 262 | F | 0.06 | -1.09 | 0.12 | M | -0.07 | -0.83 | 0.13 | -0.26 | 0.18 | -1.45 | 248 | 0.15 | 3.63 | 0.06 | -0.49 | 28 | 9 |
| MA | 4 | 238 | F | 0.05 | -0.53 | 0.19 | M | -0.05 | -0.07 | 0.21 | -0.46 | 0.28 | -1.66 | 244 | 0.10 | 1.28 | 0.26 | -0.34 | 28 | 10 |
| MA | 4 | 268 | F | -0.02 | -1.18 | 0.19 | M | 0.03 | -1.42 | 0.19 | 0.24 | 0.27 | 0.88 | 248 | 0.38 | 0.10 | 0.75 | 0.12 | 28 | 11 |
| MA | 4 | 276 | F | -0.03 | 0.42 | 0.21 | M | 0.03 | 0.11 | 0.21 | 0.31 | 0.30 | 1.05 | 249 | 0.30 | 0.71 | 0.40 | 0.29 | 28 | 12 |
| MA | 4 | 244 | F | -0.01 | 4.48 | 1.01 | M | 0.01 | 2.93 | 0.59 | 1.55 | 1.17 | 1.33 | 208 | 0.18 | 0.36 | 0.55 | 1.16 | 28 | 13 |
| MA | 4 | 166 | F | -0.02 | 0.51 | 0.21 | M | 0.02 | 0.30 | 0.22 | 0.21 | 0.31 | 0.69 | 248 | 0.49 | 1.13 | 0.29 | 0.42 | 28 | 14 |
| MA | 4 | 247 | F | -0.02 | 0.09 | 0.20 | M | 0.02 | -0.15 | 0.20 | 0.24 | 0.28 | 0.85 | 248 | 0.40 | 0.19 | 0.66 | 0.18 | 28 | 15 |
| MA | 4 | 171 | F | 0.04 | -0.46 | 0.19 | M | -0.04 | -0.07 | 0.21 | -0.39 | 0.28 | -1.41 | 244 | 0.16 | 1.19 | 0.28 | -0.35 | 28 | 16 |
| MA | 4 | 1005 | F | 0.01 | -0.97 | 0.19 | M | -0.02 | -0.83 | 0.19 | -0.14 | 0.27 | -0.52 | 248 | 0.60 | 0.03 | 0.87 | -0.09 | 28 | 17 |
| MA | 4 | 254 | F | 0.01 | 0.01 | 0.20 | M | -0.01 | 0.11 | 0.21 | -0.10 | 0.29 | -0.33 | 245 | 0.74 | 0.15 | 0.70 | -0.16 | 28 | 18 |
| MA | 4 | 239 | F | 0.00 | 2.04 | 0.34 | M | 0.00 | 2.04 | 0.40 | 0.00 | 0.52 | 0.00 | 240 | 1.00 | 0.76 | 0.38 | 0.86 | 28 | 19 |
| MA | 4 | 165 | F | -0.01 | -0.42 | 0.19 | M | 0.01 | -0.54 | 0.19 | 0.12 | 0.27 | 0.43 | 248 | 0.66 | 0.00 | 0.97 | 0.05 | 28 | 20 |
| MA | 4 | 265 | F | 0.04 | -1.18 | 0.19 | M | -0.04 | -0.83 | 0.19 | -0.35 | 0.27 | -1.30 | 248 | 0.20 | 3.84 | 0.05 | -0.59 | 28 | 21 |
| MA | 4 | 259 | F | -0.02 | 0.42 | 0.21 | M | 0.02 | 0.15 | 0.21 | 0.27 | 0.30 | 0.89 | 248 | 0.37 | 1.01 | 0.32 | 0.39 | 28 | 22 |
| MA | 4 | 256 | F | -0.04 | 0.25 | 0.20 | M | 0.04 | -0.19 | 0.20 | 0.44 | 0.29 | 1.54 | 249 | 0.12 | 1.24 | 0.26 | 0.39 | 28 | 23 |
| MA | 4 | 250 | F | -0.01 | -0.14 | 0.19 | M | 0.01 | -0.27 | 0.20 | 0.13 | 0.28 | 0.48 | 248 | 0.63 | 0.21 | 0.65 | 0.19 | 28 | 24 |
| MA | 4 | 164 | F | -0.01 | 0.05 | 0.20 | M | 0.01 | -0.02 | 0.21 | 0.08 | 0.29 | 0.26 | 247 | 0.79 | 0.00 | 0.98 | -0.03 | 28 | 25 |
| MA | 4 | 1006 | F | 0.00 | 0.29 | 0.20 | M | 0.00 | 0.25 | 0.22 | 0.04 | 0.30 | 0.15 | 246 | 0.88 | 0.21 | 0.64 | -0.19 | 28 | 26 |
| MA | 4 | 263 | F | 0.03 | -0.63 | 0.19 | M | -0.03 | -0.35 | 0.20 | -0.28 | 0.27 | -1.04 | 246 | 0.30 | 0.84 | 0.36 | -0.30 | 28 | 27 |
| MA | 4 | 261 | F | 0.01 | 0.38 | 0.21 | M | -0.01 | 0.45 | 0.23 | -0.07 | 0.31 | -0.23 | 244 | 0.82 | 0.01 | 0.92 | -0.02 | 28 | 28 |
| MA | 4 | 168 | F | 0.06 | -0.28 | 0.19 | M | -0.07 | 0.40 | 0.23 | -0.68 | 0.30 | -2.30 | 237 | 0.02 | 2.99 | 0.08 | -0.58 | 28 | 29 |
| MA | 4 | 163 | F | 0.00 | -1.41 | 0.19 | M | 0.00 | -1.41 | 0.19 | 0.00 | 0.27 | 0.00 | 248 | 1.00 | 0.00 | 0.95 | 0.02 | 28 | 30 |
| MA | 4 | 103 | F | -0.02 | 0.25 | 0.20 | M | 0.03 | -0.02 | 0.21 | 0.27 | 0.29 | 0.95 | 248 | 0.35 | 2.30 | 0.13 | 0.54 | 28 | 31 |
| MA | 4 | 245 | F | -0.01 | -0.17 | 0.19 | M | 0.01 | -0.23 | 0.20 | 0.06 | 0.28 | 0.21 | 247 | 0.84 | 0.00 | 0.95 | 0.03 | 28 | 32 |
| MA | 4 | 167 | F | 0.01 | -0.84 | 0.18 | M | -0.01 | -0.76 | 0.19 | -0.07 | 0.27 | -0.28 | 248 | 0.78 | 0.17 | 0.68 | -0.14 | 28 | 33 |
| MA | 4 | 1010 | F | 0.02 | 2.81 | 0.46 | M | -0.02 | | 1.83 | -2.46 | 1.89 | -1.30 | 134 | 0.19 | 0.56 | 0.45 | | 28 | 34 |
| MA | 4 | 277 | F | -0.02 | -0.06 | 0.19 | M | 0.03 | -0.31 | 0.20 | 0.25 | 0.28 | 0.89 | 248 | 0.37 | 1.40 | 0.24 | 0.38 | 28 | 35 |
| MA | 4 | 240 | F | -0.01 | 2.81 | 0.46 | M | 0.01 | 2.19 | 0.42 | 0.62 | 0.63 | 0.98 | 249 | 0.33 | 0.77 | 0.38 | 0.86 | 28 | 36 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 264 | F | 0.03 | -0.14 | 0.19 | M | -0.03 | 0.15 | 0.21 | -0.29 | 0.29 | -1.01 | 243 | 0.31 | 3.29 | 0.07 | -0.55 | 28 | 37 |
| MA | 4 | 154 | F | -0.07 | -0.46 | 0.19 | M | 0.08 | -1.12 | 0.19 | 0.66 | 0.27 | 2.49 | 248 | 0.01 | 8.98 | 0.00 | 0.99 | 28 | 38 |
| MA | 4 | 271 | F | 0.01 | -0.70 | 0.18 | M | -0.01 | -0.61 | 0.19 | -0.08 | 0.27 | -0.32 | 248 | 0.75 | 0.00 | 0.96 | 0.06 | 28 | 39 |
| MA | 4 | 253 | F | 0.02 | 0.47 | 0.21 | M | -0.02 | 0.67 | 0.24 | -0.21 | 0.32 | -0.64 | 241 | 0.52 | 0.23 | 0.63 | -0.22 | 28 | 40 |
| MA | 4 | 375 | F | 0.09 | 0.00 | 0.14 | M | -0.10 | 0.54 | 0.17 | -0.54 | 0.22 | -2.48 | 239 | 0.01 | 7.39 | 0.01 | -0.77 | 28 | 41 |
| MA | 4 | 267 | F | -0.04 | -0.97 | 0.19 | M | 0.04 | -1.34 | 0.19 | 0.37 | 0.27 | 1.38 | 248 | 0.17 | 4.75 | 0.03 | 0.74 | 28 | 42 |
| MA | 4 | 242 | F | 0.03 | -3.04 | 0.29 | M | -0.03 | -2.54 | 0.24 | -0.50 | 0.38 | -1.34 | 246 | 0.18 | 1.17 | 0.28 | -0.50 | 28 | 43 |
| MA | 4 | 274 | F | -0.05 | -0.10 | 0.19 | M | 0.05 | -0.58 | 0.19 | 0.48 | 0.27 | 1.75 | 249 | 0.08 | 2.35 | 0.13 | 0.50 | 28 | 44 |
| MA | 4 | 246 | F | 0.01 | 0.38 | 0.21 | M | -0.01 | 0.50 | 0.23 | -0.12 | 0.31 | -0.40 | 243 | 0.69 | 0.00 | 0.97 | -0.07 | 28 | 45 |
| MA | 4 | 373 | F | 0.03 | 0.01 | 0.20 | M | -0.03 | 0.35 | 0.22 | -0.33 | 0.30 | -1.12 | 241 | 0.26 | 1.02 | 0.31 | -0.33 | 28 | 46 |
| MA | 4 | 278 | F | -0.02 | 0.56 | 0.22 | M | 0.03 | 0.25 | 0.22 | 0.31 | 0.31 | 1.00 | 248 | 0.32 | 0.39 | 0.53 | 0.25 | 28 | 47 |
| MA | 4 | 1007 | F | -0.02 | 0.33 | 0.21 | M | 0.02 | 0.15 | 0.21 | 0.18 | 0.30 | 0.61 | 248 | 0.54 | 0.01 | 0.91 | -0.01 | 28 | 48 |
| MA | 4 | 377 | F | -0.02 | 0.01 | 0.20 | M | 0.02 | -0.19 | 0.20 | 0.20 | 0.28 | 0.72 | 248 | 0.47 | 0.41 | 0.52 | 0.24 | 28 | 49 |
| MA | 4 | 243 | F | 0.04 | -0.10 | 0.19 | M | -0.04 | 0.35 | 0.22 | -0.45 | 0.30 | -1.51 | 240 | 0.13 | 2.65 | 0.10 | -0.52 | 28 | 50 |
| MA | 4 | 378 | F | 0.01 | -0.39 | 0.19 | M | -0.01 | -0.27 | 0.20 | -0.12 | 0.27 | -0.43 | 247 | 0.67 | 0.00 | 1.00 | -0.05 | 28 | 51 |
| MA | 4 | 241 | F | 0.00 | 0.36 | 0.21 | M | 0.00 | 0.36 | 0.22 | 0.00 | 0.31 | 0.00 | 246 | 1.00 | 0.23 | 0.63 | -0.19 | 28 | 52 |
| MA | 4 | 252 | F | 0.02 | 2.44 | 0.40 | M | -0.02 | | 1.84 | -2.83 | 1.88 | -1.51 | 130 | 0.13 | 1.22 | 0.27 | | 28 | 53 |
| MA | 4 | 258 | F | 0.00 | -0.46 | 0.19 | M | 0.00 | -0.46 | 0.19 | 0.00 | 0.27 | 0.00 | 247 | 1.00 | 0.00 | 0.96 | -0.05 | 28 | 54 |
| MA | 4 | 249 | F | 0.02 | -0.25 | 0.19 | M | -0.02 | -0.02 | 0.21 | -0.22 | 0.28 | -0.79 | 245 | 0.43 | 0.22 | 0.64 | -0.18 | 28 | 55 |
| MA | 5 | 422 | F | -0.03 | -0.37 | 0.18 | M | 0.04 | -0.69 | 0.20 | 0.32 | 0.27 | 1.17 | 234 | 0.24 | 0.35 | 0.56 | 0.22 | 26 | 1 |
| MA | 5 | 1128 | F | -0.02 | -1.23 | 0.18 | M | 0.03 | -1.46 | 0.21 | 0.22 | 0.27 | 0.82 | 231 | 0.41 | 0.27 | 0.60 | 0.20 | 26 | 2 |
| MA | 5 | 459 | F | 0.00 | 0.78 | 0.23 | M | -0.01 | 0.86 | 0.27 | -0.08 | 0.35 | -0.24 | 226 | 0.81 | 0.01 | 0.94 | 0.04 | 26 | 3 |
| MA | 5 | 455 | F | 0.00 | -0.32 | 0.18 | M | 0.00 | -0.32 | 0.21 | 0.00 | 0.28 | 0.00 | 231 | 1.00 | 0.06 | 0.80 | -0.12 | 26 | 4 |
| MA | 5 | 1217 | F | 0.00 | 1.38 | 0.27 | M | 0.00 | 1.38 | 0.32 | 0.00 | 0.42 | 0.00 | 229 | 1.00 | 0.01 | 0.93 | 0.06 | 26 | 5 |
| MA | 5 | 434 | F | 0.02 | -0.50 | 0.18 | M | -0.03 | -0.27 | 0.21 | -0.23 | 0.28 | -0.84 | 229 | 0.40 | 0.18 | 0.67 | -0.17 | 26 | 6 |
| MA | 5 | 432 | F | -0.03 | 0.68 | 0.22 | M | 0.04 | 0.20 | 0.23 | 0.48 | 0.32 | 1.51 | 241 | 0.13 | 0.64 | 0.42 | 0.34 | 26 | 7 |
| MA | 5 | 417 | F | 0.01 | 1.46 | 0.28 | M | -0.01 | 1.70 | 0.36 | -0.24 | 0.46 | -0.53 | 217 | 0.60 | 0.01 | 0.91 | -0.17 | 26 | 8 |
| MA | 5 | 424 | F | 0.00 | -0.58 | 0.18 | M | 0.00 | -0.58 | 0.20 | 0.00 | 0.27 | 0.00 | 232 | 1.00 | 0.04 | 0.85 | -0.10 | 26 | 9 |
| MA | 5 | 441 | F | 0.00 | -1.35 | 0.18 | M | 0.00 | -1.35 | 0.20 | 0.00 | 0.27 | 0.00 | 233 | 1.00 | 0.01 | 0.92 | 0.02 | 26 | 10 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 1136 | F | -0.01 | -0.02 | 0.19 | M | 0.01 | -0.09 | 0.21 | 0.07 | 0.29 | 0.23 | 232 | 0.82 | 0.03 | 0.86 | -0.10 | 26 | 11 |
| MA | 5 | 431 | F | 0.01 | -0.63 | 0.18 | M | -0.02 | -0.48 | 0.20 | -0.15 | 0.27 | -0.54 | 231 | 0.59 | 0.02 | 0.90 | 0.01 | 26 | 12 |
| MA | 5 | 1223 | F | -0.01 | 1.11 | 0.25 | M | 0.02 | 0.86 | 0.27 | 0.25 | 0.37 | 0.69 | 237 | 0.49 | 0.00 | 0.96 | -0.06 | 26 | 13 |
| MA | 5 | 463 | F | 0.01 | 0.75 | 0.16 | M | -0.01 | 0.82 | 0.20 | -0.08 | 0.26 | -0.30 | 221 | 0.77 | 0.53 | 0.47 | 0.34 | 26 | 14 |
| MA | 5 | 413 | F | 0.02 | -1.33 | 0.18 | M | -0.03 | -1.09 | 0.20 | -0.24 | 0.27 | -0.89 | 234 | 0.37 | 0.70 | 0.40 | -0.29 | 26 | 15 |
| MA | 5 | 442 | F | 0.03 | 0.05 | 0.19 | M | -0.04 | 0.42 | 0.24 | -0.37 | 0.31 | -1.20 | 221 | 0.23 | 0.33 | 0.57 | -0.23 | 26 | 16 |
| MA | 5 | 450 | F | 0.02 | -0.16 | 0.19 | M | -0.03 | 0.10 | 0.22 | -0.27 | 0.29 | -0.92 | 226 | 0.36 | 0.28 | 0.59 | -0.23 | 26 | 17 |
| MA | 5 | 1202 | F | 0.00 | 0.36 | 0.20 | M | 0.00 | 0.36 | 0.23 | 0.00 | 0.31 | 0.00 | 230 | 1.00 | 0.66 | 0.42 | 0.36 | 26 | 18 |
| MA | 5 | 1130 | F | -0.07 | -0.23 | 0.18 | M | 0.09 | -0.97 | 0.20 | 0.73 | 0.27 | 2.70 | 236 | 0.01 | 8.20 | 0.00 | 1.02 | 26 | 19 |
| MA | 5 | 414 | F | 0.05 | -0.39 | 0.08 | M | -0.07 | -0.27 | 0.10 | -0.12 | 0.13 | -0.94 | 227 | 0.35 | 0.84 | 0.36 | -0.29 | 26 | 20 |
| MA | 5 | 444 | F | -0.03 | -0.83 | 0.18 | M | 0.03 | -1.09 | 0.20 | 0.25 | 0.27 | 0.94 | 232 | 0.35 | 0.09 | 0.76 | 0.12 | 26 | 21 |
| MA | 5 | 460 | F | 0.04 | -1.77 | 0.19 | M | -0.05 | -1.37 | 0.20 | -0.40 | 0.28 | -1.41 | 238 | 0.16 | 1.07 | 0.30 | -0.39 | 26 | 22 |
| MA | 5 | 1232 | F | 0.01 | 0.93 | 0.24 | M | -0.01 | 1.09 | 0.29 | -0.16 | 0.37 | -0.44 | 223 | 0.66 | 0.81 | 0.37 | -0.50 | 26 | 23 |
| MA | 5 | 420 | F | 0.01 | 2.68 | 0.46 | M | -0.01 | 3.33 | 0.72 | -0.66 | 0.86 | -0.77 | 189 | 0.44 | 0.10 | 0.75 | -0.21 | 26 | 24 |
| MA | 5 | 462 | F | -0.02 | 0.48 | 0.21 | M | 0.03 | 0.20 | 0.23 | 0.28 | 0.31 | 0.91 | 236 | 0.37 | 0.17 | 0.68 | 0.18 | 26 | 25 |
| MA | 5 | 436 | F | 0.00 | 0.15 | 0.20 | M | 0.00 | 0.15 | 0.22 | 0.00 | 0.30 | 0.00 | 231 | 1.00 | 0.10 | 0.76 | 0.17 | 26 | 26 |
| MA | 5 | 1229 | F | 0.04 | 0.87 | 0.23 | M | -0.06 | 1.99 | 0.40 | -1.12 | 0.46 | -2.41 | 177 | 0.02 | 5.34 | 0.02 | -1.57 | 26 | 27 |
| MA | 5 | 457 | F | 0.00 | -0.70 | 0.18 | M | 0.00 | -0.70 | 0.20 | 0.00 | 0.27 | 0.00 | 232 | 1.00 | 0.00 | 0.98 | -0.05 | 26 | 28 |
| MA | 5 | 439 | F | -0.07 | 0.44 | 0.21 | M | 0.08 | -0.35 | 0.21 | 0.79 | 0.29 | 2.70 | 242 | 0.01 | 6.15 | 0.01 | 0.83 | 26 | 29 |
| MA | 5 | 440 | F | -0.02 | 1.45 | 0.28 | M | 0.02 | 1.09 | 0.29 | 0.36 | 0.40 | 0.90 | 240 | 0.37 | 0.04 | 0.85 | 0.17 | 26 | 30 |
| MA | 5 | 415 | F | -0.01 | -0.55 | 0.18 | M | 0.01 | -0.65 | 0.20 | 0.10 | 0.27 | 0.37 | 233 | 0.71 | 0.18 | 0.67 | 0.18 | 26 | 31 |
| MA | 5 | 429 | F | -0.02 | 0.53 | 0.21 | M | 0.02 | 0.31 | 0.23 | 0.22 | 0.31 | 0.70 | 235 | 0.49 | 0.93 | 0.33 | 0.41 | 26 | 32 |
| MA | 5 | 445 | F | 0.01 | 0.44 | 0.21 | M | -0.01 | 0.53 | 0.24 | -0.10 | 0.32 | -0.30 | 227 | 0.77 | 0.02 | 0.88 | -0.02 | 26 | 33 |
| MA | 5 | 412 | F | -0.02 | 0.53 | 0.21 | M | 0.02 | 0.31 | 0.23 | 0.22 | 0.31 | 0.70 | 235 | 0.49 | 0.33 | 0.56 | 0.33 | 26 | 34 |
| MA | 5 | 426 | F | 0.02 | -0.14 | 0.19 | M | -0.03 | 0.15 | 0.22 | -0.29 | 0.29 | -1.00 | 225 | 0.32 | 0.49 | 0.48 | -0.28 | 26 | 35 |
| MA | 5 | 448 | F | 0.01 | -0.45 | 0.18 | M | -0.01 | -0.35 | 0.21 | -0.09 | 0.28 | -0.34 | 231 | 0.73 | 0.00 | 0.99 | -0.05 | 26 | 36 |
| MA | 5 | 421 | F | -0.02 | -1.28 | 0.18 | M | 0.03 | -1.50 | 0.21 | 0.21 | 0.27 | 0.78 | 231 | 0.44 | 0.03 | 0.87 | 0.09 | 26 | 37 |
| MA | 5 | 446 | F | -0.03 | -0.71 | 0.18 | M | 0.04 | -1.01 | 0.20 | 0.30 | 0.27 | 1.12 | 233 | 0.27 | 0.28 | 0.59 | 0.20 | 26 | 38 |
| MA | 5 | 1093 | F | -0.01 | 1.63 | 0.29 | M | 0.01 | 1.41 | 0.30 | 0.22 | 0.41 | 0.52 | 239 | 0.60 | 0.21 | 0.65 | 0.36 | 26 | 39 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 443 | F | 0.00 | 0.48 | 0.21 | M | 0.01 | 0.42 | 0.24 | 0.07 | 0.32 | 0.21 | 232 | 0.84 | 0.11 | 0.73 | 0.18 | 26 | 40 |
| MA | 5 | 454 | F | -0.01 | 0.04 | 0.19 | M | 0.01 | -0.04 | 0.22 | 0.08 | 0.29 | 0.28 | 232 | 0.78 | 0.41 | 0.52 | 0.27 | 26 | 41 |
| MA | 5 | 425 | F | 0.00 | -0.25 | 0.19 | M | 0.00 | -0.27 | 0.21 | 0.02 | 0.28 | 0.08 | 231 | 0.94 | 0.54 | 0.46 | -0.27 | 26 | 42 |
| MA | 5 | 419 | F | -0.01 | 0.61 | 0.22 | M | 0.01 | 0.47 | 0.24 | 0.13 | 0.33 | 0.41 | 233 | 0.68 | 0.49 | 0.48 | 0.30 | 26 | 43 |
| MA | 5 | 433 | F | -0.02 | -1.81 | 0.20 | M | 0.02 | -2.05 | 0.23 | 0.24 | 0.30 | 0.80 | 228 | 0.42 | 1.29 | 0.26 | 0.49 | 26 | 44 |
| MA | 5 | 458 | F | 0.00 | -2.19 | 0.21 | M | 0.00 | -2.19 | 0.23 | 0.00 | 0.32 | 0.00 | 232 | 1.00 | 0.10 | 0.75 | -0.16 | 26 | 45 |
| MA | 5 | 416 | F | -0.01 | -0.50 | 0.18 | M | 0.01 | -0.56 | 0.20 | 0.06 | 0.27 | 0.23 | 232 | 0.81 | 0.00 | 0.96 | -0.04 | 26 | 46 |
| MA | 5 | 456 | F | 0.01 | -0.47 | 0.18 | M | -0.02 | -0.31 | 0.21 | -0.16 | 0.28 | -0.56 | 230 | 0.58 | 0.00 | 0.98 | -0.06 | 26 | 47 |
| MA | 5 | 449 | F | 0.00 | 0.71 | 0.22 | M | 0.00 | 0.71 | 0.26 | 0.00 | 0.34 | 0.00 | 228 | 1.00 | 0.04 | 0.84 | 0.14 | 26 | 48 |
| MA | 5 | 435 | F | 0.02 | 0.12 | 0.11 | M | -0.02 | 0.18 | 0.12 | -0.07 | 0.16 | -0.41 | 225 | 0.69 | 0.37 | 0.54 | -0.19 | 26 | 49 |
| MA | 5 | 452 | F | 0.03 | -0.57 | 0.18 | M | -0.04 | -0.27 | 0.21 | -0.30 | 0.28 | -1.08 | 228 | 0.28 | 0.23 | 0.63 | -0.20 | 26 | 50 |
| MA | 5 | 1187 | F | -0.03 | -0.19 | 0.19 | M | 0.03 | -0.48 | 0.20 | 0.29 | 0.28 | 1.04 | 234 | 0.30 | 0.86 | 0.35 | 0.32 | 26 | 51 |
| MA | 5 | 451 | F | 0.01 | -0.33 | 0.18 | M | -0.01 | -0.27 | 0.21 | -0.06 | 0.28 | -0.23 | 230 | 0.82 | 0.09 | 0.77 | -0.14 | 26 | 52 |
| MA | 5 | 1058 | F | 0.01 | -0.09 | 0.19 | M | -0.02 | 0.05 | 0.22 | -0.14 | 0.29 | -0.48 | 228 | 0.63 | 0.00 | 0.97 | -0.06 | 26 | 53 |
| MA | 5 | 464 | F | 0.05 | 0.81 | 0.16 | M | -0.07 | 1.35 | 0.23 | -0.54 | 0.28 | -1.94 | 205 | 0.05 | 3.51 | 0.06 | -0.73 | 26 | 54 |
| MA | 5 | 437 | F | 0.01 | -0.09 | 0.19 | M | -0.01 | 0.00 | 0.22 | -0.09 | 0.29 | -0.31 | 229 | 0.75 | 0.25 | 0.62 | -0.20 | 26 | 55 |
| MA | 5 | 1121 | F | 0.02 | -0.33 | 0.18 | M | -0.03 | -0.09 | 0.21 | -0.24 | 0.28 | -0.86 | 227 | 0.39 | 0.49 | 0.48 | -0.27 | 26 | 56 |
| MA | 5 | 453 | F | 0.00 | 0.80 | 0.23 | M | 0.00 | 0.80 | 0.26 | 0.00 | 0.35 | 0.00 | 229 | 1.00 | 0.00 | 0.98 | -0.10 | 26 | 57 |
| MA | 5 | 428 | F | -0.01 | 0.30 | 0.20 | M | 0.01 | 0.20 | 0.23 | 0.10 | 0.30 | 0.32 | 232 | 0.75 | 0.01 | 0.93 | -0.09 | 26 | 58 |
| MA | 6 | 581 | F | 0.00 | 0.10 | 0.27 | M | 0.00 | 0.10 | 0.31 | 0.00 | 0.41 | 0.00 | 151 | 1.00 | 0.00 | 0.97 | 0.13 | 19 | 1 |
| MA | 6 | 568 | F | 0.02 | -1.21 | 0.22 | M | -0.02 | -1.03 | 0.26 | -0.18 | 0.34 | -0.53 | 151 | 0.60 | 0.36 | 0.55 | -0.30 | 19 | 2 |
| MA | 6 | 579 | F | -0.01 | -0.41 | 0.24 | M | 0.01 | -0.48 | 0.27 | 0.07 | 0.36 | 0.19 | 151 | 0.85 | 0.00 | 0.95 | 0.11 | 19 | 3 |
| MA | 6 | 470 | F | -0.03 | 1.02 | 0.35 | M | 0.04 | 0.40 | 0.33 | 0.62 | 0.48 | 1.30 | 159 | 0.20 | 2.22 | 0.14 | 1.13 | 19 | 4 |
| MA | 6 | 468 | F | 0.04 | -0.96 | 0.23 | M | -0.05 | -0.55 | 0.27 | -0.40 | 0.35 | -1.15 | 148 | 0.25 | 1.12 | 0.29 | -0.57 | 19 | 5 |
| MA | 6 | 1200 | F | -0.02 | -0.35 | 0.24 | M | 0.02 | -0.55 | 0.27 | 0.20 | 0.36 | 0.56 | 153 | 0.58 | 0.02 | 0.88 | 0.14 | 19 | 6 |
| MA | 6 | 551 | F | -0.01 | -0.29 | 0.25 | M | 0.01 | -0.41 | 0.28 | 0.11 | 0.37 | 0.31 | 152 | 0.76 | 0.02 | 0.88 | -0.03 | 19 | 7 |
| MA | 6 | 480 | F | 0.02 | -0.29 | 0.25 | M | -0.03 | 0.00 | 0.30 | -0.30 | 0.39 | -0.76 | 146 | 0.45 | 2.01 | 0.16 | -0.74 | 19 | 8 |
| MA | 6 | 469 | F | 0.02 | -0.17 | 0.12 | M | -0.02 | -0.15 | 0.14 | -0.02 | 0.18 | -0.13 | 148 | 0.90 | 0.14 | 0.71 | 0.15 | 19 | 9 |
| MA | 6 | 585 | F | -0.01 | 2.81 | 0.72 | M | 0.01 | 2.20 | 0.61 | 0.61 | 0.95 | 0.64 | 159 | 0.52 | 0.04 | 0.84 | 0.85 | 19 | 10 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 578 | F | -0.01 | -0.35 | 0.24 | M | 0.01 | -0.48 | 0.27 | 0.13 | 0.37 | 0.35 | 152 | 0.73 | 0.00 | 0.98 | -0.09 | 19 | 11 |
| MA | 6 | 1251 | F | 0.00 | 1.42 | 0.41 | M | 0.00 | 1.40 | 0.45 | 0.02 | 0.61 | 0.04 | 153 | 0.97 | 0.01 | 0.91 | -0.51 | 19 | 12 |
| MA | 6 | 490 | F | 0.04 | -0.58 | 0.24 | M | -0.05 | -0.08 | 0.29 | -0.50 | 0.38 | -1.33 | 144 | 0.19 | 1.22 | 0.27 | -0.51 | 19 | 13 |
| MA | 6 | 1256 | F | -0.05 | 0.59 | 0.31 | M | 0.06 | -0.17 | 0.29 | 0.76 | 0.42 | 1.81 | 159 | 0.07 | 1.07 | 0.30 | 0.62 | 19 | 14 |
| MA | 6 | 502 | F | 0.02 | 0.45 | 0.21 | M | -0.02 | 0.59 | 0.24 | -0.15 | 0.32 | -0.47 | 149 | 0.64 | 0.08 | 0.77 | 0.12 | 19 | 15 |
| MA | 6 | 484 | F | -0.05 | 1.15 | 0.36 | M | 0.07 | 0.10 | 0.31 | 1.05 | 0.48 | 2.21 | 159 | 0.03 | 2.55 | 0.11 | 1.26 | 19 | 16 |
| MA | 6 | 1131 | F | 0.09 | -0.14 | 0.12 | M | -0.11 | 0.17 | 0.16 | -0.30 | 0.20 | -1.55 | 139 | 0.12 | 0.25 | 0.62 | -0.26 | 19 | 17 |
| MA | 6 | 1062 | F | -0.02 | 0.63 | 0.19 | M | 0.03 | 0.46 | 0.20 | 0.18 | 0.28 | 0.63 | 155 | 0.53 | 1.66 | 0.20 | 0.96 | 19 | 18 |
| MA | 6 | 537 | F | 0.00 | -1.08 | 0.23 | M | 0.00 | -1.08 | 0.25 | 0.00 | 0.34 | 0.00 | 151 | 1.00 | 0.00 | 0.97 | -0.09 | 19 | 19 |
| MA | 6 | 567 | F | -0.07 | -0.29 | 0.25 | M | 0.08 | -1.03 | 0.26 | 0.74 | 0.36 | 2.08 | 156 | 0.04 | 1.17 | 0.28 | 0.52 | 19 | 20 |
| MA | 6 | 577 | F | 0.03 | 0.69 | 0.31 | M | -0.04 | 1.40 | 0.45 | -0.71 | 0.55 | -1.30 | 132 | 0.20 | 0.42 | 0.52 | -0.48 | 19 | 21 |
| MA | 6 | 1142 | F | 0.00 | -0.99 | 0.23 | M | -0.01 | -0.97 | 0.26 | -0.02 | 0.34 | -0.07 | 151 | 0.94 | 0.06 | 0.81 | -0.16 | 19 | 22 |
| MA | 6 | 487 | F | -0.03 | 0.33 | 0.28 | M | 0.04 | -0.17 | 0.29 | 0.50 | 0.40 | 1.24 | 157 | 0.22 | 1.09 | 0.30 | 0.53 | 19 | 23 |
| MA | 6 | 580 | F | -0.02 | 0.18 | 0.27 | M | 0.02 | -0.08 | 0.29 | 0.26 | 0.40 | 0.65 | 154 | 0.52 | 0.04 | 0.84 | -0.18 | 19 | 24 |
| MA | 6 | 526 | F | -0.01 | -0.69 | 0.23 | M | 0.01 | -0.76 | 0.26 | 0.07 | 0.35 | 0.21 | 152 | 0.84 | 0.03 | 0.86 | 0.01 | 19 | 25 |
| MA | 6 | 1253 | F | 0.04 | 0.03 | 0.26 | M | -0.04 | 0.63 | 0.35 | -0.59 | 0.44 | -1.35 | 138 | 0.18 | 0.66 | 0.42 | -0.51 | 19 | 26 |
| MA | 6 | 534 | F | 0.00 | 0.41 | 0.29 | M | 0.00 | 0.41 | 0.33 | 0.00 | 0.44 | 0.00 | 151 | 1.00 | 0.05 | 0.83 | 0.02 | 19 | 27 |
| MA | 6 | 1225 | F | -0.03 | 2.81 | 0.72 | M | 0.04 | 1.21 | 0.42 | 1.60 | 0.84 | 1.91 | 139 | 0.06 | 1.74 | 0.19 | | 19 | 28 |
| MA | 6 | 520 | F | -0.04 | 0.33 | 0.28 | M | 0.05 | -0.25 | 0.28 | 0.58 | 0.40 | 1.45 | 158 | 0.15 | 1.24 | 0.26 | 0.61 | 19 | 29 |
| MA | 6 | 499 | F | -0.05 | 0.59 | 0.31 | M | 0.07 | -0.25 | 0.28 | 0.84 | 0.42 | 2.02 | 159 | 0.04 | 1.03 | 0.31 | 0.58 | 19 | 30 |
| MA | 6 | 535 | F | -0.04 | -0.96 | 0.23 | M | 0.05 | -1.35 | 0.25 | 0.39 | 0.34 | 1.16 | 152 | 0.25 | 0.33 | 0.56 | 0.28 | 19 | 31 |
| MA | 6 | 571 | F | -0.08 | -1.61 | 0.23 | M | 0.10 | -2.50 | 0.28 | 0.88 | 0.36 | 2.45 | 144 | 0.02 | 9.75 | 0.00 | 1.57 | 19 | 32 |
| MA | 6 | 553 | F | 0.01 | -0.23 | 0.25 | M | -0.01 | -0.08 | 0.29 | -0.15 | 0.39 | -0.38 | 148 | 0.70 | 0.00 | 0.98 | -0.11 | 19 | 33 |
| MA | 6 | 563 | F | 0.00 | -0.63 | 0.23 | M | 0.00 | -0.63 | 0.27 | 0.00 | 0.35 | 0.00 | 151 | 1.00 | 0.15 | 0.70 | -0.25 | 19 | 34 |
| MA | 6 | 550 | F | -0.01 | -0.75 | 0.23 | M | 0.01 | -0.83 | 0.26 | 0.09 | 0.35 | 0.25 | 152 | 0.81 | 0.13 | 0.72 | 0.25 | 19 | 35 |
| MA | 6 | 515 | F | -0.03 | -0.58 | 0.24 | M | 0.04 | -0.90 | 0.26 | 0.32 | 0.35 | 0.91 | 153 | 0.37 | 1.46 | 0.23 | 0.55 | 19 | 36 |
| MA | 6 | 509 | F | 0.04 | -1.16 | 0.22 | M | -0.05 | -0.70 | 0.26 | -0.47 | 0.35 | -1.34 | 148 | 0.18 | 0.73 | 0.39 | -0.37 | 19 | 37 |
| MA | 6 | 495 | F | -0.02 | -0.69 | 0.23 | M | 0.02 | -0.90 | 0.26 | 0.21 | 0.35 | 0.60 | 152 | 0.55 | 0.33 | 0.56 | 0.28 | 19 | 38 |
| MA | 6 | 574 | F | 0.03 | -0.64 | 0.23 | M | -0.04 | -0.25 | 0.28 | -0.39 | 0.37 | -1.06 | 146 | 0.29 | 0.52 | 0.47 | -0.44 | 19 | 39 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 478 | F | 0.07 | -1.01 | 0.23 | M | -0.09 | -0.17 | 0.29 | -0.84 | 0.37 | -2.29 | 142 | 0.02 | 5.87 | 0.02 | -1.28 | 19 | 40 |
| MA | 6 | 575 | F | 0.02 | 1.44 | 0.41 | M | -0.02 | 2.20 | 0.61 | -0.76 | 0.73 | -1.04 | 127 | 0.30 | 0.93 | 0.33 | | 19 | 41 |
| MA | 6 | 491 | F | 0.00 | 0.23 | 0.16 | M | 0.00 | 0.23 | 0.18 | 0.00 | 0.24 | 0.00 | 150 | 1.00 | 0.52 | 0.47 | -0.28 | 19 | 42 |
| MA | 6 | 512 | F | 0.03 | 0.25 | 0.28 | M | -0.03 | 0.75 | 0.36 | -0.50 | 0.46 | -1.09 | 140 | 0.28 | 0.00 | 0.95 | -0.14 | 19 | 43 |
| MA | 6 | 521 | F | 0.04 | -0.03 | 0.26 | M | -0.05 | 0.63 | 0.35 | -0.66 | 0.44 | -1.51 | 137 | 0.13 | 1.50 | 0.22 | -0.61 | 19 | 44 |
| MA | 6 | 1101 | F | 0.02 | -1.01 | 0.23 | M | -0.03 | -0.76 | 0.26 | -0.24 | 0.35 | -0.70 | 150 | 0.48 | 0.38 | 0.54 | -0.31 | 19 | 45 |
| MA | 6 | 572 | F | -0.02 | -0.17 | 0.25 | M | 0.02 | -0.41 | 0.28 | 0.24 | 0.37 | 0.64 | 153 | 0.52 | 0.02 | 0.88 | 0.15 | 19 | 46 |
| MA | 6 | 476 | F | 0.00 | 1.03 | 0.35 | M | 0.00 | 1.03 | 0.40 | 0.00 | 0.53 | 0.00 | 150 | 1.00 | 0.01 | 0.94 | -0.22 | 19 | 47 |
| MA | 6 | 1203 | F | 0.02 | -1.16 | 0.22 | M | -0.02 | -0.97 | 0.26 | -0.20 | 0.34 | -0.57 | 150 | 0.57 | 0.00 | 0.97 | -0.08 | 19 | 48 |
| MA | 6 | 524 | F | 0.03 | 1.28 | 0.38 | M | -0.04 | 2.65 | 0.74 | -1.37 | 0.83 | -1.65 | 108 | 0.10 | 1.05 | 0.31 | -1.62 | 19 | 49 |
| MA | 6 | 514 | F | -0.02 | -0.91 | 0.23 | M | 0.02 | -1.10 | 0.25 | 0.19 | 0.34 | 0.56 | 152 | 0.58 | 0.01 | 0.93 | 0.04 | 19 | 50 |
| MA | 6 | 1063 | F | 0.06 | -1.16 | 0.22 | M | -0.07 | -0.55 | 0.27 | -0.61 | 0.35 | -1.73 | 147 | 0.09 | 1.49 | 0.22 | -0.53 | 19 | 51 |
| MA | 6 | 570 | F | -0.01 | 2.07 | 0.52 | M | 0.01 | 1.62 | 0.49 | 0.45 | 0.71 | 0.63 | 159 | 0.53 | | | | 19 | 52 |
| MA | 6 | 545 | F | -0.01 | 0.03 | 0.26 | M | 0.02 | -0.17 | 0.29 | 0.20 | 0.39 | 0.52 | 153 | 0.61 | 0.05 | 0.83 | -0.01 | 19 | 53 |
| MA | 6 | 517 | F | -0.03 | -0.03 | 0.26 | M | 0.04 | -0.48 | 0.27 | 0.45 | 0.38 | 1.18 | 156 | 0.24 | 3.91 | 0.05 | 1.11 | 19 | 54 |
| MA | 6 | 466 | F | 0.01 | 0.90 | 0.34 | M | -0.02 | 1.21 | 0.42 | -0.31 | 0.54 | -0.58 | 143 | 0.57 | 0.06 | 0.81 | 0.02 | 19 | 55 |
| MA | 6 | 482 | F | -0.01 | 3.52 | 1.01 | M | 0.02 | 2.20 | 0.61 | 1.32 | 1.18 | 1.12 | 141 | 0.26 | 0.37 | 0.54 | | 19 | 56 |
| MA | 6 | 1254 | F | 0.06 | -1.31 | 0.22 | M | -0.07 | -0.70 | 0.26 | -0.62 | 0.35 | -1.78 | 148 | 0.08 | 1.31 | 0.25 | -0.53 | 19 | 57 |
| MA | 7 | 475 | F | 0.00 | 0.38 | 0.33 | M | 0.00 | 0.38 | 0.34 | 0.00 | 0.47 | 0.00 | 159 | 1.00 | 0.00 | 0.99 | -0.17 | 14 | 1 |
| MA | 7 | 564 | F | -0.06 | 0.27 | 0.32 | M | 0.06 | -0.54 | 0.26 | 0.81 | 0.41 | 1.97 | 152 | 0.05 | 2.45 | 0.12 | 0.77 | 14 | 2 |
| MA | 7 | 505 | F | 0.00 | -0.84 | 0.24 | M | 0.00 | -0.80 | 0.25 | -0.04 | 0.35 | -0.12 | 159 | 0.90 | 0.00 | 0.98 | 0.06 | 14 | 3 |
| MA | 7 | 516 | F | -0.02 | 1.07 | 0.43 | M | 0.02 | 0.50 | 0.35 | 0.56 | 0.55 | 1.02 | 152 | 0.31 | 0.17 | 0.68 | 0.58 | 14 | 4 |
| MA | 7 | 508 | F | -0.05 | -1.50 | 0.23 | M | 0.04 | -1.89 | 0.23 | 0.39 | 0.33 | 1.19 | 159 | 0.23 | 0.43 | 0.51 | 0.30 | 14 | 5 |
| MA | 7 | 525 | F | 0.01 | -0.90 | 0.24 | M | -0.01 | -0.80 | 0.25 | -0.10 | 0.34 | -0.29 | 159 | 0.77 | 0.00 | 0.99 | -0.08 | 14 | 6 |
| MA | 7 | 1134 | F | -0.03 | -1.18 | 0.23 | M | 0.03 | -1.41 | 0.23 | 0.24 | 0.33 | 0.72 | 159 | 0.47 | 0.00 | 0.98 | 0.07 | 14 | 7 |
| MA | 7 | 1066 | F | -0.03 | | 1.83 | M | 0.03 | 1.31 | 0.47 | 2.85 | 1.90 | 1.50 | 89 | 0.14 | 1.26 | 0.26 | | 14 | 8 |
| MA | 7 | 488 | F | 0.01 | -0.25 | 0.27 | M | -0.01 | -0.18 | 0.28 | -0.07 | 0.39 | -0.18 | 159 | 0.85 | 0.02 | 0.88 | -0.03 | 14 | 9 |
| MA | 7 | 477 | F | -0.01 | 0.49 | 0.34 | M | 0.01 | 0.39 | 0.34 | 0.10 | 0.48 | 0.21 | 159 | 0.84 | 0.00 | 0.99 | 0.14 | 14 | 10 |
| MA | 7 | 494 | F | -0.02 | -0.59 | 0.25 | M | 0.02 | -0.80 | 0.25 | 0.20 | 0.35 | 0.57 | 159 | 0.57 | 0.01 | 0.93 | -0.04 | 14 | 11 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 506 | F | -0.01 | -0.32 | 0.27 | M | 0.01 | -0.47 | 0.26 | 0.15 | 0.38 | 0.40 | 159 | 0.69 | 0.10 | 0.75 | -0.21 | 14 | 12 |
| MA | 7 | 496 | F | 0.00 | -0.85 | 0.24 | M | 0.00 | -0.85 | 0.24 | 0.00 | 0.34 | 0.00 | 159 | 1.00 | 0.01 | 0.91 | 0.02 | 14 | 13 |
| MA | 7 | 479 | F | 0.00 | 0.17 | 0.31 | M | 0.00 | 0.17 | 0.31 | 0.00 | 0.44 | 0.00 | 159 | 1.00 | 0.01 | 0.93 | 0.08 | 14 | 14 |
| MA | 7 | 483 | F | 0.01 | 0.08 | 0.30 | M | -0.01 | 0.18 | 0.31 | -0.10 | 0.43 | -0.23 | 159 | 0.82 | 0.00 | 0.97 | 0.09 | 14 | 15 |
| MA | 7 | 559 | F | -0.09 | 0.17 | 0.31 | M | 0.09 | -0.86 | 0.24 | 1.03 | 0.39 | 2.61 | 151 | 0.01 | 6.23 | 0.01 | 1.19 | 14 | 16 |
| MA | 7 | 486 | F | 0.02 | -0.66 | 0.25 | M | -0.02 | -0.40 | 0.27 | -0.25 | 0.37 | -0.69 | 159 | 0.49 | 0.09 | 0.76 | -0.19 | 14 | 17 |
| MA | 7 | 1234 | F | -0.08 | -0.01 | 0.29 | M | 0.07 | -0.86 | 0.24 | 0.85 | 0.38 | 2.23 | 154 | 0.03 | 0.96 | 0.33 | 0.48 | 14 | 18 |
| MA | 7 | 1247 | F | -0.01 | 2.23 | 0.72 | M | 0.01 | 1.88 | 0.60 | 0.36 | 0.94 | 0.38 | 154 | 0.70 | 0.00 | 0.95 | 0.43 | 14 | 19 |
| MA | 7 | 481 | F | 0.10 | -0.81 | 0.16 | M | -0.09 | -0.36 | 0.19 | -0.45 | 0.25 | -1.83 | 154 | 0.07 | 1.36 | 0.24 | -0.49 | 14 | 20 |
| MA | 7 | 498 | F | 0.05 | -1.18 | 0.23 | M | -0.05 | -0.67 | 0.25 | -0.51 | 0.34 | -1.47 | 159 | 0.14 | 0.50 | 0.48 | -0.40 | 14 | 21 |
| MA | 7 | 485 | F | -0.03 | -0.01 | 0.29 | M | 0.03 | -0.40 | 0.27 | 0.39 | 0.40 | 0.99 | 158 | 0.32 | 0.03 | 0.86 | 0.19 | 14 | 22 |
| MA | 7 | 1237 | F | 0.02 | 0.37 | 0.33 | M | -0.02 | 0.77 | 0.38 | -0.40 | 0.51 | -0.79 | 156 | 0.43 | 1.15 | 0.28 | -0.90 | 14 | 23 |
| MA | 7 | 555 | F | 0.01 | 2.94 | 1.01 | M | -0.01 | | 1.84 | -1.32 | 2.09 | -0.63 | 125 | 0.53 | | | | 14 | 24 |
| MA | 7 | 557 | F | -0.03 | -1.12 | 0.23 | M | 0.03 | -1.36 | 0.23 | 0.24 | 0.33 | 0.72 | 159 | 0.47 | 0.24 | 0.62 | 0.25 | 14 | 25 |
| MA | 7 | 552 | F | -0.01 | 1.07 | 0.43 | M | 0.01 | 0.77 | 0.38 | 0.29 | 0.58 | 0.51 | 157 | 0.61 | 0.08 | 0.78 | -0.02 | 14 | 26 |
| MA | 7 | 536 | F | 0.08 | -1.82 | 0.23 | M | -0.08 | -1.09 | 0.24 | -0.73 | 0.33 | -2.20 | 159 | 0.03 | 3.78 | 0.05 | -0.79 | 14 | 27 |
| MA | 7 | 549 | F | -0.03 | 0.08 | 0.30 | M | 0.03 | -0.33 | 0.27 | 0.41 | 0.40 | 1.01 | 158 | 0.32 | 1.01 | 0.31 | 0.50 | 14 | 28 |
| MA | 7 | 541 | F | -0.02 | -1.29 | 0.23 | M | 0.01 | -1.41 | 0.23 | 0.13 | 0.33 | 0.39 | 159 | 0.70 | 0.08 | 0.78 | 0.19 | 14 | 29 |
| MA | 7 | 501 | F | 0.00 | 2.23 | 0.72 | M | 0.00 | 2.31 | 0.73 | -0.08 | 1.02 | -0.08 | 159 | 0.94 | 0.02 | 0.90 | -0.67 | 14 | 30 |
| MA | 7 | 547 | F | 0.12 | -0.26 | 0.15 | M | -0.11 | 0.28 | 0.20 | -0.54 | 0.25 | -2.17 | 150 | 0.03 | 5.07 | 0.02 | -1.05 | 14 | 31 |
| MA | 7 | 513 | F | -0.02 | | 1.83 | M | 0.02 | 1.87 | 0.60 | 2.29 | 1.93 | 1.19 | 95 | 0.24 | | | | 14 | 32 |
| MA | 7 | 503 | F | -0.01 | -0.59 | 0.25 | M | 0.01 | -0.74 | 0.25 | 0.14 | 0.36 | 0.40 | 159 | 0.69 | 0.08 | 0.78 | 0.19 | 14 | 33 |
| MA | 7 | 1252 | F | 0.00 | 2.94 | 1.01 | M | 0.00 | 3.03 | 1.02 | -0.09 | 1.43 | -0.06 | 159 | 0.95 | 0.16 | | | 14 | 34 |
| MA | 7 | 493 | F | 0.02 | -0.46 | 0.26 | M | -0.02 | -0.26 | 0.28 | -0.21 | 0.38 | -0.55 | 159 | 0.59 | 0.32 | 0.57 | -0.34 | 14 | 35 |
| MA | 7 | 561 | F | 0.06 | -0.59 | 0.25 | M | -0.06 | 0.18 | 0.31 | -0.77 | 0.40 | -1.91 | 153 | 0.06 | 3.16 | 0.08 | -0.99 | 14 | 36 |
| MA | 7 | 492 | F | 0.03 | -0.32 | 0.27 | M | -0.03 | 0.08 | 0.30 | -0.40 | 0.41 | -1.00 | 158 | 0.32 | 0.31 | 0.57 | -0.44 | 14 | 37 |
| MA | 7 | 511 | F | -0.02 | -0.09 | 0.29 | M | 0.02 | -0.33 | 0.27 | 0.24 | 0.39 | 0.60 | 159 | 0.55 | 1.02 | 0.31 | 0.50 | 14 | 38 |
| MA | 7 | 616 | F | 0.01 | -1.50 | 0.23 | M | -0.01 | -1.38 | 0.23 | -0.12 | 0.33 | -0.36 | 158 | 0.72 | 0.15 | 0.70 | -0.20 | 14 | 39 |
| MA | 7 | 562 | F | 0.16 | -1.17 | 0.16 | M | -0.15 | -0.44 | 0.19 | -0.73 | 0.25 | -2.96 | 155 | 0.00 | 10.49 | 0.00 | -1.32 | 14 | 40 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 533 | F | -0.03 | -0.39 | 0.26 | M | 0.03 | -0.69 | 0.25 | 0.29 | 0.37 | 0.80 | 158 | 0.42 | 0.00 | 0.98 | 0.09 | 14 | 41 |
| MA | 7 | 467 | F | 0.01 | 0.49 | 0.34 | M | -0.01 | 0.62 | 0.37 | -0.14 | 0.50 | -0.27 | 158 | 0.79 | 0.06 | 0.80 | -0.01 | 14 | 42 |
| MA | 7 | 471 | F | -0.02 | 1.81 | 0.59 | M | 0.02 | 0.92 | 0.41 | 0.89 | 0.72 | 1.24 | 140 | 0.22 | 0.85 | 0.36 | 1.04 | 14 | 43 |
| MA | 7 | 543 | F | 0.00 | 0.37 | 0.33 | M | 0.00 | 0.37 | 0.34 | 0.00 | 0.47 | 0.00 | 158 | 1.00 | 0.31 | 0.58 | 0.45 | 14 | 44 |
| MA | 7 | 474 | F | -0.02 | 0.49 | 0.34 | M | 0.02 | 0.17 | 0.31 | 0.32 | 0.47 | 0.69 | 157 | 0.49 | 0.27 | 0.60 | 0.37 | 14 | 45 |
| MA | 7 | 565 | F | 0.03 | -0.90 | 0.24 | M | -0.03 | -0.56 | 0.26 | -0.34 | 0.35 | -0.96 | 158 | 0.34 | 0.79 | 0.37 | -0.45 | 14 | 46 |
| MA | 7 | 522 | F | 0.01 | 0.27 | 0.32 | M | -0.01 | 0.49 | 0.35 | -0.23 | 0.47 | -0.48 | 157 | 0.63 | 0.00 | 0.97 | -0.22 | 14 | 47 |
| MA | 7 | 489 | F | -0.06 | -0.53 | 0.26 | M | 0.06 | -1.11 | 0.24 | 0.58 | 0.35 | 1.65 | 157 | 0.10 | 0.60 | 0.44 | 0.42 | 14 | 48 |
| MA | 7 | 540 | F | -0.04 | -0.25 | 0.27 | M | 0.04 | -0.69 | 0.25 | 0.44 | 0.37 | 1.18 | 157 | 0.24 | 1.89 | 0.17 | 0.74 | 14 | 49 |
| MA | 7 | 523 | F | 0.03 | -1.39 | 0.23 | M | -0.03 | -1.16 | 0.24 | -0.23 | 0.33 | -0.70 | 158 | 0.49 | 0.01 | 0.91 | -0.03 | 14 | 50 |
| MA | 7 | 527 | F | 0.03 | -0.39 | 0.26 | M | -0.03 | -0.02 | 0.30 | -0.37 | 0.40 | -0.94 | 157 | 0.35 | 0.00 | 0.98 | -0.14 | 14 | 51 |
| MA | 7 | 1241 | F | -0.07 | -0.53 | 0.26 | M | 0.07 | -1.22 | 0.23 | 0.69 | 0.35 | 1.98 | 157 | 0.05 | 3.27 | 0.07 | 0.83 | 14 | 52 |
| MA | 7 | 1244 | F | 0.01 | 0.49 | 0.34 | M | -0.01 | 0.76 | 0.38 | -0.28 | 0.52 | -0.53 | 157 | 0.59 | 0.00 | 0.95 | -0.19 | 14 | 53 |
| MA | 7 | 1264 | F | 0.01 | 1.81 | 0.59 | M | -0.01 | 2.30 | 0.73 | -0.49 | 0.94 | -0.52 | 153 | 0.60 | 0.02 | 0.89 | -0.43 | 14 | 54 |
| MA | 7 | 1259 | F | -0.01 | -0.09 | 0.29 | M | 0.01 | -0.19 | 0.28 | 0.10 | 0.40 | 0.24 | 158 | 0.81 | 0.65 | 0.42 | 0.49 | 14 | 55 |
| MA | 7 | 1065 | F | -0.02 | -1.01 | 0.24 | M | 0.02 | -1.22 | 0.23 | 0.21 | 0.33 | 0.62 | 158 | 0.54 | 0.28 | 0.60 | 0.27 | 14 | 56 |
| MA | 8 | 602 | F | -0.03 | 0.33 | 0.34 | M | 0.04 | -0.14 | 0.31 | 0.47 | 0.46 | 1.02 | 132 | 0.31 | 1.08 | 0.30 | 0.78 | 15 | 1 |
| MA | 8 | 594 | F | 0.09 | -1.27 | 0.25 | M | -0.11 | -0.33 | 0.30 | -0.94 | 0.39 | -2.43 | 123 | 0.02 | 3.66 | 0.06 | -0.97 | 15 | 2 |
| MA | 8 | 593 | F | -0.02 | -0.41 | 0.28 | M | 0.02 | -0.58 | 0.29 | 0.18 | 0.40 | 0.45 | 131 | 0.66 | 0.58 | 0.45 | 0.37 | 15 | 3 |
| MA | 8 | 583 | F | 0.00 | 0.37 | 0.23 | M | 0.00 | 0.37 | 0.25 | 0.00 | 0.34 | 0.00 | 129 | 1.00 | 0.03 | 0.85 | 0.08 | 15 | 4 |
| MA | 8 | 544 | F | 0.04 | -0.41 | 0.28 | M | -0.05 | 0.18 | 0.34 | -0.59 | 0.44 | -1.33 | 122 | 0.19 | 1.63 | 0.20 | -0.72 | 15 | 5 |
| MA | 8 | 604 | F | 0.03 | -0.76 | 0.26 | M | -0.04 | -0.42 | 0.29 | -0.35 | 0.39 | -0.89 | 127 | 0.38 | 0.20 | 0.65 | -0.29 | 15 | 6 |
| MA | 8 | 597 | F | -0.01 | -0.90 | 0.25 | M | 0.01 | -0.97 | 0.27 | 0.07 | 0.37 | 0.20 | 130 | 0.84 | 0.04 | 0.84 | 0.21 | 15 | 7 |
| MA | 8 | 1236 | F | -0.01 | 0.02 | 0.31 | M | 0.01 | -0.14 | 0.31 | 0.16 | 0.44 | 0.36 | 131 | 0.72 | 0.05 | 0.83 | -0.01 | 15 | 8 |
| MA | 8 | 569 | F | 0.05 | -0.33 | 0.28 | M | -0.06 | 0.43 | 0.37 | -0.76 | 0.46 | -1.63 | 118 | 0.11 | 3.46 | 0.06 | -1.25 | 15 | 9 |
| MA | 8 | 1230 | F | 0.03 | -0.48 | 0.27 | M | -0.03 | -0.14 | 0.31 | -0.34 | 0.42 | -0.82 | 126 | 0.41 | 0.03 | 0.86 | 0.21 | 15 | 10 |
| MA | 8 | 1135 | F | -0.04 | 0.19 | 0.27 | M | 0.04 | -0.12 | 0.22 | 0.31 | 0.35 | 0.90 | 131 | 0.37 | 0.59 | 0.44 | 0.48 | 15 | 11 |
| MA | 8 | 590 | F | 0.01 | 0.72 | 0.39 | M | -0.01 | 0.91 | 0.44 | -0.19 | 0.58 | -0.32 | 127 | 0.75 | 0.02 | 0.89 | -0.22 | 15 | 12 |
| MA | 8 | 573 | F | 0.09 | -0.70 | 0.26 | M | -0.11 | 0.57 | 0.39 | -1.27 | 0.47 | -2.72 | 110 | 0.01 | 2.28 | 0.13 | -0.91 | 15 | 13 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 596 | F | 0.05 | -1.27 | 0.25 | M | -0.06 | -0.74 | 0.28 | -0.52 | 0.37 | -1.41 | 127 | 0.16 | 1.37 | 0.24 | -0.60 | 15 | 14 |
| MA | 8 | 615 | F | 0.01 | 0.45 | 0.35 | M | -0.01 | 0.57 | 0.39 | -0.12 | 0.52 | -0.23 | 128 | 0.82 | 0.76 | 0.38 | -0.82 | 15 | 15 |
| MA | 8 | 531 | F | 0.04 | -0.07 | 0.30 | M | -0.05 | 0.57 | 0.39 | -0.65 | 0.49 | -1.32 | 119 | 0.19 | 2.83 | 0.09 | -1.04 | 15 | 16 |
| MA | 8 | 601 | F | 0.02 | 0.02 | 0.31 | M | -0.02 | 0.30 | 0.35 | -0.28 | 0.47 | -0.60 | 126 | 0.55 | 0.03 | 0.86 | -0.27 | 15 | 17 |
| MA | 8 | 618 | F | -0.05 | -1.86 | 0.25 | M | 0.06 | -2.34 | 0.28 | 0.48 | 0.38 | 1.29 | 126 | 0.20 | 0.59 | 0.44 | 0.48 | 15 | 18 |
| MA | 8 | 1138 | F | 0.00 | 1.37 | 0.52 | M | 0.00 | 1.46 | 0.62 | -0.10 | 0.81 | -0.12 | 124 | 0.91 | 0.23 | 0.63 | 0.79 | 15 | 19 |
| MA | 8 | 620 | F | -0.01 | | 1.84 | M | 0.02 | 2.10 | 0.72 | 2.12 | 1.98 | 1.07 | 93 | 0.29 | 0.99 | 0.32 | | 15 | 20 |
| MA | 8 | 607 | F | 0.01 | -0.48 | 0.27 | M | -0.01 | -0.42 | 0.29 | -0.07 | 0.40 | -0.16 | 129 | 0.87 | 0.18 | 0.67 | -0.31 | 15 | 21 |
| MA | 8 | 1270 | F | -0.02 | 0.12 | 0.32 | M | 0.03 | -0.24 | 0.31 | 0.35 | 0.44 | 0.80 | 132 | 0.43 | 0.01 | 0.94 | 0.09 | 15 | 22 |
| MA | 8 | 1273 | F | -0.08 | 0.88 | 0.41 | M | 0.09 | -0.42 | 0.29 | 1.30 | 0.50 | 2.57 | 125 | 0.01 | 7.93 | 0.00 | 1.94 | 15 | 23 |
| MA | 8 | 576 | F | -0.03 | 1.52 | 0.53 | M | 0.03 | 0.73 | 0.41 | 0.79 | 0.67 | 1.18 | 129 | 0.24 | 0.00 | 0.99 | 0.36 | 15 | 24 |
| MA | 8 | 1269 | F | -0.02 | -0.70 | 0.26 | M | 0.02 | -0.89 | 0.27 | 0.20 | 0.38 | 0.53 | 130 | 0.60 | 0.01 | 0.91 | 0.05 | 15 | 25 |
| MA | 8 | 582 | F | 0.06 | 0.85 | 0.26 | M | -0.07 | 1.58 | 0.35 | -0.73 | 0.43 | -1.68 | 117 | 0.10 | 1.00 | 0.32 | -0.49 | 15 | 26 |
| MA | 8 | 548 | F | -0.02 | 2.99 | 1.02 | M | 0.03 | 1.36 | 0.52 | 1.63 | 1.14 | 1.43 | 106 | 0.16 | 0.74 | 0.39 | | 15 | 27 |
| MA | 8 | 598 | F | 0.06 | -1.08 | 0.25 | M | -0.07 | -0.42 | 0.29 | -0.67 | 0.39 | -1.73 | 125 | 0.09 | 0.00 | 0.97 | -0.07 | 15 | 28 |
| MA | 8 | 617 | F | -0.01 | 0.02 | 0.31 | M | 0.01 | -0.14 | 0.31 | 0.16 | 0.44 | 0.36 | 131 | 0.72 | 0.01 | 0.94 | -0.15 | 15 | 29 |
| MA | 8 | 591 | F | -0.07 | | 1.83 | M | 0.08 | 0.43 | 0.37 | 3.79 | 1.87 | 2.02 | 77 | 0.05 | 2.09 | 0.15 | | 15 | 30 |
| MA | 8 | 613 | F | -0.01 | 0.19 | 0.20 | M | 0.02 | 0.12 | 0.20 | 0.07 | 0.28 | 0.25 | 131 | 0.80 | 0.07 | 0.80 | 0.12 | 15 | 31 |
| MA | 8 | 592 | F | 0.01 | -0.48 | 0.27 | M | -0.01 | -0.42 | 0.29 | -0.07 | 0.40 | -0.16 | 129 | 0.87 | 0.83 | 0.36 | -0.53 | 15 | 32 |
| MA | 8 | 621 | F | -0.02 | -1.39 | 0.24 | M | 0.03 | -1.60 | 0.26 | 0.22 | 0.36 | 0.61 | 129 | 0.55 | 0.75 | 0.39 | 0.48 | 15 | 33 |
| MA | 8 | 1218 | F | -0.02 | 2.99 | 1.02 | M | 0.02 | 1.67 | 0.60 | 1.32 | 1.18 | 1.12 | 114 | 0.27 | 0.01 | 0.92 | 0.98 | 15 | 34 |
| MA | 8 | 529 | F | -0.01 | 0.22 | 0.33 | M | 0.01 | 0.07 | 0.33 | 0.15 | 0.47 | 0.33 | 131 | 0.74 | 0.01 | 0.91 | 0.26 | 15 | 35 |
| MA | 8 | 1141 | F | -0.02 | -0.90 | 0.25 | M | 0.03 | -1.11 | 0.27 | 0.22 | 0.37 | 0.59 | 130 | 0.56 | 0.01 | 0.93 | -0.14 | 15 | 36 |
| MA | 8 | 584 | F | -0.01 | -0.41 | 0.28 | M | 0.01 | -0.50 | 0.29 | 0.09 | 0.40 | 0.24 | 130 | 0.81 | 0.07 | 0.80 | 0.22 | 15 | 37 |
| MA | 8 | 566 | F | -0.03 | -0.07 | 0.30 | M | 0.03 | -0.42 | 0.29 | 0.34 | 0.42 | 0.81 | 132 | 0.42 | 0.14 | 0.71 | 0.31 | 15 | 38 |
| MA | 8 | 1268 | F | -0.01 | 2.27 | 0.73 | M | 0.01 | 1.67 | 0.60 | 0.59 | 0.94 | 0.63 | 131 | 0.53 | 0.34 | 0.56 | -0.05 | 15 | 39 |
| MA | 8 | 1228 | F | 0.03 | -0.63 | 0.27 | M | -0.03 | -0.33 | 0.30 | -0.30 | 0.40 | -0.75 | 127 | 0.46 | 2.07 | 0.15 | -0.82 | 15 | 40 |
| MA | 8 | 588 | F | 0.02 | 1.27 | 0.48 | M | -0.03 | 2.82 | 1.01 | -1.55 | 1.12 | -1.39 | 87 | 0.17 | 0.38 | 0.54 | | 15 | 41 |
| MA | 8 | 612 | F | 0.02 | -0.16 | 0.29 | M | -0.02 | 0.07 | 0.33 | -0.23 | 0.44 | -0.52 | 127 | 0.61 | 0.48 | 0.49 | -0.66 | 15 | 42 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 542 | F | 0.00 | 1.83 | 0.60 | M | 0.00 | 1.67 | 0.60 | 0.16 | 0.85 | 0.19 | 132 | 0.85 | 0.00 | 0.97 | -0.49 | 15 | 43 |
| MA | 8 | 1274 | F | 0.01 | -0.25 | 0.29 | M | -0.01 | -0.14 | 0.31 | -0.11 | 0.43 | -0.25 | 129 | 0.80 | 0.05 | 0.82 | -0.03 | 15 | 44 |
| MA | 8 | 600 | F | 0.04 | -1.56 | 0.24 | M | -0.05 | -1.18 | 0.27 | -0.38 | 0.36 | -1.05 | 129 | 0.30 | 0.32 | 0.57 | -0.34 | 15 | 45 |
| MA | 8 | 614 | F | -0.02 | -0.90 | 0.25 | M | 0.03 | -1.11 | 0.27 | 0.22 | 0.37 | 0.59 | 130 | 0.56 | 0.06 | 0.80 | 0.21 | 15 | 46 |
| MA | 8 | 586 | F | 0.05 | -0.76 | 0.26 | M | -0.05 | -0.24 | 0.31 | -0.53 | 0.40 | -1.32 | 125 | 0.19 | 1.76 | 0.19 | -0.72 | 15 | 47 |
| MA | 8 | 608 | F | 0.00 | -1.06 | 0.25 | M | -0.01 | -1.04 | 0.27 | -0.02 | 0.37 | -0.06 | 129 | 0.95 | 0.15 | 0.70 | 0.23 | 15 | 48 |
| MA | 8 | 611 | F | -0.15 | -0.96 | 0.25 | M | 0.18 | -2.43 | 0.29 | 1.47 | 0.38 | 3.83 | 126 | 0.00 | 9.83 | 0.00 | 1.37 | 15 | 49 |
| MA | 8 | 556 | F | -0.02 | 0.72 | 0.39 | M | 0.03 | 0.30 | 0.35 | 0.42 | 0.52 | 0.80 | 132 | 0.42 | 0.09 | 0.76 | -0.02 | 15 | 50 |
| MA | 8 | 532 | F | 0.03 | -0.56 | 0.27 | M | -0.04 | -0.14 | 0.31 | -0.41 | 0.41 | -1.01 | 126 | 0.32 | 0.24 | 0.62 | -0.29 | 15 | 51 |
| MA | 8 | 530 | F | -0.02 | -0.70 | 0.26 | M | 0.02 | -0.89 | 0.27 | 0.20 | 0.38 | 0.53 | 130 | 0.60 | 0.94 | 0.33 | 0.49 | 15 | 52 |
| MA | 8 | 603 | F | -0.03 | -1.27 | 0.25 | M | 0.03 | -1.53 | 0.26 | 0.27 | 0.36 | 0.74 | 129 | 0.46 | 1.73 | 0.19 | 0.73 | 15 | 53 |
| MA | 8 | 599 | F | -0.04 | 0.12 | 0.32 | M | 0.05 | -0.42 | 0.29 | 0.53 | 0.43 | 1.23 | 132 | 0.22 | 0.07 | 0.80 | 0.24 | 15 | 54 |
| MA | 8 | 589 | F | 0.01 | -1.02 | 0.25 | M | -0.02 | -0.89 | 0.27 | -0.13 | 0.37 | -0.34 | 129 | 0.73 | 0.40 | 0.53 | 0.33 | 15 | 55 |
| MA | 8 | 1140 | F | 0.02 | 1.52 | 0.53 | M | -0.02 | 2.82 | 1.01 | -1.30 | 1.14 | -1.14 | 92 | 0.26 | 0.03 | 0.86 | -0.74 | 15 | 56 |

## Appendix Table I.6:Mathematics: DIF Survey

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 178 | 0 | -0.04 | -3.12 | 0.44 | 1 | 0.01 | -3.79 | 0.28 | 0.68 | 0.52 | 1.30 | 108 | 0.20 | 3.03 | 0.08 | 1.15 | 22 | 1 |
| MA | 3 | 182 | 0 | 0.00 | -0.01 | 0.30 | 1 | 0.00 | -0.01 | 0.16 | 0.00 | 0.34 | 0.00 | 92 | 1.00 | 0.01 | 0.91 | -0.10 | 22 | 2 |
| MA | 3 | 206 | 0 | 0.01 | -1.44 | 0.28 | 1 | 0.00 | -1.38 | 0.15 | -0.06 | 0.32 | -0.19 | 90 | 0.85 | 0.08 | 0.77 | 0.17 | 22 | 3 |
| MA | 3 | 1303 | 0 | 0.06 | 0.94 | 0.37 | 1 | -0.02 | 1.69 | 0.25 | -0.75 | 0.45 | -1.69 | 113 | 0.09 | 3.44 | 0.06 | -1.03 | 22 | 4 |
| MA | 3 | 225 | 0 | -0.02 | 0.26 | 0.31 | 1 | 0.00 | 0.14 | 0.16 | 0.12 | 0.35 | 0.34 | 90 | 0.74 | 0.03 | 0.86 | 0.12 | 22 | 5 |
| MA | 3 | 215 | 0 | 0.08 | -2.78 | 0.39 | 1 | -0.02 | -2.07 | 0.16 | -0.70 | 0.42 | -1.68 | 78 | 0.10 | 0.96 | 0.33 | -0.49 | 22 | 6 |
| MA | 3 | 169 | 0 | -0.05 | -0.10 | 0.29 | 1 | 0.01 | -0.40 | 0.15 | 0.29 | 0.33 | 0.89 | 89 | 0.37 | 2.07 | 0.15 | 0.63 | 22 | 7 |
| MA | 3 | 231 | 0 | 0.05 | -0.43 | 0.28 | 1 | -0.01 | -0.11 | 0.16 | -0.32 | 0.32 | -0.99 | 95 | 0.33 | 1.05 | 0.31 | -0.42 | 22 | 8 |
| MA | 3 | 219 | 0 | 0.03 | 0.94 | 0.37 | 1 | -0.01 | 1.27 | 0.22 | -0.32 | 0.43 | -0.76 | 99 | 0.45 | 2.32 | 0.13 | -0.78 | 22 | 9 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 202 | 0 | 0.01 | -2.38 | 0.34 | 1 | 0.00 | -2.31 | 0.17 | -0.07 | 0.38 | -0.18 | 87 | 0.86 | 0.03 | 0.87 | -0.02 | 22 | 10 |
| MA | 3 | 221 | 0 | 0.01 | 0.17 | 0.31 | 1 | 0.00 | 0.21 | 0.17 | -0.05 | 0.35 | -0.13 | 93 | 0.89 | 0.04 | 0.83 | -0.18 | 22 | 11 |
| MA | 3 | 992 | 0 | 0.03 | 2.44 | 0.62 | 1 | -0.01 | 3.82 | 0.59 | -1.38 | 0.86 | -1.61 | 169 | 0.11 | 4.92 | 0.03 | | 22 | 12 |
| MA | 3 | 371 | 0 | -0.02 | 0.94 | 0.37 | 1 | 0.01 | 0.75 | 0.19 | 0.20 | 0.41 | 0.47 | 88 | 0.64 | 0.12 | 0.73 | 0.25 | 22 | 13 |
| MA | 3 | 173 | 0 | 0.01 | -0.43 | 0.28 | 1 | 0.00 | -0.39 | 0.15 | -0.04 | 0.32 | -0.14 | 92 | 0.89 | 0.12 | 0.73 | -0.16 | 22 | 14 |
| MA | 3 | 226 | 0 | 0.04 | 0.36 | 0.32 | 1 | -0.01 | 0.65 | 0.18 | -0.28 | 0.37 | -0.78 | 97 | 0.44 | 0.20 | 0.65 | -0.26 | 22 | 15 |
| MA | 3 | 233 | 0 | 0.02 | 2.10 | 0.55 | 1 | -0.01 | 2.84 | 0.44 | -0.75 | 0.71 | -1.06 | 139 | 0.29 | 0.02 | 0.89 | -0.13 | 22 | 16 |
| MA | 3 | 174 | 0 | 0.09 | -0.89 | 0.28 | 1 | -0.02 | -0.37 | 0.15 | -0.52 | 0.31 | -1.65 | 94 | 0.10 | 0.59 | 0.44 | -0.36 | 22 | 17 |
| MA | 3 | 1036 | 0 | -0.02 | 2.44 | 0.62 | 1 | 0.00 | 2.04 | 0.28 | 0.40 | 0.68 | 0.59 | 81 | 0.56 | 0.14 | 0.71 | 0.02 | 22 | 18 |
| MA | 3 | 210 | 0 | 0.02 | 0.36 | 0.32 | 1 | -0.01 | 0.55 | 0.18 | -0.19 | 0.36 | -0.51 | 95 | 0.61 | 0.46 | 0.50 | -0.37 | 22 | 19 |
| MA | 3 | 207 | 0 | -0.08 | -0.67 | 0.28 | 1 | 0.02 | -1.10 | 0.15 | 0.43 | 0.31 | 1.38 | 91 | 0.17 | 1.91 | 0.17 | 0.53 | 22 | 20 |
| MA | 3 | 212 | 0 | -0.04 | 0.26 | 0.31 | 1 | 0.01 | -0.04 | 0.16 | 0.30 | 0.35 | 0.86 | 88 | 0.39 | 0.86 | 0.35 | 0.49 | 22 | 21 |
| MA | 3 | 172 | 0 | 0.08 | -0.10 | 0.29 | 1 | -0.02 | 0.43 | 0.17 | -0.53 | 0.34 | -1.55 | 100 | 0.12 | 1.87 | 0.17 | -0.66 | 22 | 22 |
| MA | 3 | 198 | 0 | -0.12 | -1.52 | 0.29 | 1 | 0.03 | -2.36 | 0.17 | 0.84 | 0.34 | 2.49 | 102 | 0.01 | 5.82 | 0.02 | 0.97 | 22 | 23 |
| MA | 3 | 368 | 0 | -0.02 | 0.94 | 0.37 | 1 | 0.01 | 0.71 | 0.19 | 0.23 | 0.41 | 0.56 | 87 | 0.58 | 0.01 | 0.94 | 0.17 | 22 | 24 |
| MA | 3 | 191 | 0 | 0.02 | 0.46 | 0.33 | 1 | -0.01 | 0.65 | 0.18 | -0.18 | 0.37 | -0.48 | 95 | 0.63 | 0.02 | 0.89 | -0.16 | 22 | 25 |
| MA | 3 | 193 | 0 | -0.10 | -0.74 | 0.28 | 1 | 0.03 | -1.32 | 0.15 | 0.57 | 0.31 | 1.83 | 92 | 0.07 | 1.28 | 0.26 | 0.40 | 22 | 26 |
| MA | 3 | 189 | 0 | 0.10 | -2.50 | 0.36 | 1 | -0.03 | -1.75 | 0.15 | -0.76 | 0.39 | -1.95 | 79 | 0.05 | 1.17 | 0.28 | -0.50 | 22 | 27 |
| MA | 3 | 995 | 0 | 0.02 | 0.57 | 0.33 | 1 | -0.01 | 0.75 | 0.19 | -0.17 | 0.38 | -0.45 | 95 | 0.65 | 0.00 | 0.95 | -0.10 | 22 | 28 |
| MA | 3 | 229 | 0 | 0.01 | -0.59 | 0.28 | 1 | 0.00 | -0.54 | 0.15 | -0.04 | 0.32 | -0.14 | 92 | 0.89 | 0.47 | 0.49 | -0.29 | 22 | 29 |
| MA | 3 | 374 | 0 | 0.00 | 0.15 | 0.31 | 1 | 0.00 | 0.15 | 0.16 | 0.00 | 0.35 | 0.00 | 92 | 1.00 | 0.02 | 0.90 | 0.11 | 22 | 30 |
| MA | 3 | 184 | 0 | -0.07 | -1.87 | 0.30 | 1 | 0.02 | -2.42 | 0.18 | 0.55 | 0.35 | 1.57 | 98 | 0.12 | 1.73 | 0.19 | 0.62 | 22 | 31 |
| MA | 3 | 186 | 0 | 0.02 | -0.35 | 0.28 | 1 | 0.00 | -0.26 | 0.15 | -0.09 | 0.32 | -0.29 | 93 | 0.77 | 0.11 | 0.74 | -0.18 | 22 | 32 |
| MA | 3 | 1035 | 0 | -0.01 | 0.46 | 0.33 | 1 | 0.00 | 0.37 | 0.17 | 0.10 | 0.37 | 0.27 | 90 | 0.79 | 0.30 | 0.58 | 0.30 | 22 | 33 |
| MA | 3 | 201 | 0 | 0.04 | -1.69 | 0.29 | 1 | -0.01 | -1.43 | 0.15 | -0.26 | 0.33 | -0.79 | 88 | 0.43 | 0.04 | 0.85 | -0.14 | 22 | 34 |
| MA | 3 | 211 | 0 | 0.05 | 0.36 | 0.32 | 1 | -0.01 | 0.75 | 0.19 | -0.39 | 0.37 | -1.05 | 99 | 0.30 | 0.70 | 0.40 | -0.38 | 22 | 35 |
| MA | 3 | 234 | 0 | 0.00 | 1.84 | 0.48 | 1 | 0.00 | 1.84 | 0.24 | 0.00 | 0.54 | 0.00 | 88 | 1.00 | 0.03 | 0.86 | 0.21 | 22 | 36 |
| MA | 3 | 216 | 0 | -0.03 | -0.43 | 0.28 | 1 | 0.01 | -0.62 | 0.15 | 0.19 | 0.32 | 0.60 | 91 | 0.55 | 0.23 | 0.64 | 0.21 | 22 | 37 |
| MA | 3 | 235 | 0 | -0.01 | 2.24 | 0.46 | 1 | 0.00 | 2.18 | 0.24 | 0.06 | 0.52 | 0.12 | 88 | 0.91 | 0.40 | 0.53 | 0.52 | 22 | 38 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 3 | 209 | 0 | -0.03 | 0.46 | 0.33 | 1 | 0.01 | 0.25 | 0.17 | 0.21 | 0.37 | 0.58 | 89 | 0.56 | 0.61 | 0.44 | 0.40 | 22 | 39 |
| MA | 3 | 213 | 0 | -0.01 | 0.57 | 0.33 | 1 | 0.00 | 0.53 | 0.18 | 0.04 | 0.38 | 0.12 | 91 | 0.91 | 0.03 | 0.85 | -0.17 | 22 | 40 |
| MA | 3 | 224 | 0 | -0.02 | 0.07 | 0.30 | 1 | 0.01 | -0.09 | 0.16 | 0.16 | 0.34 | 0.48 | 90 | 0.64 | 0.02 | 0.88 | -0.01 | 22 | 41 |
| MA | 3 | 204 | 0 | -0.02 | -0.27 | 0.29 | 1 | 0.00 | -0.37 | 0.15 | 0.10 | 0.32 | 0.32 | 91 | 0.75 | 0.00 | 0.96 | 0.10 | 22 | 42 |
| MA | 3 | 230 | 0 | -0.03 | 0.57 | 0.33 | 1 | 0.01 | 0.31 | 0.17 | 0.27 | 0.37 | 0.71 | 88 | 0.48 | 0.07 | 0.79 | 0.18 | 22 | 43 |
| MA | 3 | 190 | 0 | 0.00 | -1.29 | 0.28 | 1 | 0.00 | -1.29 | 0.15 | 0.00 | 0.32 | 0.00 | 91 | 1.00 | 0.46 | 0.50 | -0.28 | 22 | 44 |
| MA | 3 | 180 | 0 | -0.02 | -0.35 | 0.28 | 1 | 0.01 | -0.47 | 0.15 | 0.11 | 0.32 | 0.35 | 91 | 0.73 | 0.59 | 0.44 | 0.34 | 22 | 45 |
| MA | 3 | 188 | 0 | -0.08 | -0.43 | 0.28 | 1 | 0.02 | -0.90 | 0.15 | 0.47 | 0.32 | 1.49 | 90 | 0.14 | 0.73 | 0.39 | 0.37 | 22 | 46 |
| MA | 3 | 214 | 0 | 0.01 | -0.10 | 0.29 | 1 | 0.00 | -0.07 | 0.16 | -0.03 | 0.33 | -0.09 | 92 | 0.93 | 0.00 | 0.95 | 0.09 | 22 | 47 |
| MA | 3 | 223 | 0 | 0.07 | -0.59 | 0.28 | 1 | -0.02 | -0.19 | 0.16 | -0.40 | 0.32 | -1.26 | 95 | 0.21 | 0.81 | 0.37 | -0.35 | 22 | 48 |
| MA | 3 | 205 | 0 | 0.03 | -0.27 | 0.29 | 1 | -0.01 | -0.06 | 0.16 | -0.21 | 0.33 | -0.63 | 94 | 0.53 | 0.63 | 0.43 | -0.33 | 22 | 49 |
| MA | 3 | 217 | 0 | 0.00 | 0.68 | 0.34 | 1 | 0.00 | 0.68 | 0.18 | 0.00 | 0.39 | 0.00 | 91 | 1.00 | 0.09 | 0.76 | -0.21 | 22 | 50 |
| MA | 3 | 1305 | 0 | 0.00 | 2.44 | 0.62 | 1 | 0.00 | 2.41 | 0.32 | 0.03 | 0.70 | 0.04 | 90 | 0.97 | 0.10 | 0.75 | -0.04 | 22 | 51 |
| MA | 3 | 187 | 0 | -0.01 | -1.44 | 0.28 | 1 | 0.00 | -1.50 | 0.15 | 0.06 | 0.32 | 0.19 | 91 | 0.85 | 0.09 | 0.77 | 0.17 | 22 | 52 |
| MA | 3 | 208 | 0 | -0.06 | 0.26 | 0.31 | 1 | 0.02 | -0.14 | 0.16 | 0.40 | 0.35 | 1.14 | 87 | 0.26 | 0.55 | 0.46 | 0.35 | 22 | 53 |
| MA | 3 | 218 | 0 | -0.02 | 0.81 | 0.36 | 1 | 0.01 | 0.64 | 0.18 | 0.17 | 0.40 | 0.42 | 88 | 0.68 | 0.33 | 0.57 | 0.31 | 22 | 54 |
| MA | 3 | 185 | 0 | 0.04 | 1.24 | 0.40 | 1 | -0.01 | 1.82 | 0.26 | -0.58 | 0.48 | -1.21 | 108 | 0.23 | 3.89 | 0.05 | -1.26 | 22 | 55 |
| MA | 4 | 135 | 0 | 0.00 | -1.10 | 0.29 | 1 | 0.00 | -1.10 | 0.15 | 0.00 | 0.33 | 0.00 | 85 | 1.00 | 0.00 | 0.98 | -0.09 | 23 | 1 |
| MA | 4 | 140 | 0 | 0.07 | -1.72 | 0.31 | 1 | -0.02 | -1.27 | 0.15 | -0.46 | 0.35 | -1.32 | 81 | 0.19 | 1.32 | 0.25 | -0.51 | 23 | 2 |
| MA | 4 | 109 | 0 | 0.06 | -1.18 | 0.29 | 1 | -0.02 | -0.84 | 0.15 | -0.34 | 0.33 | -1.05 | 84 | 0.30 | 0.03 | 0.85 | -0.15 | 23 | 3 |
| MA | 4 | 257 | 0 | -0.03 | 0.52 | 0.33 | 1 | 0.01 | 0.29 | 0.17 | 0.23 | 0.37 | 0.62 | 84 | 0.54 | 0.01 | 0.93 | 0.04 | 23 | 4 |
| MA | 4 | 157 | 0 | 0.08 | -0.51 | 0.29 | 1 | -0.02 | -0.04 | 0.16 | -0.47 | 0.33 | -1.42 | 89 | 0.16 | 0.46 | 0.50 | -0.33 | 23 | 5 |
| MA | 4 | 236 | 0 | 0.07 | -0.43 | 0.29 | 1 | -0.02 | -0.01 | 0.16 | -0.41 | 0.33 | -1.24 | 89 | 0.22 | 1.23 | 0.27 | -0.53 | 23 | 6 |
| MA | 4 | 170 | 0 | -0.12 | -0.07 | 0.30 | 1 | 0.03 | -0.81 | 0.15 | 0.74 | 0.34 | 2.20 | 82 | 0.03 | 3.38 | 0.07 | 0.70 | 23 | 7 |
| MA | 4 | 1009 | 0 | 0.05 | 0.02 | 0.30 | 1 | -0.01 | 0.38 | 0.17 | -0.36 | 0.35 | -1.03 | 92 | 0.31 | 0.02 | 0.90 | 0.14 | 23 | 8 |
| MA | 4 | 262 | 0 | -0.06 | -0.84 | 0.19 | 1 | 0.02 | -0.99 | 0.10 | 0.15 | 0.22 | 0.70 | 84 | 0.49 | 0.40 | 0.52 | 0.22 | 23 | 9 |
| MA | 4 | 238 | 0 | -0.01 | -0.25 | 0.30 | 1 | 0.00 | -0.32 | 0.15 | 0.06 | 0.33 | 0.19 | 85 | 0.85 | 0.14 | 0.71 | 0.21 | 23 | 10 |
| MA | 4 | 268 | 0 | 0.05 | -1.53 | 0.30 | 1 | -0.01 | -1.24 | 0.15 | -0.29 | 0.34 | -0.86 | 82 | 0.39 | 2.00 | 0.16 | -0.54 | 23 | 11 |
| MA | 4 | 276 | 0 | -0.02 | 0.41 | 0.32 | 1 | 0.01 | 0.23 | 0.17 | 0.18 | 0.37 | 0.49 | 85 | 0.62 | 0.05 | 0.82 | -0.16 | 23 | 12 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 244 | 0 | -0.02 | 4.88 | | 1 | 0.01 | 3.26 | 0.51 | 1.62 | 1.91 | 0.85 | 62 | 0.40 | 0.18 | 0.68 | | 23 | 13 |
| MA | 4 | 166 | 0 | 0.09 | -0.07 | 0.30 | 1 | -0.03 | 0.57 | 0.18 | -0.64 | 0.35 | -1.82 | 96 | 0.07 | 2.05 | 0.15 | -0.60 | 23 | 14 |
| MA | 4 | 247 | 0 | 0.08 | -0.43 | 0.29 | 1 | -0.02 | 0.09 | 0.16 | -0.52 | 0.33 | -1.55 | 90 | 0.12 | 0.21 | 0.65 | -0.23 | 23 | 15 |
| MA | 4 | 171 | 0 | 0.03 | -0.43 | 0.29 | 1 | -0.01 | -0.24 | 0.16 | -0.19 | 0.33 | -0.57 | 87 | 0.57 | 0.24 | 0.62 | -0.22 | 23 | 16 |
| MA | 4 | 1005 | 0 | -0.05 | -0.68 | 0.29 | 1 | 0.01 | -0.97 | 0.15 | 0.29 | 0.33 | 0.90 | 85 | 0.37 | 1.04 | 0.31 | 0.49 | 23 | 17 |
| MA | 4 | 254 | 0 | 0.06 | -0.25 | 0.30 | 1 | -0.02 | 0.15 | 0.17 | -0.40 | 0.34 | -1.18 | 90 | 0.24 | 1.93 | 0.17 | -0.60 | 23 | 18 |
| MA | 4 | 239 | 0 | 0.01 | 1.89 | 0.49 | 1 | 0.00 | 2.09 | 0.30 | -0.20 | 0.57 | -0.35 | 100 | 0.73 | 0.00 | 1.00 | 0.29 | 23 | 19 |
| MA | 4 | 165 | 0 | -0.01 | -0.43 | 0.29 | 1 | 0.00 | -0.48 | 0.15 | 0.06 | 0.33 | 0.17 | 85 | 0.86 | 0.02 | 0.89 | -0.02 | 23 | 20 |
| MA | 4 | 265 | 0 | -0.05 | -0.76 | 0.29 | 1 | 0.01 | -1.06 | 0.15 | 0.30 | 0.33 | 0.92 | 85 | 0.36 | 0.08 | 0.78 | 0.17 | 23 | 21 |
| MA | 4 | 259 | 0 | -0.02 | 0.41 | 0.32 | 1 | 0.00 | 0.29 | 0.17 | 0.12 | 0.37 | 0.34 | 86 | 0.74 | 0.04 | 0.85 | 0.00 | 23 | 22 |
| MA | 4 | 256 | 0 | 0.04 | -0.16 | 0.30 | 1 | -0.01 | 0.09 | 0.16 | -0.26 | 0.34 | -0.76 | 89 | 0.45 | 0.00 | 0.99 | -0.08 | 23 | 23 |
| MA | 4 | 250 | 0 | 0.01 | -0.25 | 0.30 | 1 | 0.00 | -0.20 | 0.16 | -0.05 | 0.33 | -0.15 | 86 | 0.88 | 0.32 | 0.57 | -0.31 | 23 | 24 |
| MA | 4 | 164 | 0 | 0.00 | 0.01 | 0.30 | 1 | 0.00 | 0.01 | 0.16 | 0.00 | 0.35 | 0.00 | 86 | 1.00 | 0.01 | 0.93 | -0.10 | 23 | 25 |
| MA | 4 | 1006 | 0 | -0.06 | 0.63 | 0.34 | 1 | 0.02 | 0.18 | 0.17 | 0.46 | 0.38 | 1.21 | 81 | 0.23 | 0.12 | 0.73 | 0.24 | 23 | 26 |
| MA | 4 | 263 | 0 | -0.07 | -0.16 | 0.30 | 1 | 0.02 | -0.59 | 0.15 | 0.42 | 0.33 | 1.27 | 83 | 0.21 | 1.76 | 0.18 | 0.60 | 23 | 27 |
| MA | 4 | 261 | 0 | -0.06 | 0.75 | 0.35 | 1 | 0.02 | 0.32 | 0.17 | 0.43 | 0.39 | 1.11 | 82 | 0.27 | 1.36 | 0.24 | 0.61 | 23 | 28 |
| MA | 4 | 168 | 0 | 0.09 | -0.43 | 0.29 | 1 | -0.03 | 0.15 | 0.17 | -0.57 | 0.34 | -1.71 | 91 | 0.09 | 1.40 | 0.24 | -0.58 | 23 | 29 |
| MA | 4 | 163 | 0 | 0.01 | -1.44 | 0.30 | 1 | 0.00 | -1.41 | 0.15 | -0.03 | 0.34 | -0.09 | 84 | 0.93 | 0.00 | 0.99 | 0.07 | 23 | 30 |
| MA | 4 | 103 | 0 | 0.15 | -0.59 | 0.29 | 1 | -0.04 | 0.35 | 0.17 | -0.94 | 0.34 | -2.79 | 95 | 0.01 | 5.51 | 0.02 | -1.00 | 23 | 31 |
| MA | 4 | 245 | 0 | -0.04 | 0.02 | 0.30 | 1 | 0.01 | -0.26 | 0.16 | 0.28 | 0.34 | 0.82 | 84 | 0.42 | 0.57 | 0.45 | 0.34 | 23 | 32 |
| MA | 4 | 167 | 0 | 0.08 | -1.18 | 0.29 | 1 | -0.02 | -0.70 | 0.15 | -0.48 | 0.33 | -1.45 | 84 | 0.15 | 1.32 | 0.25 | -0.44 | 23 | 33 |
| MA | 4 | 1010 | 0 | -0.02 | 4.88 | | 1 | 0.01 | 3.03 | 0.46 | 1.85 | 1.90 | 0.98 | 60 | 0.33 | 0.01 | 0.92 | | 23 | 34 |
| MA | 4 | 277 | 0 | 0.07 | -0.51 | 0.29 | 1 | -0.02 | -0.09 | 0.16 | -0.42 | 0.33 | -1.27 | 89 | 0.21 | 0.20 | 0.65 | -0.20 | 23 | 35 |
| MA | 4 | 240 | 0 | -0.05 | 4.90 | | 1 | 0.01 | 2.18 | 0.32 | 2.72 | 1.89 | 1.44 | 57 | 0.16 | 3.33 | 0.07 | | 23 | 36 |
| MA | 4 | 264 | 0 | 0.00 | 0.01 | 0.30 | 1 | 0.00 | 0.01 | 0.16 | 0.00 | 0.35 | 0.00 | 86 | 1.00 | 0.09 | 0.77 | -0.17 | 23 | 37 |
| MA | 4 | 154 | 0 | 0.09 | -1.18 | 0.29 | 1 | -0.03 | -0.66 | 0.15 | -0.52 | 0.33 | -1.59 | 84 | 0.12 | 1.00 | 0.32 | -0.44 | 23 | 38 |
| MA | 4 | 271 | 0 | -0.01 | -0.59 | 0.29 | 1 | 0.00 | -0.66 | 0.15 | 0.07 | 0.33 | 0.21 | 85 | 0.84 | 0.00 | 0.98 | -0.08 | 23 | 39 |
| MA | 4 | 253 | 0 | -0.07 | 1.01 | 0.37 | 1 | 0.02 | 0.44 | 0.18 | 0.57 | 0.41 | 1.39 | 79 | 0.17 | 1.60 | 0.21 | 0.73 | 23 | 40 |
| MA | 4 | 375 | 0 | -0.11 | 0.55 | 0.24 | 1 | 0.03 | 0.15 | 0.12 | 0.41 | 0.27 | 1.52 | 83 | 0.13 | 0.11 | 0.74 | 0.12 | 23 | 41 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 4 | 267 | 0 | 0.04 | -1.35 | 0.30 | 1 | -0.01 | -1.11 | 0.15 | -0.25 | 0.33 | -0.74 | 83 | 0.46 | 0.09 | 0.77 | -0.21 | 23 | 42 |
| MA | 4 | 242 | 0 | 0.04 | -3.22 | 0.48 | 1 | -0.01 | -2.69 | 0.20 | -0.53 | 0.52 | -1.02 | 74 | 0.31 | 0.49 | 0.49 | -0.55 | 23 | 43 |
| MA | 4 | 274 | 0 | -0.13 | 0.31 | 0.32 | 1 | 0.04 | -0.50 | 0.15 | 0.81 | 0.35 | 2.28 | 80 | 0.03 | 4.90 | 0.03 | 0.90 | 23 | 44 |
| MA | 4 | 246 | 0 | -0.01 | 0.52 | 0.33 | 1 | 0.00 | 0.41 | 0.17 | 0.11 | 0.37 | 0.30 | 86 | 0.77 | 0.61 | 0.44 | 0.46 | 23 | 45 |
| MA | 4 | 373 | 0 | -0.02 | 0.31 | 0.32 | 1 | 0.01 | 0.15 | 0.17 | 0.16 | 0.36 | 0.45 | 85 | 0.66 | 0.01 | 0.94 | -0.05 | 23 | 46 |
| MA | 4 | 278 | 0 | 0.02 | 0.31 | 0.32 | 1 | 0.00 | 0.44 | 0.18 | -0.13 | 0.36 | -0.36 | 89 | 0.72 | 0.15 | 0.69 | -0.23 | 23 | 47 |
| MA | 4 | 1007 | 0 | -0.01 | 0.31 | 0.32 | 1 | 0.00 | 0.25 | 0.17 | 0.06 | 0.36 | 0.16 | 86 | 0.87 | 0.00 | 0.95 | -0.09 | 23 | 48 |
| MA | 4 | 377 | 0 | 0.02 | -0.17 | 0.30 | 1 | 0.00 | -0.06 | 0.16 | -0.10 | 0.34 | -0.30 | 87 | 0.77 | 0.07 | 0.79 | -0.18 | 23 | 49 |
| MA | 4 | 243 | 0 | 0.00 | 0.12 | 0.31 | 1 | 0.00 | 0.12 | 0.16 | 0.00 | 0.35 | 0.00 | 87 | 1.00 | 0.00 | 1.00 | 0.07 | 23 | 50 |
| MA | 4 | 378 | 0 | 0.02 | -0.43 | 0.29 | 1 | -0.01 | -0.31 | 0.15 | -0.12 | 0.33 | -0.35 | 86 | 0.73 | 0.04 | 0.85 | 0.14 | 23 | 51 |
| MA | 4 | 241 | 0 | -0.03 | 0.52 | 0.33 | 1 | 0.01 | 0.32 | 0.17 | 0.20 | 0.37 | 0.54 | 85 | 0.59 | 0.04 | 0.85 | 0.00 | 23 | 52 |
| MA | 4 | 252 | 0 | 0.00 | 2.91 | 0.73 | 1 | 0.00 | 3.03 | 0.46 | -0.12 | 0.86 | -0.13 | 100 | 0.89 | 0.05 | 0.82 | 0.67 | 23 | 53 |
| MA | 4 | 258 | 0 | -0.17 | 0.41 | 0.32 | 1 | 0.05 | -0.66 | 0.15 | 1.07 | 0.36 | 2.99 | 78 | 0.00 | 5.86 | 0.02 | 0.98 | 23 | 54 |
| MA | 4 | 249 | 0 | -0.05 | 0.11 | 0.31 | 1 | 0.01 | -0.21 | 0.16 | 0.32 | 0.35 | 0.94 | 83 | 0.35 | 1.47 | 0.23 | 0.54 | 23 | 55 |
| MA | 5 | 422 | 0 | -0.04 | -0.29 | 0.26 | 1 | 0.01 | -0.50 | 0.15 | 0.20 | 0.30 | 0.68 | 110 | 0.50 | 0.58 | 0.45 | 0.28 | 24 | 1 |
| MA | 5 | 1128 | 0 | -0.02 | -1.05 | 0.23 | 1 | 0.00 | -1.10 | 0.13 | 0.05 | 0.26 | 0.19 | 113 | 0.85 | 0.08 | 0.78 | 0.09 | 24 | 2 |
| MA | 5 | 459 | 0 | 0.04 | 0.50 | 0.31 | 1 | -0.02 | 0.91 | 0.20 | -0.42 | 0.37 | -1.12 | 125 | 0.26 | 1.65 | 0.20 | -0.57 | 24 | 3 |
| MA | 5 | 455 | 0 | -0.03 | -0.16 | 0.27 | 1 | 0.01 | -0.31 | 0.15 | 0.16 | 0.31 | 0.51 | 110 | 0.61 | 0.52 | 0.47 | 0.25 | 24 | 4 |
| MA | 5 | 1217 | 0 | 0.04 | 0.93 | 0.35 | 1 | -0.02 | 1.53 | 0.25 | -0.59 | 0.43 | -1.36 | 135 | 0.17 | 0.55 | 0.46 | -0.36 | 24 | 5 |
| MA | 5 | 434 | 0 | -0.10 | 0.14 | 0.28 | 1 | 0.04 | -0.50 | 0.15 | 0.64 | 0.32 | 2.00 | 102 | 0.05 | 3.63 | 0.06 | 0.68 | 24 | 6 |
| MA | 5 | 432 | 0 | 0.06 | 0.14 | 0.28 | 1 | -0.02 | 0.61 | 0.19 | -0.46 | 0.34 | -1.37 | 125 | 0.17 | 1.12 | 0.29 | -0.42 | 24 | 7 |
| MA | 5 | 417 | 0 | 0.05 | 1.06 | 0.37 | 1 | -0.02 | 1.81 | 0.28 | -0.75 | 0.46 | -1.61 | 145 | 0.11 | 1.16 | 0.28 | -0.71 | 24 | 8 |
| MA | 5 | 424 | 0 | 0.04 | -0.67 | 0.24 | 1 | -0.02 | -0.43 | 0.15 | -0.24 | 0.28 | -0.84 | 118 | 0.40 | 0.22 | 0.64 | -0.14 | 24 | 9 |
| MA | 5 | 441 | 0 | 0.05 | -1.29 | 0.22 | 1 | -0.02 | -1.07 | 0.13 | -0.21 | 0.25 | -0.84 | 119 | 0.40 | 1.49 | 0.22 | -0.43 | 24 | 10 |
| MA | 5 | 1136 | 0 | 0.00 | 0.00 | 0.27 | 1 | 0.00 | 0.00 | 0.16 | 0.00 | 0.32 | 0.00 | 113 | 1.00 | 0.67 | 0.41 | 0.30 | 24 | 11 |
| MA | 5 | 431 | 0 | -0.09 | -0.09 | 0.27 | 1 | 0.03 | -0.62 | 0.15 | 0.54 | 0.31 | 1.76 | 104 | 0.08 | 2.45 | 0.12 | 0.62 | 24 | 12 |
| MA | 5 | 1223 | 0 | 0.08 | 0.40 | 0.30 | 1 | -0.03 | 1.24 | 0.23 | -0.84 | 0.38 | -2.21 | 142 | 0.03 | 2.54 | 0.11 | -0.67 | 24 | 13 |
| MA | 5 | 463 | 0 | 0.02 | 0.31 | 0.30 | 1 | -0.01 | 0.51 | 0.18 | -0.19 | 0.35 | -0.56 | 117 | 0.58 | 0.87 | 0.35 | -0.56 | 24 | 14 |
| MA | 5 | 413 | 0 | 0.00 | -1.04 | 0.23 | 1 | 0.00 | -1.04 | 0.14 | 0.00 | 0.26 | 0.00 | 115 | 1.00 | 0.43 | 0.51 | -0.23 | 24 | 15 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 442 | 0 | 0.00 | 0.24 | 0.29 | 1 | 0.00 | 0.24 | 0.17 | 0.00 | 0.34 | 0.00 | 113 | 1.00 | 0.51 | 0.48 | 0.29 | 24 | 16 |
| MA | 5 | 450 | 0 | -0.02 | 0.06 | 0.28 | 1 | 0.01 | -0.07 | 0.16 | 0.14 | 0.32 | 0.42 | 110 | 0.67 | 0.56 | 0.45 | 0.28 | 24 | 17 |
| MA | 5 | 1202 | 0 | -0.02 | 0.50 | 0.31 | 1 | 0.01 | 0.35 | 0.17 | 0.15 | 0.36 | 0.42 | 108 | 0.67 | 0.12 | 0.73 | 0.13 | 24 | 18 |
| MA | 5 | 1130 | 0 | 0.03 | -0.61 | 0.24 | 1 | -0.01 | -0.45 | 0.15 | -0.16 | 0.29 | -0.55 | 117 | 0.58 | 1.35 | 0.25 | -0.47 | 24 | 19 |
| MA | 5 | 414 | 0 | -0.28 | -1.05 | 0.23 | 1 | 0.10 | -2.06 | 0.11 | 1.01 | 0.25 | 4.07 | 95 | 0.00 | 1.47 | 0.22 | 0.49 | 24 | 20 |
| MA | 5 | 444 | 0 | 0.01 | -0.84 | 0.23 | 1 | 0.00 | -0.80 | 0.14 | -0.03 | 0.27 | -0.12 | 115 | 0.91 | 0.00 | 0.97 | -0.01 | 24 | 21 |
| MA | 5 | 460 | 0 | -0.03 | -1.19 | 0.22 | 1 | 0.01 | -1.30 | 0.13 | 0.11 | 0.25 | 0.42 | 112 | 0.68 | 0.51 | 0.48 | 0.23 | 24 | 22 |
| MA | 5 | 1232 | 0 | -0.04 | 1.37 | 0.41 | 1 | 0.01 | 0.87 | 0.20 | 0.49 | 0.46 | 1.08 | 98 | 0.28 | 1.19 | 0.28 | 0.59 | 24 | 23 |
| MA | 5 | 420 | 0 | 0.05 | 1.75 | 0.48 | 1 | -0.02 | 3.86 | 0.71 | -2.11 | 0.86 | -2.46 | 241 | 0.01 | 17.99 | 0.00 | | 24 | 24 |
| MA | 5 | 462 | 0 | 0.07 | -0.01 | 0.27 | 1 | -0.03 | 0.54 | 0.18 | -0.55 | 0.33 | -1.67 | 127 | 0.10 | 0.17 | 0.68 | -0.15 | 24 | 25 |
| MA | 5 | 436 | 0 | -0.09 | 0.70 | 0.33 | 1 | 0.03 | 0.01 | 0.16 | 0.69 | 0.37 | 1.89 | 98 | 0.06 | 2.21 | 0.14 | 0.65 | 24 | 26 |
| MA | 5 | 1229 | 0 | -0.03 | 1.55 | 0.44 | 1 | 0.01 | 1.14 | 0.22 | 0.41 | 0.49 | 0.83 | 99 | 0.41 | 1.06 | 0.30 | 0.73 | 24 | 27 |
| MA | 5 | 457 | 0 | 0.02 | -0.67 | 0.24 | 1 | -0.01 | -0.56 | 0.15 | -0.11 | 0.28 | -0.38 | 116 | 0.71 | 0.87 | 0.35 | -0.32 | 24 | 28 |
| MA | 5 | 439 | 0 | 0.10 | -0.36 | 0.25 | 1 | -0.04 | 0.32 | 0.17 | -0.68 | 0.31 | -2.19 | 129 | 0.03 | 3.63 | 0.06 | -0.64 | 24 | 29 |
| MA | 5 | 440 | 0 | 0.01 | 1.21 | 0.39 | 1 | 0.00 | 1.35 | 0.24 | -0.14 | 0.45 | -0.31 | 116 | 0.76 | 0.13 | 0.72 | 0.19 | 24 | 30 |
| MA | 5 | 415 | 0 | -0.05 | -0.29 | 0.26 | 1 | 0.02 | -0.56 | 0.15 | 0.27 | 0.30 | 0.90 | 109 | 0.37 | 0.07 | 0.79 | 0.10 | 24 | 31 |
| MA | 5 | 429 | 0 | 0.17 | -0.42 | 0.25 | 1 | -0.06 | 0.83 | 0.20 | -1.26 | 0.32 | -3.91 | 150 | 0.00 | 17.48 | 0.00 | -1.49 | 24 | 32 |
| MA | 5 | 445 | 0 | 0.00 | 0.50 | 0.31 | 1 | 0.00 | 0.47 | 0.18 | 0.02 | 0.36 | 0.06 | 111 | 0.95 | 0.64 | 0.42 | 0.36 | 24 | 33 |
| MA | 5 | 412 | 0 | 0.03 | 0.23 | 0.29 | 1 | -0.01 | 0.51 | 0.18 | -0.28 | 0.34 | -0.81 | 119 | 0.42 | 1.18 | 0.28 | -0.50 | 24 | 34 |
| MA | 5 | 426 | 0 | 0.04 | -0.16 | 0.27 | 1 | -0.02 | 0.11 | 0.17 | -0.27 | 0.31 | -0.87 | 119 | 0.39 | 0.07 | 0.79 | -0.10 | 24 | 35 |
| MA | 5 | 448 | 0 | 0.00 | -0.35 | 0.25 | 1 | 0.00 | -0.35 | 0.15 | 0.00 | 0.30 | 0.00 | 114 | 1.00 | 0.06 | 0.81 | -0.09 | 24 | 36 |
| MA | 5 | 421 | 0 | -0.10 | -0.78 | 0.24 | 1 | 0.04 | -1.25 | 0.13 | 0.47 | 0.27 | 1.74 | 106 | 0.08 | 1.98 | 0.16 | 0.43 | 24 | 37 |
| MA | 5 | 446 | 0 | 0.00 | -0.72 | 0.24 | 1 | 0.00 | -0.72 | 0.14 | 0.00 | 0.28 | 0.00 | 114 | 1.00 | 0.22 | 0.64 | 0.16 | 24 | 38 |
| MA | 5 | 1093 | 0 | 0.04 | 1.37 | 0.41 | 1 | -0.01 | 2.08 | 0.32 | -0.71 | 0.52 | -1.38 | 145 | 0.17 | 0.61 | 0.43 | -0.57 | 24 | 39 |
| MA | 5 | 443 | 0 | 0.06 | 0.14 | 0.28 | 1 | -0.02 | 0.61 | 0.19 | -0.46 | 0.34 | -1.37 | 125 | 0.17 | 2.07 | 0.15 | -0.58 | 24 | 40 |
| MA | 5 | 454 | 0 | 0.02 | -0.09 | 0.27 | 1 | -0.01 | 0.09 | 0.16 | -0.17 | 0.32 | -0.55 | 116 | 0.59 | 0.05 | 0.83 | -0.09 | 24 | 41 |
| MA | 5 | 425 | 0 | -0.01 | -0.16 | 0.27 | 1 | 0.00 | -0.21 | 0.16 | 0.05 | 0.31 | 0.16 | 112 | 0.87 | 0.01 | 0.91 | 0.04 | 24 | 42 |
| MA | 5 | 419 | 0 | -0.03 | 0.81 | 0.34 | 1 | 0.01 | 0.51 | 0.18 | 0.31 | 0.39 | 0.79 | 104 | 0.43 | 1.14 | 0.29 | 0.50 | 24 | 43 |
| MA | 5 | 433 | 0 | 0.00 | -1.48 | 0.21 | 1 | 0.00 | -1.48 | 0.12 | 0.00 | 0.24 | 0.00 | 114 | 1.00 | 0.82 | 0.36 | -0.35 | 24 | 44 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 5 | 458 | 0 | 0.00 | -1.60 | 0.20 | 1 | 0.00 | -1.60 | 0.12 | 0.00 | 0.24 | 0.00 | 114 | 1.00 | 0.14 | 0.71 | 0.13 | 24 | 45 |
| MA | 5 | 416 | 0 | -0.01 | -0.42 | 0.25 | 1 | 0.00 | -0.46 | 0.15 | 0.04 | 0.29 | 0.14 | 113 | 0.89 | 0.04 | 0.85 | 0.08 | 24 | 46 |
| MA | 5 | 456 | 0 | -0.01 | -0.29 | 0.26 | 1 | 0.00 | -0.33 | 0.15 | 0.04 | 0.30 | 0.12 | 112 | 0.91 | 0.00 | 0.95 | 0.02 | 24 | 47 |
| MA | 5 | 449 | 0 | 0.02 | 0.60 | 0.32 | 1 | -0.01 | 0.75 | 0.20 | -0.16 | 0.37 | -0.42 | 116 | 0.67 | 0.01 | 0.94 | -0.03 | 24 | 48 |
| MA | 5 | 435 | 0 | 0.00 | -1.25 | 0.22 | 1 | 0.00 | -1.25 | 0.13 | 0.00 | 0.25 | 0.00 | 114 | 1.00 | 0.60 | 0.44 | -0.29 | 24 | 49 |
| MA | 5 | 452 | 0 | 0.03 | -0.49 | 0.25 | 1 | -0.01 | -0.34 | 0.15 | -0.15 | 0.29 | -0.51 | 116 | 0.61 | 0.05 | 0.82 | -0.07 | 24 | 50 |
| MA | 5 | 1187 | 0 | -0.01 | -0.23 | 0.26 | 1 | 0.00 | -0.28 | 0.15 | 0.05 | 0.30 | 0.17 | 112 | 0.87 | 0.06 | 0.81 | 0.08 | 24 | 51 |
| MA | 5 | 451 | 0 | 0.01 | -0.29 | 0.26 | 1 | 0.00 | -0.26 | 0.15 | -0.03 | 0.30 | -0.11 | 114 | 0.91 | 0.16 | 0.69 | -0.14 | 24 | 52 |
| MA | 5 | 1058 | 0 | -0.03 | 0.14 | 0.28 | 1 | 0.01 | -0.05 | 0.16 | 0.19 | 0.33 | 0.58 | 109 | 0.56 | 1.03 | 0.31 | 0.38 | 24 | 53 |
| MA | 5 | 464 | 0 | -0.08 | 0.59 | 0.32 | 1 | 0.03 | 0.01 | 0.16 | 0.59 | 0.36 | 1.64 | 100 | 0.10 | 1.18 | 0.28 | 0.50 | 24 | 54 |
| MA | 5 | 437 | 0 | 0.03 | -0.16 | 0.27 | 1 | -0.01 | 0.06 | 0.16 | -0.22 | 0.31 | -0.70 | 117 | 0.49 | 0.02 | 0.88 | 0.05 | 24 | 55 |
| MA | 5 | 1121 | 0 | -0.07 | 0.14 | 0.28 | 1 | 0.02 | -0.29 | 0.15 | 0.44 | 0.32 | 1.35 | 105 | 0.18 | 1.00 | 0.32 | 0.31 | 24 | 56 |
| MA | 5 | 453 | 0 | 0.00 | 0.79 | 0.34 | 1 | 0.00 | 0.79 | 0.20 | 0.00 | 0.39 | 0.00 | 111 | 1.00 | 0.03 | 0.86 | -0.10 | 24 | 57 |
| MA | 5 | 428 | 0 | 0.01 | 0.23 | 0.29 | 1 | -0.01 | 0.32 | 0.17 | -0.09 | 0.34 | -0.26 | 114 | 0.79 | 0.32 | 0.57 | 0.22 | 24 | 58 |
| MA | 6 | 581 | 0 | 0.03 | -0.12 | 0.34 | 1 | -0.02 | 0.21 | 0.25 | -0.34 | 0.42 | -0.80 | 109 | 0.43 | 0.12 | 0.73 | -0.33 | 19 | 1 |
| MA | 6 | 568 | 0 | 0.03 | -1.26 | 0.29 | 1 | -0.01 | -1.08 | 0.21 | -0.18 | 0.36 | -0.50 | 104 | 0.62 | 0.24 | 0.63 | -0.26 | 19 | 2 |
| MA | 6 | 579 | 0 | -0.08 | -0.01 | 0.35 | 1 | 0.04 | -0.64 | 0.22 | 0.63 | 0.41 | 1.55 | 93 | 0.13 | 2.32 | 0.13 | 0.87 | 19 | 3 |
| MA | 6 | 470 | 0 | 0.02 | 0.54 | 0.40 | 1 | -0.01 | 0.80 | 0.30 | -0.26 | 0.50 | -0.52 | 108 | 0.61 | 0.43 | 0.51 | -0.58 | 19 | 4 |
| MA | 6 | 468 | 0 | 0.01 | -0.82 | 0.30 | 1 | 0.00 | -0.79 | 0.21 | -0.03 | 0.37 | -0.09 | 104 | 0.93 | 0.69 | 0.41 | -0.48 | 19 | 5 |
| MA | 6 | 1200 | 0 | -0.01 | -0.34 | 0.32 | 1 | 0.01 | -0.45 | 0.22 | 0.11 | 0.39 | 0.27 | 101 | 0.79 | 0.05 | 0.83 | 0.17 | 19 | 6 |
| MA | 6 | 551 | 0 | 0.06 | -0.64 | 0.31 | 1 | -0.03 | -0.19 | 0.23 | -0.45 | 0.38 | -1.16 | 110 | 0.25 | 0.06 | 0.81 | -0.20 | 19 | 7 |
| MA | 6 | 480 | 0 | 0.03 | -0.34 | 0.32 | 1 | -0.01 | -0.08 | 0.24 | -0.26 | 0.40 | -0.64 | 107 | 0.52 | 0.00 | 0.97 | -0.11 | 19 | 8 |
| MA | 6 | 469 | 0 | -0.01 | -0.17 | 0.16 | 1 | 0.01 | -0.17 | 0.11 | 0.00 | 0.20 | 0.00 | 101 | 1.00 | 0.05 | 0.82 | 0.09 | 19 | 9 |
| MA | 6 | 585 | 0 | 0.01 | 2.14 | 0.73 | 1 | -0.01 | 2.67 | 0.60 | -0.53 | 0.94 | -0.56 | 118 | 0.58 | 0.00 | 0.99 | -0.70 | 19 | 10 |
| MA | 6 | 578 | 0 | -0.01 | -0.34 | 0.32 | 1 | 0.01 | -0.45 | 0.22 | 0.11 | 0.39 | 0.27 | 101 | 0.79 | 0.19 | 0.66 | 0.29 | 19 | 11 |
| MA | 6 | 1251 | 0 | 0.00 | 1.38 | 0.53 | 1 | 0.00 | 1.42 | 0.36 | -0.04 | 0.65 | -0.06 | 101 | 0.95 | 0.39 | 0.53 | 0.00 | 19 | 12 |
| MA | 6 | 490 | 0 | -0.01 | -0.34 | 0.32 | 1 | 0.00 | -0.38 | 0.22 | 0.04 | 0.39 | 0.10 | 102 | 0.92 | 0.01 | 0.91 | 0.04 | 19 | 13 |
| MA | 6 | 1256 | 0 | -0.02 | 0.39 | 0.38 | 1 | 0.01 | 0.15 | 0.25 | 0.24 | 0.46 | 0.52 | 96 | 0.60 | 0.14 | 0.70 | 0.32 | 19 | 14 |
| MA | 6 | 502 | 0 | -0.04 | 0.68 | 0.29 | 1 | 0.02 | 0.43 | 0.19 | 0.25 | 0.34 | 0.74 | 96 | 0.46 | 0.26 | 0.61 | 0.23 | 19 | 15 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 484 | 0 | -0.01 | 0.71 | 0.42 | 1 | 0.01 | 0.56 | 0.28 | 0.16 | 0.50 | 0.31 | 96 | 0.76 | 0.02 | 0.90 | 0.22 | 19 | 16 |
| MA | 6 | 1131 | 0 | -0.01 | -0.02 | 0.17 | 1 | 0.01 | -0.02 | 0.11 | 0.00 | 0.20 | 0.00 | 100 | 1.00 | 0.07 | 0.79 | -0.12 | 19 | 17 |
| MA | 6 | 1062 | 0 | 0.04 | 0.43 | 0.24 | 1 | -0.02 | 0.61 | 0.17 | -0.18 | 0.29 | -0.60 | 107 | 0.55 | 2.02 | 0.15 | -1.05 | 19 | 18 |
| MA | 6 | 537 | 0 | -0.04 | -0.91 | 0.30 | 1 | 0.02 | -1.17 | 0.21 | 0.25 | 0.36 | 0.70 | 102 | 0.49 | 0.06 | 0.81 | 0.18 | 19 | 19 |
| MA | 6 | 567 | 0 | 0.08 | -1.00 | 0.30 | 1 | -0.04 | -0.45 | 0.22 | -0.55 | 0.37 | -1.50 | 109 | 0.14 | 1.22 | 0.27 | -0.52 | 19 | 20 |
| MA | 6 | 577 | 0 | 0.04 | 0.54 | 0.40 | 1 | -0.02 | 1.19 | 0.33 | -0.65 | 0.52 | -1.25 | 121 | 0.21 | 0.02 | 0.88 | -0.24 | 19 | 21 |
| MA | 6 | 1142 | 0 | -0.06 | -0.73 | 0.30 | 1 | 0.03 | -1.12 | 0.21 | 0.39 | 0.37 | 1.06 | 100 | 0.29 | 0.87 | 0.35 | 0.45 | 19 | 22 |
| MA | 6 | 487 | 0 | 0.08 | -0.34 | 0.32 | 1 | -0.04 | 0.41 | 0.26 | -0.75 | 0.42 | -1.80 | 119 | 0.07 | 1.51 | 0.22 | -0.57 | 19 | 23 |
| MA | 6 | 580 | 0 | -0.03 | 0.25 | 0.37 | 1 | 0.01 | -0.03 | 0.24 | 0.28 | 0.44 | 0.63 | 96 | 0.53 | 0.00 | 0.97 | 0.09 | 19 | 24 |
| MA | 6 | 526 | 0 | -0.01 | -0.64 | 0.31 | 1 | 0.01 | -0.73 | 0.21 | 0.09 | 0.37 | 0.24 | 102 | 0.81 | 0.58 | 0.44 | 0.40 | 19 | 25 |
| MA | 6 | 1253 | 0 | -0.05 | 0.71 | 0.42 | 1 | 0.03 | 0.09 | 0.24 | 0.62 | 0.49 | 1.28 | 87 | 0.21 | 1.19 | 0.28 | 0.87 | 19 | 26 |
| MA | 6 | 534 | 0 | 0.00 | 0.40 | 0.38 | 1 | 0.00 | 0.40 | 0.26 | 0.00 | 0.47 | 0.00 | 102 | 1.00 | 0.01 | 0.93 | -0.08 | 19 | 27 |
| MA | 6 | 1225 | 0 | -0.01 | 2.14 | 0.73 | 1 | 0.01 | 1.73 | 0.41 | 0.41 | 0.84 | 0.49 | 85 | 0.63 | 0.26 | 0.61 | -0.18 | 19 | 28 |
| MA | 6 | 520 | 0 | -0.03 | 0.25 | 0.37 | 1 | 0.01 | -0.03 | 0.24 | 0.28 | 0.44 | 0.63 | 96 | 0.53 | 0.00 | 0.95 | 0.15 | 19 | 29 |
| MA | 6 | 499 | 0 | -0.01 | 0.25 | 0.37 | 1 | 0.00 | 0.15 | 0.25 | 0.10 | 0.44 | 0.22 | 99 | 0.83 | 0.02 | 0.88 | 0.21 | 19 | 30 |
| MA | 6 | 535 | 0 | 0.01 | -1.17 | 0.29 | 1 | 0.00 | -1.14 | 0.21 | -0.03 | 0.36 | -0.09 | 104 | 0.93 | 0.13 | 0.72 | -0.21 | 19 | 31 |
| MA | 6 | 571 | 0 | -0.11 | -1.51 | 0.29 | 1 | 0.05 | -2.27 | 0.22 | 0.76 | 0.37 | 2.06 | 111 | 0.04 | 2.72 | 0.10 | 0.87 | 19 | 32 |
| MA | 6 | 553 | 0 | 0.03 | -0.34 | 0.32 | 1 | -0.01 | -0.08 | 0.24 | -0.26 | 0.40 | -0.64 | 107 | 0.52 | 1.30 | 0.25 | -0.62 | 19 | 33 |
| MA | 6 | 563 | 0 | -0.05 | -0.34 | 0.32 | 1 | 0.02 | -0.73 | 0.21 | 0.39 | 0.39 | 1.00 | 98 | 0.32 | 0.64 | 0.42 | 0.42 | 19 | 34 |
| MA | 6 | 550 | 0 | 0.04 | -1.00 | 0.30 | 1 | -0.02 | -0.68 | 0.21 | -0.32 | 0.36 | -0.87 | 106 | 0.39 | 1.66 | 0.20 | -0.73 | 19 | 35 |
| MA | 6 | 515 | 0 | 0.04 | -0.91 | 0.30 | 1 | -0.02 | -0.64 | 0.22 | -0.28 | 0.37 | -0.75 | 106 | 0.46 | 0.00 | 0.98 | -0.07 | 19 | 36 |
| MA | 6 | 509 | 0 | 0.03 | -1.09 | 0.29 | 1 | -0.02 | -0.86 | 0.21 | -0.22 | 0.36 | -0.62 | 105 | 0.54 | 0.19 | 0.66 | -0.24 | 19 | 37 |
| MA | 6 | 495 | 0 | 0.06 | -1.09 | 0.29 | 1 | -0.03 | -0.64 | 0.22 | -0.45 | 0.36 | -1.24 | 107 | 0.22 | 1.33 | 0.25 | -0.51 | 19 | 38 |
| MA | 6 | 574 | 0 | -0.04 | -0.24 | 0.33 | 1 | 0.02 | -0.59 | 0.22 | 0.36 | 0.39 | 0.90 | 97 | 0.37 | 1.07 | 0.30 | 0.57 | 19 | 39 |
| MA | 6 | 478 | 0 | 0.01 | -0.73 | 0.30 | 1 | -0.01 | -0.64 | 0.22 | -0.09 | 0.37 | -0.25 | 104 | 0.80 | 0.02 | 0.90 | -0.15 | 19 | 40 |
| MA | 6 | 575 | 0 | 0.04 | 1.12 | 0.49 | 1 | -0.02 | 2.11 | 0.47 | -1.00 | 0.68 | -1.47 | 137 | 0.14 | 0.00 | 0.98 | -1.27 | 19 | 41 |
| MA | 6 | 491 | 0 | -0.14 | 0.58 | 0.23 | 1 | 0.07 | 0.08 | 0.14 | 0.51 | 0.27 | 1.88 | 90 | 0.06 | 4.85 | 0.03 | 0.99 | 19 | 42 |
| MA | 6 | 512 | 0 | -0.01 | 0.54 | 0.40 | 1 | 0.01 | 0.41 | 0.26 | 0.13 | 0.48 | 0.27 | 98 | 0.79 | 0.01 | 0.91 | 0.06 | 19 | 43 |
| MA | 6 | 521 | 0 | 0.09 | -0.34 | 0.32 | 1 | -0.04 | 0.56 | 0.28 | -0.90 | 0.42 | -2.12 | 123 | 0.04 | 1.38 | 0.24 | -0.60 | 19 | 44 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 6 | 1101 | 0 | 0.08 | -1.26 | 0.29 | 1 | -0.04 | -0.68 | 0.21 | -0.58 | 0.36 | -1.59 | 107 | 0.11 | 2.46 | 0.12 | -0.70 | 19 | 45 |
| MA | 6 | 572 | 0 | -0.01 | -0.24 | 0.33 | 1 | 0.00 | -0.28 | 0.23 | 0.04 | 0.40 | 0.11 | 101 | 0.92 | 0.46 | 0.50 | 0.40 | 19 | 46 |
| MA | 6 | 476 | 0 | -0.01 | 1.12 | 0.49 | 1 | 0.00 | 0.98 | 0.31 | 0.13 | 0.58 | 0.23 | 96 | 0.82 | 0.01 | 0.92 | 0.26 | 19 | 47 |
| MA | 6 | 1203 | 0 | -0.05 | -0.82 | 0.30 | 1 | 0.02 | -1.17 | 0.21 | 0.34 | 0.36 | 0.94 | 101 | 0.35 | 1.16 | 0.28 | 0.54 | 19 | 48 |
| MA | 6 | 524 | 0 | -0.02 | 2.14 | 0.73 | 1 | 0.01 | 1.58 | 0.38 | 0.57 | 0.83 | 0.68 | 81 | 0.50 | 0.00 | 0.96 | 0.34 | 19 | 49 |
| MA | 6 | 514 | 0 | 0.06 | -1.26 | 0.29 | 1 | -0.03 | -0.86 | 0.21 | -0.40 | 0.36 | -1.10 | 106 | 0.27 | 0.34 | 0.56 | -0.32 | 19 | 50 |
| MA | 6 | 1063 | 0 | -0.06 | -0.64 | 0.31 | 1 | 0.03 | -1.04 | 0.21 | 0.40 | 0.37 | 1.07 | 100 | 0.29 | 0.53 | 0.47 | 0.41 | 19 | 51 |
| MA | 6 | 570 | 0 | -0.01 | 2.14 | 0.73 | 1 | 0.01 | 1.73 | 0.41 | 0.41 | 0.84 | 0.49 | 85 | 0.63 | | | | 19 | 52 |
| MA | 6 | 545 | 0 | -0.01 | -0.01 | 0.35 | 1 | 0.00 | -0.08 | 0.24 | 0.08 | 0.42 | 0.18 | 100 | 0.86 | 0.03 | 0.87 | -0.05 | 19 | 53 |
| MA | 6 | 517 | 0 | 0.00 | -0.24 | 0.33 | 1 | 0.00 | -0.21 | 0.23 | -0.03 | 0.40 | -0.07 | 103 | 0.94 | 0.03 | 0.86 | -0.04 | 19 | 54 |
| MA | 6 | 466 | 0 | 0.03 | 0.71 | 0.42 | 1 | -0.01 | 1.19 | 0.33 | -0.48 | 0.54 | -0.90 | 115 | 0.37 | 0.35 | 0.55 | -0.53 | 19 | 55 |
| MA | 6 | 482 | 0 | -0.02 | | 1.00 | 0.01 | 2.36 | 0.52 | 1.74 | 1.91 | 0.91 | 60.00 | 0.3653 | 0.23 | 0.64 | | | 19 | 56 |
| MA | 6 | 1254 | 0 | 0.03 | -1.17 | 0.29 | 1 | -0.01 | -0.99 | 0.21 | -0.18 | 0.36 | -0.50 | 104 | 0.62 | 0.04 | 0.85 | -0.16 | 19 | 57 |
| MA | 7 | 475 | 0 | -0.06 | 1.17 | 0.46 | 1 | 0.06 | -0.04 | 0.28 | 1.21 | 0.54 | 2.24 | 127 | 0.03 | 4.74 | 0.03 | 1.24 | 17 | 1 |
| MA | 7 | 564 | 0 | 0.02 | -0.24 | 0.27 | 1 | -0.02 | -0.04 | 0.28 | -0.20 | 0.39 | -0.51 | 158 | 0.61 | 0.31 | 0.58 | -0.24 | 17 | 2 |
| MA | 7 | 505 | 0 | 0.03 | -0.87 | 0.23 | 1 | -0.03 | -0.57 | 0.24 | -0.30 | 0.34 | -0.89 | 157 | 0.37 | 0.07 | 0.79 | -0.09 | 17 | 3 |
| MA | 7 | 516 | 0 | -0.03 | 1.17 | 0.46 | 1 | 0.03 | 0.51 | 0.33 | 0.67 | 0.57 | 1.17 | 141 | 0.24 | 0.04 | 0.84 | 0.12 | 17 | 4 |
| MA | 7 | 508 | 0 | -0.04 | -1.37 | 0.22 | 1 | 0.04 | -1.64 | 0.21 | 0.26 | 0.30 | 0.88 | 157 | 0.38 | 1.30 | 0.26 | 0.42 | 17 | 5 |
| MA | 7 | 525 | 0 | 0.00 | -0.76 | 0.24 | 1 | 0.00 | -0.78 | 0.23 | 0.02 | 0.33 | 0.06 | 157 | 0.95 | 0.17 | 0.68 | -0.14 | 17 | 6 |
| MA | 7 | 1134 | 0 | 0.02 | -1.28 | 0.22 | 1 | -0.02 | -1.10 | 0.22 | -0.18 | 0.31 | -0.58 | 157 | 0.56 | 0.02 | 0.90 | -0.04 | 17 | 7 |
| MA | 7 | 1066 | 0 | -0.02 | 2.84 | 1.01 | 1 | 0.01 | 1.65 | 0.52 | 1.19 | 1.13 | 1.05 | 116 | 0.29 | 1.20 | 0.27 | 1.51 | 17 | 8 |
| MA | 7 | 488 | 0 | 0.00 | -0.18 | 0.28 | 1 | 0.00 | -0.18 | 0.27 | 0.00 | 0.39 | 0.00 | 157 | 1.00 | 0.05 | 0.82 | 0.10 | 17 | 9 |
| MA | 7 | 477 | 0 | 0.01 | 0.40 | 0.34 | 1 | -0.01 | 0.51 | 0.33 | -0.10 | 0.47 | -0.22 | 157 | 0.83 | 0.00 | 0.97 | 0.02 | 17 | 10 |
| MA | 7 | 494 | 0 | -0.01 | -0.58 | 0.25 | 1 | 0.01 | -0.69 | 0.24 | 0.11 | 0.34 | 0.31 | 157 | 0.76 | 0.07 | 0.80 | 0.11 | 17 | 11 |
| MA | 7 | 506 | 0 | -0.02 | -0.16 | 0.28 | 1 | 0.02 | -0.39 | 0.25 | 0.23 | 0.38 | 0.60 | 155 | 0.55 | 0.35 | 0.56 | 0.23 | 17 | 12 |
| MA | 7 | 496 | 0 | -0.04 | -0.58 | 0.25 | 1 | 0.04 | -0.95 | 0.22 | 0.37 | 0.34 | 1.11 | 155 | 0.27 | 1.80 | 0.18 | 0.47 | 17 | 13 |
| MA | 7 | 479 | 0 | 0.03 | 0.00 | 0.30 | 1 | -0.03 | 0.40 | 0.32 | -0.40 | 0.43 | -0.91 | 157 | 0.36 | 0.19 | 0.66 | -0.21 | 17 | 14 |
| MA | 7 | 483 | 0 | 0.11 | -0.52 | 0.25 | 1 | -0.11 | 1.21 | 0.43 | -1.72 | 0.50 | -3.44 | 129 | 0.00 | 8.97 | 0.00 | -1.54 | 17 | 15 |
| MA | 7 | 559 | 0 | 0.06 | -0.64 | 0.25 | 1 | -0.06 | 0.04 | 0.28 | -0.68 | 0.38 | -1.81 | 155 | 0.07 | 1.49 | 0.22 | -0.48 | 17 | 16 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 486 | 0 | -0.01 | -0.38 | 0.26 | 1 | 0.01 | -0.51 | 0.25 | 0.13 | 0.36 | 0.36 | 156 | 0.72 | 0.85 | 0.36 | 0.36 | 17 | 17 |
| MA | 7 | 1234 | 0 | 0.06 | -0.70 | 0.24 | 1 | -0.06 | -0.11 | 0.27 | -0.59 | 0.36 | -1.61 | 156 | 0.11 | 1.08 | 0.30 | -0.39 | 17 | 18 |
| MA | 7 | 1247 | 0 | 0.01 | 1.71 | 0.59 | 1 | -0.01 | 2.38 | 0.72 | -0.67 | 0.93 | -0.72 | 152 | 0.47 | 0.04 | 0.84 | -0.19 | 17 | 19 |
| MA | 7 | 481 | 0 | -0.07 | -0.98 | 0.23 | 1 | 0.06 | -1.46 | 0.21 | 0.49 | 0.31 | 1.57 | 156 | 0.12 | 0.24 | 0.63 | 0.19 | 17 | 20 |
| MA | 7 | 498 | 0 | -0.01 | -0.82 | 0.24 | 1 | 0.01 | -0.90 | 0.23 | 0.08 | 0.33 | 0.25 | 157 | 0.80 | 0.04 | 0.85 | 0.07 | 17 | 21 |
| MA | 7 | 485 | 0 | -0.05 | 0.19 | 0.31 | 1 | 0.04 | -0.39 | 0.25 | 0.58 | 0.40 | 1.43 | 150 | 0.15 | 2.61 | 0.11 | 0.64 | 17 | 22 |
| MA | 7 | 1237 | 0 | -0.01 | 0.66 | 0.37 | 1 | 0.01 | 0.51 | 0.33 | 0.15 | 0.50 | 0.30 | 155 | 0.76 | 0.02 | 0.89 | -0.09 | 17 | 23 |
| MA | 7 | 555 | 0 | -0.01 | 4.06 | 1.83 | 1 | 0.01 | 3.10 | 1.01 | 0.96 | 2.09 | 0.46 | 121 | 0.65 | 0.50 | 0.48 | | 17 | 24 |
| MA | 7 | 557 | 0 | -0.02 | -1.03 | 0.23 | 1 | 0.02 | -1.19 | 0.22 | 0.16 | 0.31 | 0.52 | 157 | 0.61 | 0.13 | 0.72 | 0.13 | 17 | 25 |
| MA | 7 | 552 | 0 | 0.02 | 0.66 | 0.37 | 1 | -0.02 | 1.21 | 0.43 | -0.55 | 0.57 | -0.96 | 155 | 0.34 | 0.74 | 0.39 | -0.64 | 17 | 26 |
| MA | 7 | 536 | 0 | -0.03 | -1.23 | 0.22 | 1 | 0.02 | -1.42 | 0.21 | 0.19 | 0.30 | 0.62 | 157 | 0.53 | 0.50 | 0.48 | 0.26 | 17 | 27 |
| MA | 7 | 549 | 0 | 0.01 | -0.16 | 0.28 | 1 | -0.01 | -0.04 | 0.28 | -0.12 | 0.39 | -0.31 | 157 | 0.76 | 0.23 | 0.63 | -0.20 | 17 | 28 |
| MA | 7 | 541 | 0 | 0.04 | -1.37 | 0.22 | 1 | -0.04 | -1.05 | 0.22 | -0.32 | 0.31 | -1.05 | 157 | 0.30 | 1.61 | 0.20 | -0.44 | 17 | 29 |
| MA | 7 | 501 | 0 | 0.00 | 2.14 | 0.72 | 1 | 0.00 | 2.38 | 0.72 | -0.24 | 1.02 | -0.24 | 157 | 0.81 | 0.02 | 0.88 | -0.15 | 17 | 30 |
| MA | 7 | 547 | 0 | -0.07 | -0.87 | 0.23 | 1 | 0.06 | -1.38 | 0.21 | 0.51 | 0.32 | 1.60 | 155 | 0.11 | 0.05 | 0.82 | 0.09 | 17 | 31 |
| MA | 7 | 513 | 0 | -0.02 | 4.06 | 1.83 | 1 | 0.02 | 1.96 | 0.59 | 2.10 | 1.93 | 1.09 | 94 | 0.28 | | | | 17 | 32 |
| MA | 7 | 503 | 0 | -0.02 | -0.52 | 0.25 | 1 | 0.02 | -0.69 | 0.24 | 0.17 | 0.35 | 0.49 | 156 | 0.63 | 0.08 | 0.77 | 0.11 | 17 | 33 |
| MA | 7 | 1252 | 0 | 0.01 | 2.13 | 0.72 | 1 | -0.01 | 4.32 | 1.83 | -2.19 | 1.97 | -1.11 | 103 | 0.27 | 0.73 | 0.39 | | 17 | 34 |
| MA | 7 | 493 | 0 | -0.01 | -0.24 | 0.27 | 1 | 0.01 | -0.39 | 0.25 | 0.15 | 0.37 | 0.40 | 156 | 0.69 | 0.11 | 0.74 | 0.13 | 17 | 35 |
| MA | 7 | 561 | 0 | 0.02 | -0.31 | 0.27 | 1 | -0.02 | -0.11 | 0.27 | -0.20 | 0.38 | -0.52 | 157 | 0.61 | 0.61 | 0.44 | -0.30 | 17 | 36 |
| MA | 7 | 492 | 0 | 0.03 | -0.24 | 0.27 | 1 | -0.03 | 0.12 | 0.29 | -0.36 | 0.40 | -0.91 | 157 | 0.37 | 1.21 | 0.27 | -0.54 | 17 | 37 |
| MA | 7 | 511 | 0 | 0.05 | -0.45 | 0.26 | 1 | -0.05 | 0.12 | 0.29 | -0.58 | 0.39 | -1.48 | 156 | 0.14 | 1.05 | 0.31 | -0.39 | 17 | 38 |
| MA | 7 | 616 | 0 | 0.02 | -1.37 | 0.22 | 1 | -0.02 | -1.19 | 0.22 | -0.18 | 0.31 | -0.59 | 157 | 0.56 | 0.13 | 0.72 | -0.12 | 17 | 39 |
| MA | 7 | 562 | 0 | 0.03 | -2.03 | 0.20 | 1 | -0.03 | -1.84 | 0.20 | -0.19 | 0.29 | -0.65 | 157 | 0.52 | 0.01 | 0.93 | -0.03 | 17 | 40 |
| MA | 7 | 533 | 0 | -0.04 | -0.24 | 0.27 | 1 | 0.04 | -0.69 | 0.24 | 0.45 | 0.36 | 1.24 | 154 | 0.22 | 0.54 | 0.46 | 0.29 | 17 | 41 |
| MA | 7 | 467 | 0 | 0.04 | 0.19 | 0.31 | 1 | -0.04 | 1.04 | 0.40 | -0.84 | 0.51 | -1.65 | 150 | 0.10 | 2.32 | 0.13 | -0.89 | 17 | 42 |
| MA | 7 | 471 | 0 | 0.03 | 0.81 | 0.40 | 1 | -0.03 | 1.96 | 0.59 | -1.15 | 0.72 | -1.61 | 138 | 0.11 | 2.47 | 0.12 | -1.42 | 17 | 43 |
| MA | 7 | 543 | 0 | 0.06 | -0.08 | 0.29 | 1 | -0.06 | 1.03 | 0.40 | -1.11 | 0.49 | -2.25 | 144 | 0.03 | 1.54 | 0.21 | -0.55 | 17 | 44 |
| MA | 7 | 474 | 0 | 0.02 | 0.19 | 0.31 | 1 | -0.02 | 0.51 | 0.33 | -0.32 | 0.46 | -0.69 | 157 | 0.49 | 0.04 | 0.84 | -0.11 | 17 | 45 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 7 | 565 | 0 | -0.02 | -0.52 | 0.25 | 1 | 0.02 | -0.74 | 0.23 | 0.23 | 0.35 | 0.65 | 156 | 0.51 | 0.29 | 0.59 | 0.19 | 17 | 46 |
| MA | 7 | 522 | 0 | -0.03 | 0.66 | 0.37 | 1 | 0.02 | 0.21 | 0.30 | 0.45 | 0.48 | 0.93 | 149 | 0.35 | 0.50 | 0.48 | 0.42 | 17 | 47 |
| MA | 7 | 489 | 0 | -0.01 | -0.70 | 0.24 | 1 | 0.01 | -0.79 | 0.23 | 0.09 | 0.34 | 0.28 | 157 | 0.78 | 0.12 | 0.73 | -0.13 | 17 | 48 |
| MA | 7 | 540 | 0 | 0.00 | -0.39 | 0.26 | 1 | 0.00 | -0.39 | 0.25 | 0.00 | 0.37 | 0.00 | 157 | 1.00 | 0.02 | 0.89 | -0.06 | 17 | 49 |
| MA | 7 | 523 | 0 | -0.02 | -1.08 | 0.23 | 1 | 0.02 | -1.24 | 0.22 | 0.16 | 0.31 | 0.51 | 157 | 0.61 | 0.13 | 0.72 | 0.13 | 17 | 50 |
| MA | 7 | 527 | 0 | -0.02 | -0.08 | 0.29 | 1 | 0.01 | -0.25 | 0.26 | 0.17 | 0.39 | 0.45 | 156 | 0.65 | 0.01 | 0.92 | -0.05 | 17 | 51 |
| MA | 7 | 1241 | 0 | 0.00 | -0.76 | 0.24 | 1 | 0.00 | -0.78 | 0.23 | 0.02 | 0.33 | 0.06 | 157 | 0.95 | 0.38 | 0.54 | 0.24 | 17 | 52 |
| MA | 7 | 1244 | 0 | -0.04 | 1.18 | 0.46 | 1 | 0.04 | 0.30 | 0.31 | 0.87 | 0.56 | 1.57 | 136 | 0.12 | 3.61 | 0.06 | 1.07 | 17 | 53 |
| MA | 7 | 1264 | 0 | 0.01 | 1.71 | 0.59 | 1 | -0.01 | 2.38 | 0.72 | -0.67 | 0.93 | -0.72 | 152 | 0.47 | 0.93 | 0.33 | -0.91 | 17 | 54 |
| MA | 7 | 1259 | 0 | -0.03 | 0.10 | 0.30 | 1 | 0.03 | -0.26 | 0.26 | 0.35 | 0.40 | 0.87 | 153 | 0.38 | 0.59 | 0.44 | 0.32 | 17 | 55 |
| MA | 7 | 1065 | 0 | -0.01 | -0.98 | 0.23 | 1 | 0.01 | -1.05 | 0.22 | 0.07 | 0.32 | 0.22 | 157 | 0.82 | 0.03 | 0.87 | 0.06 | 17 | 56 |
| MA | 8 | 602 | 0 | 0.01 | 0.00 | 0.31 | 1 | -0.01 | 0.19 | 0.34 | -0.19 | 0.46 | -0.42 | 130 | 0.68 | 0.71 | 0.40 | -0.61 | 19 | 1 |
| MA | 8 | 594 | 0 | -0.06 | -0.59 | 0.27 | 1 | 0.06 | -1.13 | 0.26 | 0.54 | 0.38 | 1.43 | 131 | 0.15 | 2.78 | 0.10 | 0.76 | 19 | 2 |
| MA | 8 | 593 | 0 | 0.00 | -0.52 | 0.28 | 1 | 0.00 | -0.47 | 0.29 | -0.04 | 0.40 | -0.11 | 131 | 0.91 | 0.01 | 0.91 | 0.03 | 19 | 3 |
| MA | 8 | 583 | 0 | 0.00 | 0.37 | 0.24 | 1 | 0.00 | 0.37 | 0.24 | 0.00 | 0.34 | 0.00 | 131 | 1.00 | 0.67 | 0.41 | 0.36 | 19 | 4 |
| MA | 8 | 544 | 0 | -0.02 | 0.00 | 0.31 | 1 | 0.03 | -0.31 | 0.30 | 0.30 | 0.43 | 0.70 | 131 | 0.48 | 0.07 | 0.79 | 0.22 | 19 | 5 |
| MA | 8 | 604 | 0 | -0.06 | -0.28 | 0.29 | 1 | 0.07 | -0.93 | 0.27 | 0.65 | 0.39 | 1.65 | 131 | 0.10 | 2.30 | 0.13 | 0.67 | 19 | 6 |
| MA | 8 | 597 | 0 | -0.04 | -0.74 | 0.27 | 1 | 0.04 | -1.13 | 0.26 | 0.40 | 0.37 | 1.06 | 131 | 0.29 | 0.66 | 0.42 | 0.50 | 19 | 7 |
| MA | 8 | 1236 | 0 | -0.02 | 0.10 | 0.32 | 1 | 0.02 | -0.22 | 0.30 | 0.31 | 0.44 | 0.71 | 131 | 0.48 | 0.44 | 0.51 | 0.37 | 19 | 8 |
| MA | 8 | 569 | 0 | 0.00 | -0.01 | 0.31 | 1 | 0.00 | -0.01 | 0.32 | 0.00 | 0.45 | 0.00 | 131 | 1.00 | 0.44 | 0.50 | 0.44 | 19 | 9 |
| MA | 8 | 1230 | 0 | 0.00 | -0.36 | 0.29 | 1 | 0.00 | -0.31 | 0.30 | -0.05 | 0.41 | -0.13 | 131 | 0.90 | 0.01 | 0.94 | -0.06 | 19 | 10 |
| MA | 8 | 1135 | 0 | 0.01 | -0.03 | 0.23 | 1 | -0.01 | 0.06 | 0.25 | -0.09 | 0.34 | -0.26 | 130 | 0.80 | 0.60 | 0.44 | -0.55 | 19 | 11 |
| MA | 8 | 590 | 0 | -0.02 | 1.05 | 0.44 | 1 | 0.02 | 0.58 | 0.38 | 0.48 | 0.58 | 0.82 | 130 | 0.41 | 1.96 | 0.16 | 1.46 | 19 | 12 |
| MA | 8 | 573 | 0 | 0.02 | -0.28 | 0.29 | 1 | -0.02 | -0.02 | 0.32 | -0.25 | 0.43 | -0.58 | 130 | 0.56 | 0.11 | 0.74 | -0.26 | 19 | 13 |
| MA | 8 | 596 | 0 | 0.02 | -1.14 | 0.25 | 1 | -0.02 | -0.93 | 0.27 | -0.22 | 0.37 | -0.59 | 131 | 0.56 | 0.56 | 0.45 | -0.36 | 19 | 14 |
| MA | 8 | 615 | 0 | 0.04 | 0.20 | 0.33 | 1 | -0.04 | 0.91 | 0.43 | -0.71 | 0.55 | -1.29 | 121 | 0.20 | 0.92 | 0.34 | -0.62 | 19 | 15 |
| MA | 8 | 531 | 0 | 0.00 | 0.20 | 0.33 | 1 | 0.00 | 0.20 | 0.34 | 0.00 | 0.47 | 0.00 | 131 | 1.00 | 0.04 | 0.84 | 0.03 | 19 | 16 |
| MA | 8 | 601 | 0 | -0.01 | 0.20 | 0.33 | 1 | 0.01 | 0.08 | 0.33 | 0.12 | 0.46 | 0.26 | 131 | 0.79 | 0.00 | 0.96 | 0.17 | 19 | 17 |
| MA | 8 | 618 | 0 | 0.01 | -2.10 | 0.26 | 1 | -0.01 | -2.01 | 0.26 | -0.09 | 0.37 | -0.25 | 131 | 0.80 | 0.01 | 0.94 | 0.05 | 19 | 18 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 1138 | 0 | 0.02 | 1.16 | 0.45 | 1 | -0.02 | 1.99 | 0.91 | -0.83 | 1.02 | -0.81 | 93 | 0.42 | 0.08 | 0.78 | -0.33 | 19 | 19 |
| MA | 8 | 620 | 0 | 0.00 | 2.99 | 1.01 | 1 | 0.00 | 2.81 | 1.01 | 0.18 | 1.43 | 0.12 | 131 | 0.90 | 0.21 | 0.65 | 0.38 | 19 | 20 |
| MA | 8 | 607 | 0 | -0.03 | -0.28 | 0.29 | 1 | 0.03 | -0.63 | 0.28 | 0.36 | 0.40 | 0.89 | 131 | 0.38 | 0.38 | 0.54 | 0.37 | 19 | 21 |
| MA | 8 | 1270 | 0 | 0.01 | -0.10 | 0.30 | 1 | -0.01 | -0.03 | 0.32 | -0.07 | 0.44 | -0.17 | 131 | 0.87 | 0.58 | 0.44 | -0.49 | 19 | 22 |
| MA | 8 | 1273 | 0 | 0.00 | 0.20 | 0.33 | 1 | 0.00 | 0.20 | 0.34 | 0.00 | 0.47 | 0.00 | 131 | 1.00 | 0.04 | 0.85 | 0.22 | 19 | 23 |
| MA | 8 | 576 | 0 | -0.03 | 1.52 | 0.53 | 1 | 0.03 | 0.73 | 0.41 | 0.79 | 0.67 | 1.18 | 125 | 0.24 | 0.05 | 0.83 | 0.39 | 19 | 24 |
| MA | 8 | 1269 | 0 | -0.01 | -0.74 | 0.27 | 1 | 0.01 | -0.86 | 0.27 | 0.12 | 0.38 | 0.31 | 131 | 0.76 | 0.14 | 0.71 | 0.26 | 19 | 25 |
| MA | 8 | 582 | 0 | 0.06 | 0.83 | 0.26 | 1 | -0.07 | 1.59 | 0.34 | -0.75 | 0.43 | -1.74 | 121 | 0.08 | 4.44 | 0.04 | -1.07 | 19 | 26 |
| MA | 8 | 548 | 0 | -0.01 | 2.27 | 0.73 | 1 | 0.01 | 1.67 | 0.60 | 0.60 | 0.94 | 0.64 | 128 | 0.52 | 0.28 | 0.60 | 1.47 | 19 | 27 |
| MA | 8 | 598 | 0 | 0.02 | -0.88 | 0.26 | 1 | -0.02 | -0.71 | 0.27 | -0.17 | 0.38 | -0.45 | 131 | 0.66 | 0.04 | 0.84 | -0.16 | 19 | 28 |
| MA | 8 | 617 | 0 | 0.02 | -0.19 | 0.30 | 1 | -0.02 | 0.08 | 0.33 | -0.27 | 0.44 | -0.61 | 129 | 0.55 | 0.12 | 0.73 | -0.25 | 19 | 29 |
| MA | 8 | 591 | 0 | 0.02 | 1.05 | 0.44 | 1 | -0.02 | 1.67 | 0.60 | -0.61 | 0.74 | -0.83 | 119 | 0.41 | 1.38 | 0.24 | -1.56 | 19 | 30 |
| MA | 8 | 613 | 0 | -0.10 | 0.44 | 0.22 | 1 | 0.10 | -0.11 | 0.19 | 0.55 | 0.29 | 1.90 | 129 | 0.06 | 4.00 | 0.05 | 0.93 | 19 | 31 |
| MA | 8 | 592 | 0 | 0.04 | -0.67 | 0.27 | 1 | -0.04 | -0.22 | 0.30 | -0.45 | 0.41 | -1.11 | 129 | 0.27 | 2.02 | 0.15 | -0.71 | 19 | 32 |
| MA | 8 | 621 | 0 | 0.02 | -1.59 | 0.25 | 1 | -0.02 | -1.40 | 0.26 | -0.18 | 0.36 | -0.51 | 131 | 0.61 | 0.02 | 0.89 | 0.02 | 19 | 33 |
| MA | 8 | 1218 | 0 | 0.00 | 2.27 | 0.73 | 1 | 0.00 | 2.09 | 0.72 | 0.18 | 1.02 | 0.17 | 131 | 0.86 | 0.18 | 0.67 | -0.09 | 19 | 34 |
| MA | 8 | 529 | 0 | 0.05 | -0.19 | 0.30 | 1 | -0.05 | 0.58 | 0.38 | -0.77 | 0.49 | -1.58 | 122 | 0.12 | 0.36 | 0.55 | -0.44 | 19 | 35 |
| MA | 8 | 1141 | 0 | -0.09 | -0.59 | 0.27 | 1 | 0.09 | -1.40 | 0.26 | 0.81 | 0.38 | 2.15 | 131 | 0.03 | 3.03 | 0.08 | 0.89 | 19 | 36 |
| MA | 8 | 584 | 0 | 0.05 | -0.74 | 0.27 | 1 | -0.06 | -0.12 | 0.31 | -0.62 | 0.41 | -1.51 | 127 | 0.13 | 1.69 | 0.19 | -0.66 | 19 | 37 |
| MA | 8 | 566 | 0 | -0.02 | -0.10 | 0.30 | 1 | 0.03 | -0.39 | 0.29 | 0.29 | 0.42 | 0.70 | 131 | 0.49 | 0.04 | 0.84 | -0.01 | 19 | 38 |
| MA | 8 | 1268 | 0 | -0.02 | 3.00 | 1.02 | 1 | 0.03 | 1.36 | 0.52 | 1.64 | 1.14 | 1.44 | 100 | 0.15 | 1.26 | 0.26 | | 19 | 39 |
| MA | 8 | 1228 | 0 | 0.03 | -0.59 | 0.27 | 1 | -0.03 | -0.31 | 0.30 | -0.29 | 0.40 | -0.71 | 130 | 0.48 | 0.04 | 0.84 | -0.19 | 19 | 40 |
| MA | 8 | 588 | 0 | 0.01 | 1.52 | 0.53 | 1 | -0.01 | 2.09 | 0.72 | -0.58 | 0.89 | -0.64 | 118 | 0.52 | 0.08 | 0.78 | -0.86 | 19 | 41 |
| MA | 8 | 612 | 0 | 0.01 | -0.10 | 0.30 | 1 | -0.01 | -0.03 | 0.32 | -0.07 | 0.44 | -0.17 | 131 | 0.87 | 0.02 | 0.88 | -0.07 | 19 | 42 |
| MA | 8 | 542 | 0 | 0.01 | 1.52 | 0.53 | 1 | -0.01 | 2.09 | 0.72 | -0.58 | 0.89 | -0.64 | 118 | 0.52 | 0.01 | 0.91 | -0.54 | 19 | 43 |
| MA | 8 | 1274 | 0 | 0.00 | -0.20 | 0.30 | 1 | 0.00 | -0.20 | 0.30 | 0.00 | 0.42 | 0.00 | 131 | 1.00 | 0.06 | 0.80 | 0.00 | 19 | 44 |
| MA | 8 | 600 | 0 | 0.01 | -1.46 | 0.25 | 1 | -0.01 | -1.34 | 0.26 | -0.13 | 0.36 | -0.35 | 131 | 0.73 | 0.01 | 0.91 | -0.03 | 19 | 45 |
| MA | 8 | 614 | 0 | 0.05 | -1.21 | 0.25 | 1 | -0.05 | -0.78 | 0.27 | -0.42 | 0.37 | -1.15 | 130 | 0.25 | 0.76 | 0.38 | -0.45 | 19 | 46 |
| MA | 8 | 586 | 0 | -0.03 | -0.36 | 0.29 | 1 | 0.03 | -0.71 | 0.27 | 0.35 | 0.40 | 0.88 | 131 | 0.38 | 0.96 | 0.33 | 0.47 | 19 | 47 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| MA | 8 | 608 | 0 | -0.02 | -0.95 | 0.26 | 1 | 0.02 | -1.13 | 0.26 | 0.19 | 0.37 | 0.51 | 131 | 0.61 | 0.01 | 0.92 | 0.11 | 19 | 48 |
| MA | 8 | 611 | 0 | 0.01 | -1.65 | 0.25 | 1 | -0.01 | -1.60 | 0.26 | -0.05 | 0.36 | -0.13 | 131 | 0.89 | 0.09 | 0.77 | -0.18 | 19 | 49 |
| MA | 8 | 556 | 0 | 0.05 | 0.10 | 0.32 | 1 | -0.05 | 1.11 | 0.47 | -1.02 | 0.57 | -1.78 | 114 | 0.08 | 4.61 | 0.03 | -2.16 | 19 | 50 |
| MA | 8 | 532 | 0 | -0.02 | -0.28 | 0.29 | 1 | 0.02 | -0.47 | 0.29 | 0.20 | 0.41 | 0.49 | 131 | 0.63 | 0.04 | 0.84 | 0.18 | 19 | 51 |
| MA | 8 | 530 | 0 | 0.05 | -1.01 | 0.26 | 1 | -0.06 | -0.47 | 0.29 | -0.54 | 0.38 | -1.40 | 129 | 0.16 | 0.37 | 0.55 | -0.31 | 19 | 52 |
| MA | 8 | 603 | 0 | -0.02 | -1.27 | 0.25 | 1 | 0.02 | -1.47 | 0.26 | 0.20 | 0.36 | 0.55 | 131 | 0.59 | 0.01 | 0.93 | 0.04 | 19 | 53 |
| MA | 8 | 599 | 0 | 0.02 | -0.28 | 0.29 | 1 | -0.02 | -0.02 | 0.32 | -0.25 | 0.43 | -0.58 | 130 | 0.56 | 1.02 | 0.31 | -0.62 | 19 | 54 |
| MA | 8 | 589 | 0 | -0.01 | -0.95 | 0.26 | 1 | 0.01 | -1.00 | 0.26 | 0.05 | 0.37 | 0.14 | 131 | 0.89 | 0.00 | 0.98 | 0.09 | 19 | 55 |
| MA | 8 | 1140 | 0 | -0.01 | 2.27 | 0.73 | 1 | 0.01 | 1.67 | 0.60 | 0.60 | 0.94 | 0.64 | 128 | 0.52 | 0.02 | 0.89 | 0.89 | 19 | 56 |

## Appendix Table I.7:Science: DIF FRL

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1369 | C | 0.02 | 0.91 | 0.26 | D | -0.03 | 1.44 | 0.31 | -0.53 | 0.41 | -1.30 | 231 | 0.19 | 0.25 | 0.62 | -0.32 | 29 | 1 |
| SC | 5 | 1327 | C | -0.01 | -0.05 | 0.20 | D | 0.01 | -0.17 | 0.21 | 0.12 | 0.29 | 0.42 | 244 | 0.67 | 0.35 | 0.55 | 0.24 | 29 | 2 |
| SC | 5 | 1365 | C | 0.02 | 0.39 | 0.22 | D | -0.03 | 0.74 | 0.25 | -0.35 | 0.33 | -1.04 | 238 | 0.30 | 1.05 | 0.31 | -0.44 | 29 | 3 |
| SC | 5 | 1320 | C | 0.01 | 1.29 | 0.30 | D | -0.01 | 1.54 | 0.32 | -0.25 | 0.44 | -0.56 | 241 | 0.58 | 0.00 | 0.97 | -0.18 | 29 | 4 |
| SC | 5 | 1372 | C | 0.01 | 0.47 | 0.13 | D | -0.01 | 0.52 | 0.12 | -0.05 | 0.17 | -0.31 | 248 | 0.76 | 0.53 | 0.47 | -0.28 | 29 | 5 |
| SC | 5 | 1344 | C | 0.04 | -0.70 | 0.18 | D | -0.05 | -0.26 | 0.21 | -0.44 | 0.28 | -1.60 | 238 | 0.11 | 0.16 | 0.69 | -0.15 | 29 | 6 |
| SC | 5 | 1373 | C | 0.01 | -0.80 | 0.18 | D | -0.02 | -0.67 | 0.20 | -0.13 | 0.27 | -0.49 | 240 | 0.63 | 0.00 | 0.95 | -0.03 | 29 | 7 |
| SC | 5 | 1324 | C | -0.01 | 0.55 | 0.23 | D | 0.01 | 0.45 | 0.23 | 0.10 | 0.33 | 0.29 | 246 | 0.77 | 0.45 | 0.50 | 0.26 | 29 | 8 |
| SC | 5 | 1334 | C | 0.00 | 0.36 | 0.16 | D | 0.00 | 0.36 | 0.16 | 0.00 | 0.22 | 0.00 | 246 | 1.00 | 0.03 | 0.86 | -0.06 | 29 | 9 |
| SC | 5 | 1366 | C | 0.06 | -0.09 | 0.20 | D | -0.07 | 0.68 | 0.25 | -0.77 | 0.32 | -2.43 | 227 | 0.02 | 4.08 | 0.04 | -0.89 | 29 | 10 |
| SC | 5 | 1358 | C | 0.03 | -0.80 | 0.18 | D | -0.04 | -0.51 | 0.20 | -0.29 | 0.27 | -1.08 | 239 | 0.28 | 0.97 | 0.33 | -0.35 | 29 | 11 |
| SC | 5 | 1349 | C | -0.03 | 0.91 | 0.26 | D | 0.03 | 0.45 | 0.23 | 0.46 | 0.35 | 1.30 | 248 | 0.19 | 2.84 | 0.09 | 0.72 | 29 | 12 |
| SC | 5 | 1359 | C | 0.04 | -0.32 | 0.19 | D | -0.05 | 0.20 | 0.22 | -0.51 | 0.29 | -1.75 | 235 | 0.08 | 1.83 | 0.18 | -0.50 | 29 | 13 |
| SC | 5 | 1328 | C | 0.01 | -1.75 | 0.19 | D | -0.01 | -1.68 | 0.21 | -0.07 | 0.28 | -0.23 | 238 | 0.82 | 0.14 | 0.71 | -0.18 | 29 | 14 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1370 | C | -0.03 | -0.28 | 0.19 | D | 0.03 | -0.59 | 0.20 | 0.31 | 0.28 | 1.11 | 244 | 0.27 | 0.15 | 0.70 | 0.17 | 29 | 15 |
| SC | 5 | 1361 | C | -0.02 | -0.28 | 0.19 | D | 0.02 | -0.46 | 0.20 | 0.19 | 0.28 | 0.67 | 243 | 0.51 | 0.56 | 0.45 | 0.26 | 29 | 16 |
| SC | 5 | 1331 | C | -0.03 | 0.12 | 0.12 | D | 0.04 | 0.01 | 0.12 | 0.11 | 0.17 | 0.66 | 246 | 0.51 | 0.02 | 0.90 | -0.04 | 29 | 17 |
| SC | 5 | 1348 | C | 0.06 | 0.44 | 0.23 | D | -0.08 | 1.77 | 0.35 | -1.32 | 0.42 | -3.15 | 196 | 0.00 | 4.16 | 0.04 | -0.98 | 29 | 18 |
| SC | 5 | 1326 | C | 0.02 | -0.24 | 0.19 | D | -0.03 | 0.01 | 0.21 | -0.25 | 0.29 | -0.86 | 240 | 0.39 | 0.02 | 0.90 | -0.09 | 29 | 19 |
| SC | 5 | 1325 | C | -0.03 | -0.56 | 0.19 | D | 0.04 | -0.86 | 0.20 | 0.30 | 0.27 | 1.11 | 242 | 0.27 | 0.30 | 0.58 | 0.21 | 29 | 20 |
| SC | 5 | 1332 | C | -0.04 | -0.56 | 0.19 | D | 0.05 | -0.94 | 0.20 | 0.38 | 0.27 | 1.40 | 242 | 0.16 | 0.95 | 0.33 | 0.33 | 29 | 21 |
| SC | 5 | 1353 | C | 0.00 | 1.83 | 0.37 | D | 0.00 | 1.77 | 0.35 | 0.07 | 0.51 | 0.13 | 248 | 0.89 | 0.21 | 0.65 | 0.39 | 29 | 22 |
| SC | 5 | 1368 | C | -0.02 | 1.29 | 0.30 | D | 0.02 | 0.94 | 0.27 | 0.35 | 0.40 | 0.87 | 248 | 0.38 | 0.02 | 0.90 | 0.05 | 29 | 23 |
| SC | 5 | 1347 | C | 0.02 | -1.38 | 0.18 | D | -0.02 | -1.18 | 0.20 | -0.20 | 0.27 | -0.73 | 239 | 0.46 | 0.00 | 0.98 | 0.05 | 29 | 24 |
| SC | 5 | 1340 | C | 0.01 | 0.84 | 0.25 | D | -0.02 | 1.09 | 0.28 | -0.25 | 0.38 | -0.66 | 240 | 0.51 | 0.01 | 0.91 | 0.04 | 29 | 25 |
| SC | 5 | 1362 | C | -0.02 | -0.90 | 0.18 | D | 0.02 | -1.10 | 0.20 | 0.21 | 0.27 | 0.77 | 239 | 0.44 | 0.15 | 0.70 | 0.15 | 29 | 26 |
| SC | 5 | 1319 | C | 0.05 | -0.13 | 0.20 | D | -0.06 | 0.51 | 0.24 | -0.63 | 0.31 | -2.06 | 232 | 0.04 | 0.12 | 0.73 | -0.16 | 29 | 27 |
| SC | 5 | 1318 | C | -0.02 | 0.72 | 0.24 | D | 0.03 | 0.40 | 0.23 | 0.32 | 0.34 | 0.95 | 248 | 0.34 | 0.03 | 0.87 | -0.20 | 29 | 28 |
| SC | 5 | 1354 | C | -0.02 | 0.44 | 0.23 | D | 0.02 | 0.20 | 0.22 | 0.25 | 0.32 | 0.79 | 247 | 0.43 | 0.44 | 0.51 | 0.28 | 29 | 29 |
| SC | 5 | 1341 | C | -0.01 | -0.40 | 0.10 | D | 0.01 | -0.40 | 0.10 | 0.00 | 0.14 | 0.00 | 243 | 1.00 | 0.75 | 0.39 | -0.24 | 29 | 30 |
| SC | 5 | 1321 | C | -0.03 | -1.68 | 0.18 | D | 0.04 | -2.06 | 0.22 | 0.38 | 0.29 | 1.30 | 230 | 0.19 | 0.25 | 0.62 | 0.22 | 29 | 31 |
| SC | 5 | 1330 | C | 0.01 | -0.39 | 0.19 | D | -0.01 | -0.26 | 0.21 | -0.13 | 0.28 | -0.47 | 241 | 0.64 | 0.02 | 0.88 | 0.00 | 29 | 32 |
| SC | 5 | 1356 | C | -0.05 | -1.34 | 0.12 | D | 0.05 | -1.56 | 0.14 | 0.23 | 0.19 | 1.19 | 235 | 0.24 | 0.46 | 0.50 | 0.20 | 29 | 33 |
| SC | 5 | 1371 | C | 0.02 | -0.90 | 0.18 | D | -0.03 | -0.67 | 0.20 | -0.23 | 0.27 | -0.85 | 239 | 0.40 | 1.31 | 0.25 | -0.38 | 29 | 34 |
| SC | 5 | 1374 | C | 0.03 | -0.09 | 0.20 | D | -0.04 | 0.35 | 0.23 | -0.43 | 0.30 | -1.44 | 236 | 0.15 | 0.29 | 0.59 | -0.22 | 29 | 35 |
| SC | 5 | 1329 | C | 0.03 | -0.66 | 0.18 | D | -0.03 | -0.38 | 0.20 | -0.28 | 0.27 | -1.03 | 239 | 0.30 | 1.28 | 0.26 | -0.39 | 29 | 36 |
| SC | 5 | 1350 | C | 0.01 | 0.46 | 0.12 | D | 0.00 | 0.46 | 0.11 | 0.00 | 0.17 | 0.00 | 248 | 1.00 | 1.53 | 0.22 | -0.45 | 29 | 37 |
| SC | 5 | 1322 | C | -0.02 | -1.78 | 0.19 | D | 0.03 | -2.06 | 0.22 | 0.27 | 0.29 | 0.94 | 231 | 0.35 | 1.20 | 0.27 | 0.46 | 29 | 38 |
| SC | 5 | 1363 | C | 0.00 | 1.29 | 0.30 | D | 0.00 | 1.34 | 0.30 | -0.05 | 0.42 | -0.12 | 246 | 0.91 | 0.01 | 0.93 | 0.14 | 29 | 39 |
| SC | 5 | 1367 | C | 0.01 | -0.70 | 0.18 | D | -0.01 | -0.63 | 0.20 | -0.07 | 0.27 | -0.26 | 240 | 0.79 | 0.00 | 0.96 | -0.03 | 29 | 40 |
| SC | 5 | 1336 | C | -0.02 | -0.46 | 0.19 | D | 0.02 | -0.63 | 0.20 | 0.17 | 0.27 | 0.61 | 242 | 0.54 | 0.28 | 0.60 | 0.21 | 29 | 41 |
| SC | 5 | 1323 | C | -0.01 | -1.12 | 0.18 | D | 0.01 | -1.18 | 0.20 | 0.06 | 0.27 | 0.23 | 239 | 0.82 | 0.01 | 0.93 | -0.07 | 29 | 42 |
| SC | 5 | 1364 | C | -0.02 | 0.84 | 0.25 | D | 0.02 | 0.56 | 0.24 | 0.28 | 0.35 | 0.80 | 248 | 0.43 | 0.05 | 0.83 | 0.16 | 29 | 43 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1357 | C | -0.03 | 1.98 | 0.39 | D | 0.03 | 1.17 | 0.29 | 0.81 | 0.49 | 1.67 | 237 | 0.10 | 0.45 | 0.50 | 0.51 | 29 | 44 |
| SC | 5 | 1360 | C | -0.02 | 2.87 | 0.59 | D | 0.02 | 1.77 | 0.35 | 1.11 | 0.69 | 1.61 | 218 | 0.11 | 3.29 | 0.07 | | 29 | 45 |
| SC | 5 | 1346 | C | 0.02 | 0.91 | 0.26 | D | -0.03 | 1.44 | 0.31 | -0.53 | 0.41 | -1.30 | 231 | 0.19 | 0.84 | 0.36 | -0.49 | 29 | 46 |
| SC | 5 | 1315 | C | 0.04 | 0.53 | 0.12 | D | -0.04 | 0.67 | 0.12 | -0.14 | 0.17 | -0.83 | 245 | 0.40 | 2.09 | 0.15 | -0.48 | 29 | 47 |
| SC | 5 | 1317 | C | -0.05 | -0.90 | 0.18 | D | 0.06 | -1.39 | 0.20 | 0.49 | 0.27 | 1.80 | 238 | 0.07 | 2.75 | 0.10 | 0.50 | 29 | 48 |
| SC | 5 | 1333 | C | 0.03 | -0.32 | 0.19 | D | -0.03 | 0.01 | 0.21 | -0.32 | 0.29 | -1.13 | 239 | 0.26 | 0.16 | 0.69 | -0.16 | 29 | 49 |
| SC | 5 | 1351 | C | -0.04 | 0.08 | 0.21 | D | 0.05 | -0.42 | 0.20 | 0.50 | 0.29 | 1.73 | 247 | 0.09 | 3.13 | 0.08 | 0.61 | 29 | 50 |
| SC | 5 | 1337 | C | -0.05 | 0.25 | 0.21 | D | 0.06 | -0.30 | 0.21 | 0.55 | 0.30 | 1.85 | 248 | 0.06 | 4.73 | 0.03 | 0.68 | 29 | 51 |
| SC | 5 | 1338 | C | 0.00 | 0.06 | 0.21 | D | 0.00 | 0.06 | 0.22 | 0.00 | 0.30 | 0.00 | 244 | 1.00 | 0.02 | 0.89 | 0.08 | 29 | 52 |
| SC | 5 | 1339 | C | -0.02 | 0.30 | 0.22 | D | 0.03 | 0.01 | 0.21 | 0.29 | 0.30 | 0.95 | 247 | 0.34 | 3.07 | 0.08 | 0.61 | 29 | 53 |
| SC | 8 | 983 | C | -0.02 | 2.88 | 1.01 | D | 0.02 | 1.50 | 0.52 | 1.38 | 1.14 | 1.21 | 116 | 0.23 | 0.00 | 0.99 | 0.57 | 22 | 1 |
| SC | 8 | 962 | C | -0.02 | -2.13 | 0.24 | D | 0.03 | -2.38 | 0.29 | 0.26 | 0.37 | 0.69 | 130 | 0.49 | 0.01 | 0.92 | 0.16 | 22 | 2 |
| SC | 8 | 962 | C | -0.02 | -2.10 | 0.24 | D | 0.03 | -2.35 | 0.30 | 0.25 | 0.38 | 0.65 | 123 | 0.52 | 0.01 | 0.94 | 0.08 | 22 | 2 |
| SC | 8 | 952 | C | -0.01 | -1.11 | 0.24 | D | 0.01 | -1.21 | 0.27 | 0.10 | 0.36 | 0.27 | 136 | 0.79 | 0.04 | 0.84 | 0.16 | 22 | 3 |
| SC | 8 | 952 | C | 0.00 | -1.18 | 0.25 | D | 0.00 | -1.18 | 0.27 | 0.00 | 0.37 | 0.00 | 130 | 1.00 | 0.01 | 0.94 | 0.11 | 22 | 3 |
| SC | 8 | 951 | C | 0.00 | 1.43 | 0.52 | D | 0.00 | 1.50 | 0.52 | -0.07 | 0.74 | -0.10 | 139 | 0.92 | 0.10 | 0.76 | -0.69 | 22 | 4 |
| SC | 8 | 951 | C | 0.00 | 1.40 | 0.52 | D | 0.00 | 1.48 | 0.53 | -0.08 | 0.74 | -0.11 | 133 | 0.91 | 0.10 | 0.76 | -0.69 | 22 | 4 |
| SC | 8 | 977 | C | 0.04 | -0.93 | 0.25 | D | -0.05 | -0.46 | 0.29 | -0.47 | 0.38 | -1.22 | 133 | 0.22 | 1.66 | 0.20 | -0.60 | 22 | 5 |
| SC | 8 | 977 | C | 0.04 | -0.91 | 0.26 | D | -0.05 | -0.41 | 0.29 | -0.50 | 0.39 | -1.28 | 127 | 0.20 | 1.77 | 0.18 | -0.65 | 22 | 5 |
| SC | 8 | 1109 | C | 0.03 | -1.34 | 0.24 | D | -0.03 | -1.07 | 0.27 | -0.28 | 0.36 | -0.77 | 135 | 0.44 | 0.04 | 0.85 | -0.14 | 22 | 6 |
| SC | 8 | 1109 | C | 0.02 | -1.34 | 0.24 | D | -0.03 | -1.12 | 0.27 | -0.22 | 0.37 | -0.61 | 129 | 0.54 | 0.01 | 0.93 | -0.04 | 22 | 6 |
| SC | 8 | 956 | C | -0.02 | -1.05 | 0.25 | D | 0.02 | -1.21 | 0.27 | 0.16 | 0.36 | 0.44 | 137 | 0.66 | 0.01 | 0.92 | 0.12 | 22 | 7 |
| SC | 8 | 956 | C | 0.00 | -1.11 | 0.25 | D | 0.00 | -1.11 | 0.27 | 0.00 | 0.37 | 0.00 | 130 | 1.00 | 0.00 | 0.96 | 0.06 | 22 | 7 |
| SC | 8 | 959 | C | 0.00 | 2.88 | 1.01 | D | 0.00 | 2.96 | 1.01 | -0.08 | 1.43 | -0.06 | 140 | 0.95 | 0.00 | 1.00 | | 22 | 8 |
| SC | 8 | 959 | C | 0.00 | 2.85 | 1.01 | D | 0.00 | 2.94 | 1.01 | -0.09 | 1.43 | -0.06 | 134 | 0.95 | 0.00 | 1.00 | | 22 | 8 |
| SC | 8 | 955 | C | 0.00 | 0.29 | 0.33 | D | 0.00 | 0.29 | 0.34 | 0.00 | 0.48 | 0.00 | 139 | 1.00 | 0.06 | 0.81 | -0.01 | 22 | 9 |
| SC | 8 | 955 | C | 0.00 | 0.36 | 0.35 | D | 0.00 | 0.41 | 0.36 | -0.05 | 0.50 | -0.10 | 133 | 0.92 | 0.03 | 0.85 | -0.05 | 22 | 9 |
| SC | 8 | 1238 | C | 0.03 | -0.03 | 0.31 | D | -0.04 | 0.56 | 0.37 | -0.60 | 0.48 | -1.25 | 129 | 0.22 | 1.11 | 0.29 | -0.73 | 22 | 10 |
| SC | 8 | 1238 | C | 0.03 | 0.13 | 0.32 | D | -0.04 | 0.68 | 0.39 | -0.55 | 0.51 | -1.09 | 124 | 0.28 | 1.43 | 0.23 | -0.91 | 22 | 10 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 1205 | C | 0.03 | -0.59 | 0.27 | D | -0.04 | -0.20 | 0.30 | -0.39 | 0.40 | -0.98 | 134 | 0.33 | 0.49 | 0.48 | -0.43 | 22 | 11 |
| SC | 8 | 1205 | C | 0.04 | -0.64 | 0.27 | D | -0.05 | -0.14 | 0.31 | -0.50 | 0.41 | -1.21 | 127 | 0.23 | 0.29 | 0.59 | -0.36 | 22 | 11 |
| SC | 8 | 1257 | C | 0.00 | -1.69 | 0.24 | D | 0.00 | -1.69 | 0.27 | 0.00 | 0.36 | 0.00 | 134 | 1.00 | 0.15 | 0.70 | 0.23 | 22 | 12 |
| SC | 8 | 1257 | C | 0.01 | -1.69 | 0.24 | D | -0.01 | -1.64 | 0.27 | -0.06 | 0.36 | -0.16 | 128 | 0.87 | 0.02 | 0.89 | 0.14 | 22 | 12 |
| SC | 8 | 932 | C | -0.02 | -0.99 | 0.25 | D | 0.03 | -1.21 | 0.27 | 0.22 | 0.36 | 0.61 | 137 | 0.55 | 0.01 | 0.91 | 0.13 | 22 | 13 |
| SC | 8 | 932 | C | -0.01 | -1.04 | 0.25 | D | 0.02 | -1.20 | 0.27 | 0.16 | 0.37 | 0.42 | 131 | 0.67 | 0.00 | 0.96 | 0.07 | 22 | 13 |
| SC | 8 | 1111 | C | 0.03 | -0.03 | 0.31 | D | -0.04 | 0.56 | 0.37 | -0.60 | 0.48 | -1.25 | 129 | 0.22 | 0.06 | 0.81 | -0.27 | 22 | 14 |
| SC | 8 | 1111 | C | 0.03 | 0.03 | 0.32 | D | -0.04 | 0.54 | 0.37 | -0.51 | 0.49 | -1.05 | 125 | 0.30 | 0.00 | 0.98 | -0.16 | 22 | 14 |
| SC | 8 | 1260 | C | -0.04 | 0.81 | 0.40 | D | 0.05 | -0.01 | 0.31 | 0.82 | 0.51 | 1.60 | 139 | 0.11 | 0.45 | 0.50 | 0.57 | 22 | 15 |
| SC | 8 | 1260 | C | -0.04 | 0.78 | 0.41 | D | 0.05 | -0.04 | 0.32 | 0.82 | 0.51 | 1.60 | 133 | 0.11 | 0.48 | 0.49 | 0.58 | 22 | 15 |
| SC | 8 | 1265 | C | 0.00 | -0.60 | 0.27 | D | -0.01 | -0.54 | 0.28 | -0.05 | 0.39 | -0.14 | 137 | 0.89 | 0.01 | 0.91 | 0.03 | 22 | 16 |
| SC | 8 | 1265 | C | 0.01 | -0.57 | 0.27 | D | -0.01 | -0.50 | 0.29 | -0.07 | 0.40 | -0.17 | 131 | 0.87 | 0.04 | 0.85 | -0.01 | 22 | 16 |
| SC | 8 | 953 | C | 0.04 | -0.99 | 0.25 | D | -0.05 | -0.54 | 0.28 | -0.45 | 0.38 | -1.19 | 133 | 0.24 | 0.38 | 0.54 | -0.32 | 22 | 17 |
| SC | 8 | 953 | C | 0.04 | -0.98 | 0.25 | D | -0.04 | -0.58 | 0.29 | -0.39 | 0.38 | -1.03 | 128 | 0.30 | 0.23 | 0.63 | -0.27 | 22 | 17 |
| SC | 8 | 954 | C | 0.02 | -0.66 | 0.26 | D | -0.03 | -0.38 | 0.29 | -0.29 | 0.39 | -0.73 | 135 | 0.46 | 1.01 | 0.31 | -0.56 | 22 | 18 |
| SC | 8 | 954 | C | 0.03 | -0.64 | 0.27 | D | -0.03 | -0.33 | 0.30 | -0.31 | 0.40 | -0.78 | 129 | 0.44 | 1.58 | 0.21 | -0.74 | 22 | 18 |
| SC | 8 | 942 | C | 0.01 | -1.57 | 0.24 | D | -0.02 | -1.42 | 0.26 | -0.15 | 0.35 | -0.42 | 135 | 0.67 | 0.01 | 0.93 | 0.04 | 22 | 19 |
| SC | 8 | 942 | C | 0.02 | -1.58 | 0.24 | D | -0.03 | -1.34 | 0.27 | -0.24 | 0.36 | -0.65 | 128 | 0.51 | 0.03 | 0.86 | -0.01 | 22 | 19 |
| SC | 8 | 936 | C | -0.01 | -0.73 | 0.26 | D | 0.01 | -0.85 | 0.27 | 0.12 | 0.38 | 0.31 | 138 | 0.76 | 0.25 | 0.62 | -0.35 | 22 | 20 |
| SC | 8 | 936 | C | -0.01 | -0.78 | 0.26 | D | 0.01 | -0.90 | 0.28 | 0.12 | 0.38 | 0.31 | 132 | 0.75 | 0.11 | 0.74 | -0.27 | 22 | 20 |
| SC | 8 | 964 | C | -0.01 | 0.06 | 0.31 | D | 0.01 | -0.11 | 0.31 | 0.17 | 0.44 | 0.39 | 140 | 0.70 | 0.06 | 0.80 | -0.01 | 22 | 21 |
| SC | 8 | 964 | C | -0.01 | 0.03 | 0.32 | D | 0.01 | -0.14 | 0.31 | 0.17 | 0.44 | 0.38 | 134 | 0.70 | 0.01 | 0.91 | 0.10 | 22 | 21 |
| SC | 8 | 937 | C | -0.09 | -0.81 | 0.11 | D | 0.12 | -1.00 | 0.11 | 0.19 | 0.16 | 1.19 | 140 | 0.23 | 1.03 | 0.31 | 0.40 | 22 | 22 |
| SC | 8 | 937 | C | -0.09 | -0.82 | 0.12 | D | 0.12 | -1.01 | 0.12 | 0.19 | 0.16 | 1.18 | 134 | 0.24 | 0.92 | 0.34 | 0.38 | 22 | 22 |
| SC | 8 | 971 | C | 0.00 | 2.88 | 1.01 | D | 0.00 | 2.96 | 1.01 | -0.08 | 1.43 | -0.06 | 140 | 0.95 | 0.16 | 0.69 | 0.47 | 22 | 23 |
| SC | 8 | 971 | C | 0.00 | 2.85 | 1.01 | D | 0.00 | 2.94 | 1.01 | -0.09 | 1.43 | -0.06 | 134 | 0.95 | 0.37 | 0.54 | 0.15 | 22 | 23 |
| SC | 8 | 972 | C | -0.03 | -0.99 | 0.25 | D | 0.04 | -1.35 | 0.26 | 0.36 | 0.36 | 0.99 | 137 | 0.32 | 0.42 | 0.52 | 0.34 | 22 | 24 |
| SC | 8 | 972 | C | -0.04 | -1.04 | 0.25 | D | 0.05 | -1.42 | 0.27 | 0.38 | 0.37 | 1.02 | 131 | 0.31 | 0.46 | 0.50 | 0.35 | 22 | 24 |
| SC | 8 | 1258 | C | -0.03 | 1.19 | 0.47 | D | 0.04 | 0.43 | 0.36 | 0.75 | 0.59 | 1.28 | 138 | 0.20 | 0.33 | 0.57 | 0.51 | 22 | 25 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 1258 | C | -0.03 | 1.40 | 0.52 | D | 0.04 | 0.54 | 0.37 | 0.86 | 0.64 | 1.35 | 130 | 0.18 | 0.33 | 0.57 | 0.56 | 22 | 25 |
| SC | 8 | 947 | C | 0.01 | 0.98 | 0.43 | D | -0.02 | 1.50 | 0.52 | -0.52 | 0.68 | -0.77 | 129 | 0.45 | 0.03 | 0.87 | 0.48 | 22 | 26 |
| SC | 8 | 947 | C | 0.02 | 0.95 | 0.43 | D | -0.02 | 1.48 | 0.53 | -0.53 | 0.68 | -0.78 | 124 | 0.44 | 0.01 | 0.91 | 0.43 | 22 | 26 |
| SC | 8 | 1114 | C | -0.06 | -0.93 | 0.13 | D | 0.08 | -1.11 | 0.14 | 0.18 | 0.19 | 0.93 | 138 | 0.35 | 0.01 | 0.92 | 0.03 | 22 | 27 |
| SC | 8 | 1114 | C | -0.06 | -0.94 | 0.14 | D | 0.08 | -1.12 | 0.14 | 0.18 | 0.20 | 0.92 | 131 | 0.36 | 0.00 | 0.97 | -0.02 | 22 | 27 |
| SC | 8 | 984 | C | 0.03 | 0.98 | 0.43 | D | -0.04 | 2.96 | 1.02 | -1.98 | 1.10 | -1.80 | 84 | 0.08 | 2.61 | 0.11 | -2.07 | 22 | 28 |
| SC | 8 | 984 | C | 0.03 | 0.95 | 0.43 | D | -0.04 | 2.95 | 1.02 | -2.00 | 1.10 | -1.81 | 80 | 0.07 | 2.37 | 0.12 | -1.94 | 22 | 28 |
| SC | 8 | 948 | C | 0.01 | -0.73 | 0.26 | D | -0.01 | -0.63 | 0.28 | -0.11 | 0.38 | -0.28 | 135 | 0.78 | 0.01 | 0.94 | -0.12 | 22 | 29 |
| SC | 8 | 948 | C | 0.01 | -0.71 | 0.26 | D | -0.01 | -0.59 | 0.29 | -0.12 | 0.39 | -0.31 | 129 | 0.76 | 0.01 | 0.91 | -0.13 | 22 | 29 |
| SC | 8 | 950 | C | -0.02 | -0.66 | 0.26 | D | 0.03 | -0.93 | 0.27 | 0.27 | 0.38 | 0.70 | 137 | 0.48 | 0.13 | 0.72 | 0.29 | 22 | 30 |
| SC | 8 | 950 | C | -0.02 | -0.71 | 0.26 | D | 0.03 | -0.98 | 0.28 | 0.27 | 0.38 | 0.71 | 131 | 0.48 | 0.13 | 0.72 | 0.30 | 22 | 30 |
| SC | 8 | 961 | C | -0.01 | 4.09 | | D | 0.02 | 2.24 | 0.72 | 1.85 | 1.97 | 0.94 | 102 | 0.35 | 1.70 | 0.19 | | 22 | 31 |
| SC | 8 | 961 | C | -0.01 | 4.07 | | D | 0.02 | 2.22 | 0.72 | 1.85 | 1.97 | 0.94 | 98 | 0.35 | 1.60 | 0.21 | | 22 | 31 |
| SC | 8 | 987 | C | 0.00 | 0.65 | 0.38 | D | 0.00 | 0.70 | 0.39 | -0.05 | 0.54 | -0.09 | 138 | 0.92 | 0.07 | 0.80 | -0.04 | 22 | 32 |
| SC | 8 | 987 | C | 0.00 | 0.62 | 0.38 | D | 0.00 | 0.68 | 0.39 | -0.06 | 0.55 | -0.10 | 132 | 0.92 | 0.05 | 0.83 | -0.06 | 22 | 32 |
| SC | 8 | 970 | C | 0.01 | -0.21 | 0.29 | D | -0.02 | -0.02 | 0.32 | -0.19 | 0.43 | -0.45 | 135 | 0.65 | 0.60 | 0.44 | 0.47 | 22 | 33 |
| SC | 8 | 970 | C | 0.02 | -0.25 | 0.29 | D | -0.03 | 0.06 | 0.33 | -0.30 | 0.44 | -0.69 | 128 | 0.49 | 0.25 | 0.62 | 0.36 | 22 | 33 |
| SC | 8 | 985 | C | 0.00 | -1.88 | 0.24 | D | -0.01 | -1.86 | 0.27 | -0.02 | 0.36 | -0.07 | 131 | 0.94 | 0.04 | 0.84 | -0.15 | 22 | 34 |
| SC | 8 | 985 | C | 0.00 | -1.87 | 0.24 | D | 0.00 | -1.87 | 0.28 | 0.00 | 0.37 | 0.00 | 125 | 1.00 | 0.01 | 0.92 | -0.11 | 22 | 34 |
| SC | 8 | 949 | C | 0.07 | -0.93 | 0.25 | D | -0.08 | -0.11 | 0.31 | -0.81 | 0.40 | -2.05 | 127 | 0.04 | 0.46 | 0.50 | -0.37 | 22 | 35 |
| SC | 8 | 949 | C | 0.07 | -0.98 | 0.25 | D | -0.09 | -0.15 | 0.31 | -0.83 | 0.40 | -2.07 | 121 | 0.04 | 0.34 | 0.56 | -0.33 | 22 | 35 |
| SC | 8 | 981 | C | -0.01 | -0.45 | 0.27 | D | 0.01 | -0.55 | 0.28 | 0.10 | 0.39 | 0.25 | 137 | 0.80 | 0.64 | 0.42 | 0.45 | 22 | 36 |
| SC | 8 | 981 | C | -0.02 | -0.33 | 0.29 | D | 0.03 | -0.59 | 0.29 | 0.26 | 0.41 | 0.63 | 132 | 0.53 | 1.29 | 0.26 | 0.63 | 22 | 36 |
| SC | 8 | 946 | C | -0.07 | -1.40 | 0.24 | D | 0.08 | -2.09 | 0.28 | 0.68 | 0.37 | 1.87 | 130 | 0.06 | 3.65 | 0.06 | 1.05 | 22 | 37 |
| SC | 8 | 946 | C | -0.08 | -1.40 | 0.24 | D | 0.10 | -2.20 | 0.29 | 0.80 | 0.38 | 2.11 | 123 | 0.04 | 4.45 | 0.03 | 1.15 | 22 | 37 |
| SC | 8 | 944 | C | -0.03 | 0.51 | 0.36 | D | 0.04 | -0.02 | 0.32 | 0.53 | 0.48 | 1.10 | 140 | 0.27 | 0.16 | 0.69 | 0.42 | 22 | 38 |
| SC | 8 | 944 | C | -0.04 | 0.62 | 0.38 | D | 0.05 | -0.05 | 0.32 | 0.67 | 0.50 | 1.35 | 134 | 0.18 | 0.42 | 0.51 | 0.60 | 22 | 38 |
| SC | 8 | 978 | C | -0.01 | 1.43 | 0.52 | D | 0.01 | 1.04 | 0.44 | 0.38 | 0.68 | 0.57 | 140 | 0.57 | 0.10 | 0.75 | 0.60 | 22 | 39 |
| SC | 8 | 978 | C | -0.01 | 1.40 | 0.52 | D | 0.01 | 1.02 | 0.44 | 0.38 | 0.68 | 0.56 | 134 | 0.58 | 0.10 | 0.75 | 0.60 | 22 | 39 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 945 | C | 0.06 | -0.39 | 0.14 | D | -0.07 | -0.20 | 0.15 | -0.20 | 0.20 | -0.96 | 137 | 0.34 | 1.36 | 0.24 | -0.45 | 22 | 40 |
| SC | 8 | 945 | C | 0.06 | -0.37 | 0.15 | D | -0.07 | -0.19 | 0.15 | -0.18 | 0.21 | -0.87 | 131 | 0.38 | 1.60 | 0.21 | -0.50 | 22 | 40 |
| SC | 8 | 1266 | C | 0.03 | -0.80 | 0.26 | D | -0.04 | -0.47 | 0.29 | -0.33 | 0.38 | -0.86 | 133 | 0.39 | 0.00 | 0.99 | -0.11 | 22 | 41 |
| SC | 8 | 1266 | C | 0.03 | -0.78 | 0.26 | D | -0.04 | -0.42 | 0.29 | -0.36 | 0.39 | -0.91 | 127 | 0.36 | 0.00 | 0.98 | -0.10 | 22 | 41 |
| SC | 8 | 986 | C | 0.02 | 0.51 | 0.36 | D | -0.03 | 1.04 | 0.44 | -0.53 | 0.57 | -0.93 | 128 | 0.35 | 0.01 | 0.91 | -0.12 | 22 | 42 |
| SC | 8 | 986 | C | 0.02 | 0.48 | 0.36 | D | -0.03 | 1.02 | 0.44 | -0.54 | 0.57 | -0.94 | 122 | 0.35 | 0.01 | 0.90 | -0.12 | 22 | 42 |
| SC | 8 | 967 | C | 0.01 | 0.51 | 0.36 | D | -0.02 | 0.86 | 0.41 | -0.35 | 0.55 | -0.64 | 133 | 0.52 | 0.04 | 0.84 | -0.28 | 22 | 43 |
| SC | 8 | 967 | C | 0.02 | 0.48 | 0.36 | D | -0.02 | 0.84 | 0.41 | -0.36 | 0.55 | -0.65 | 127 | 0.52 | 0.04 | 0.84 | -0.27 | 22 | 43 |
| SC | 8 | 969 | C | 0.00 | -0.79 | 0.26 | D | 0.00 | -0.79 | 0.28 | 0.00 | 0.38 | 0.00 | 135 | 1.00 | 0.01 | 0.91 | 0.06 | 22 | 44 |
| SC | 8 | 969 | C | 0.00 | -0.76 | 0.26 | D | 0.00 | -0.76 | 0.28 | 0.00 | 0.38 | 0.00 | 129 | 1.00 | 0.01 | 0.91 | 0.07 | 22 | 44 |
| SC | 8 | 980 | C | -0.02 | 2.16 | 0.72 | D | 0.02 | 1.25 | 0.47 | 0.91 | 0.86 | 1.06 | 130 | 0.29 | 2.30 | 0.13 | 1.85 | 22 | 45 |
| SC | 8 | 980 | C | -0.02 | 2.14 | 0.72 | D | 0.02 | 1.23 | 0.48 | 0.91 | 0.86 | 1.05 | 125 | 0.30 | 2.85 | 0.09 | 2.15 | 22 | 45 |
| SC | 8 | 1267 | C | 0.01 | -0.99 | 0.25 | D | -0.01 | -0.93 | 0.27 | -0.06 | 0.37 | -0.16 | 135 | 0.87 | 0.00 | 0.97 | -0.06 | 22 | 46 |
| SC | 8 | 1267 | C | 0.01 | -1.04 | 0.25 | D | -0.01 | -0.98 | 0.28 | -0.06 | 0.37 | -0.16 | 128 | 0.87 | 0.00 | 0.98 | -0.07 | 22 | 46 |
| SC | 8 | 965 | C | 0.02 | -1.11 | 0.24 | D | -0.02 | -0.93 | 0.27 | -0.18 | 0.36 | -0.49 | 134 | 0.62 | 1.78 | 0.18 | -0.76 | 22 | 47 |
| SC | 8 | 965 | C | 0.01 | -1.10 | 0.25 | D | -0.01 | -0.98 | 0.28 | -0.12 | 0.37 | -0.33 | 128 | 0.74 | 1.49 | 0.22 | -0.75 | 22 | 47 |
| SC | 8 | 960 | C | 0.00 | -0.68 | 0.26 | D | 0.00 | -0.70 | 0.28 | 0.02 | 0.38 | 0.06 | 136 | 0.96 | 0.04 | 0.84 | 0.17 | 22 | 48 |
| SC | 8 | 960 | C | 0.00 | -0.73 | 0.26 | D | 0.00 | -0.75 | 0.28 | 0.02 | 0.39 | 0.06 | 130 | 0.96 | 0.05 | 0.83 | 0.17 | 22 | 48 |
| SC | 8 | 958 | C | -0.02 | 2.88 | 1.01 | D | 0.02 | 1.50 | 0.52 | 1.38 | 1.14 | 1.21 | 116 | 0.23 | 0.51 | 0.48 | 1.52 | 22 | 49 |
| SC | 8 | 958 | C | -0.02 | 2.85 | 1.01 | D | 0.02 | 1.48 | 0.53 | 1.37 | 1.14 | 1.21 | 112 | 0.23 | 0.43 | 0.51 | 1.48 | 22 | 49 |
| SC | 8 | 938 | C | 0.02 | -0.59 | 0.27 | D | -0.02 | -0.38 | 0.29 | -0.21 | 0.39 | -0.54 | 134 | 0.59 | 0.19 | 0.66 | -0.32 | 22 | 50 |
| SC | 8 | 938 | C | 0.01 | -0.56 | 0.27 | D | -0.02 | -0.42 | 0.29 | -0.15 | 0.40 | -0.36 | 129 | 0.72 | 0.13 | 0.72 | -0.28 | 22 | 50 |
| SC | 8 | 979 | C | 0.01 | 0.81 | 0.40 | D | -0.02 | 1.25 | 0.47 | -0.44 | 0.62 | -0.71 | 130 | 0.48 | 0.05 | 0.82 | -0.62 | 22 | 51 |
| SC | 8 | 979 | C | 0.02 | 0.78 | 0.41 | D | -0.03 | 1.48 | 0.53 | -0.70 | 0.66 | -1.06 | 117 | 0.29 | 0.06 | 0.81 | -0.63 | 22 | 51 |
| SC | 8 | 939 | C | -0.03 | -0.99 | 0.25 | D | 0.04 | -1.29 | 0.27 | 0.30 | 0.36 | 0.82 | 136 | 0.41 | 0.00 | 0.98 | 0.09 | 22 | 52 |
| SC | 8 | 939 | C | -0.02 | -1.04 | 0.25 | D | 0.02 | -1.20 | 0.27 | 0.17 | 0.37 | 0.45 | 129 | 0.66 | 0.02 | 0.90 | -0.16 | 22 | 52 |
| SC | 8 | 974 | C | 0.02 | 0.65 | 0.38 | D | -0.03 | 1.25 | 0.47 | -0.60 | 0.61 | -0.98 | 126 | 0.33 | 0.43 | 0.51 | -0.52 | 22 | 53 |
| SC | 8 | 974 | C | 0.02 | 0.62 | 0.38 | D | -0.03 | 1.23 | 0.48 | -0.61 | 0.61 | -0.99 | 120 | 0.32 | 0.35 | 0.55 | -0.49 | 22 | 53 |
| SC | 8 | 1056 | C | -0.02 | 1.18 | 0.47 | D | 0.03 | 0.56 | 0.37 | 0.62 | 0.60 | 1.04 | 139 | 0.30 | 2.93 | 0.09 | 1.32 | 22 | 54 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 1056 | C | -0.02 | 1.16 | 0.47 | D | 0.03 | 0.54 | 0.37 | 0.62 | 0.60 | 1.04 | 133 | 0.30 | 2.66 | 0.10 | 1.20 | 22 | 54 |
| SC | 8 | 1110 | C | -0.02 | 2.88 | 1.01 | D | 0.02 | 1.50 | 0.52 | 1.38 | 1.14 | 1.21 | 116 | 0.23 | 0.19 | 0.66 | 1.04 | 22 | 55 |
| SC | 8 | 1110 | C | -0.02 | 2.85 | 1.01 | D | 0.02 | 1.48 | 0.53 | 1.37 | 1.14 | 1.21 | 112 | 0.23 | 0.25 | 0.62 | 1.08 | 22 | 55 |
| SC | 8 | 1263 | C | -0.03 | -0.21 | 0.29 | D | 0.03 | -0.55 | 0.28 | 0.34 | 0.41 | 0.83 | 139 | 0.41 | 0.10 | 0.76 | 0.24 | 22 | 56 |
| SC | 8 | 1263 | C | -0.03 | -0.25 | 0.29 | D | 0.03 | -0.59 | 0.29 | 0.34 | 0.41 | 0.83 | 133 | 0.41 | 0.13 | 0.72 | 0.27 | 22 | 56 |
| SC | 8 | 975 | C | 0.01 | 1.74 | 0.59 | D | -0.01 | 2.24 | 0.72 | -0.51 | 0.94 | -0.54 | 128 | 0.59 | 0.18 | 0.67 | -0.18 | 22 | 57 |
| SC | 8 | 975 | C | 0.01 | 1.71 | 0.60 | D | -0.01 | 2.22 | 0.73 | -0.51 | 0.94 | -0.55 | 122 | 0.59 | 0.17 | 0.68 | -0.19 | 22 | 57 |
| SC | 8 | 1054 | C | 0.05 | -1.40 | 0.24 | D | -0.07 | -0.86 | 0.27 | -0.54 | 0.36 | -1.50 | 132 | 0.13 | 1.12 | 0.29 | -0.51 | 22 | 58 |
| SC | 8 | 1054 | C | 0.04 | -1.28 | 0.24 | D | -0.05 | -0.90 | 0.28 | -0.38 | 0.37 | -1.03 | 127 | 0.31 | 0.54 | 0.46 | -0.39 | 22 | 58 |

## Appendix Table I.8:Science: DIF Gender

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1369 | F | -0.01 | 1.23 | 0.27 | M | 0.01 | 1.04 | 0.30 | 0.19 | 0.40 | 0.47 | 233 | 0.64 | 0.00 | 0.97 | 0.07 | 32.00 | 1 |
| SC | 5 | 1327 | F | -0.01 | -0.06 | 0.19 | M | 0.01 | -0.17 | 0.22 | 0.11 | 0.29 | 0.38 | 232 | 0.71 | 0.05 | 0.82 | 0.12 | 32.00 | 2 |
| SC | 5 | 1365 | F | 0.01 | 0.46 | 0.21 | M | -0.02 | 0.71 | 0.27 | -0.25 | 0.34 | -0.72 | 218 | 0.47 | 0.19 | 0.66 | -0.22 | 32.00 | 3 |
| SC | 5 | 1320 | F | 0.00 | 1.37 | 0.28 | M | 0.00 | 1.46 | 0.36 | -0.09 | 0.45 | -0.20 | 219 | 0.84 | 0.00 | 0.95 | -0.13 | 32.00 | 4 |
| SC | 5 | 1372 | F | -0.02 | 0.53 | 0.11 | M | 0.03 | 0.44 | 0.14 | 0.10 | 0.18 | 0.55 | 224 | 0.58 | 1.95 | 0.16 | 0.53 | 32.00 | 5 |
| SC | 5 | 1344 | F | 0.01 | -0.54 | 0.18 | M | -0.01 | -0.45 | 0.21 | -0.09 | 0.28 | -0.33 | 230 | 0.74 | 0.20 | 0.66 | -0.16 | 32.00 | 6 |
| SC | 5 | 1373 | F | 0.03 | -0.89 | 0.18 | M | -0.04 | -0.53 | 0.21 | -0.36 | 0.27 | -1.30 | 230 | 0.20 | 1.88 | 0.17 | -0.48 | 32.00 | 7 |
| SC | 5 | 1324 | F | 0.01 | 0.46 | 0.21 | M | -0.01 | 0.56 | 0.26 | -0.11 | 0.34 | -0.31 | 223 | 0.75 | 0.19 | 0.66 | -0.22 | 32.00 | 8 |
| SC | 5 | 1334 | F | 0.05 | 0.23 | 0.14 | M | -0.06 | 0.57 | 0.19 | -0.35 | 0.23 | -1.49 | 210 | 0.14 | 0.92 | 0.34 | -0.30 | 32.00 | 9 |
| SC | 5 | 1366 | F | 0.00 | 0.25 | 0.20 | M | 0.00 | 0.25 | 0.24 | 0.00 | 0.31 | 0.00 | 228 | 1.00 | 0.02 | 0.88 | 0.11 | 32.00 | 10 |
| SC | 5 | 1358 | F | 0.02 | -0.76 | 0.18 | M | -0.03 | -0.53 | 0.21 | -0.23 | 0.27 | -0.83 | 230 | 0.41 | 0.34 | 0.56 | -0.20 | 32.00 | 11 |
| SC | 5 | 1349 | F | 0.01 | 0.60 | 0.22 | M | -0.01 | 0.78 | 0.28 | -0.18 | 0.35 | -0.52 | 219 | 0.60 | 0.40 | 0.53 | -0.37 | 32.00 | 12 |
| SC | 5 | 1359 | F | 0.01 | -0.13 | 0.19 | M | -0.01 | -0.02 | 0.23 | -0.11 | 0.29 | -0.38 | 227 | 0.71 | 0.04 | 0.85 | -0.11 | 32.00 | 13 |
| SC | 5 | 1328 | F | 0.01 | -1.78 | 0.19 | M | -0.02 | -1.65 | 0.21 | -0.14 | 0.28 | -0.49 | 239 | 0.63 | 0.24 | 0.63 | -0.19 | 32.00 | 14 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1370 | F | 0.01 | -0.47 | 0.18 | M | -0.01 | -0.36 | 0.21 | -0.12 | 0.28 | -0.41 | 230 | 0.68 | 0.00 | 0.95 | -0.03 | 32.00 | 15 |
| SC | 5 | 1361 | F | -0.03 | -0.24 | 0.19 | M | 0.03 | -0.53 | 0.21 | 0.30 | 0.28 | 1.07 | 235 | 0.29 | 1.62 | 0.20 | 0.43 | 32.00 | 16 |
| SC | 5 | 1331 | F | 0.03 | 0.02 | 0.11 | M | -0.04 | 0.14 | 0.13 | -0.13 | 0.17 | -0.75 | 221 | 0.46 | 0.01 | 0.94 | 0.02 | 32.00 | 17 |
| SC | 5 | 1348 | F | -0.02 | 1.09 | 0.25 | M | 0.02 | 0.78 | 0.28 | 0.31 | 0.38 | 0.82 | 237 | 0.41 | 0.61 | 0.44 | -0.38 | 32.00 | 18 |
| SC | 5 | 1326 | F | -0.04 | 0.09 | 0.20 | M | 0.05 | -0.40 | 0.21 | 0.49 | 0.29 | 1.70 | 238 | 0.09 | 1.99 | 0.16 | 0.44 | 32.00 | 19 |
| SC | 5 | 1325 | F | -0.04 | -0.51 | 0.18 | M | 0.06 | -0.95 | 0.20 | 0.45 | 0.27 | 1.65 | 236 | 0.10 | 1.80 | 0.18 | 0.45 | 32.00 | 20 |
| SC | 5 | 1332 | F | 0.04 | -0.92 | 0.18 | M | -0.05 | -0.49 | 0.21 | -0.43 | 0.27 | -1.57 | 230 | 0.12 | 1.30 | 0.25 | -0.41 | 32.00 | 21 |
| SC | 5 | 1353 | F | 0.03 | 1.45 | 0.29 | M | -0.03 | 2.65 | 0.59 | -1.20 | 0.66 | -1.83 | 159 | 0.07 | 2.95 | 0.09 | -1.30 | 32.00 | 22 |
| SC | 5 | 1368 | F | 0.01 | 1.03 | 0.25 | M | -0.01 | 1.23 | 0.33 | -0.20 | 0.41 | -0.50 | 215 | 0.62 | 0.35 | 0.56 | -0.31 | 32.00 | 23 |
| SC | 5 | 1347 | F | -0.05 | -1.08 | 0.18 | M | 0.06 | -1.56 | 0.20 | 0.48 | 0.27 | 1.78 | 233 | 0.08 | 1.33 | 0.25 | 0.37 | 32.00 | 24 |
| SC | 5 | 1340 | F | 0.01 | 0.91 | 0.24 | M | -0.01 | 1.04 | 0.30 | -0.13 | 0.39 | -0.32 | 220 | 0.75 | 0.00 | 0.95 | -0.06 | 32.00 | 25 |
| SC | 5 | 1362 | F | 0.02 | -1.08 | 0.18 | M | -0.03 | -0.87 | 0.20 | -0.21 | 0.27 | -0.78 | 234 | 0.44 | 0.63 | 0.43 | -0.27 | 32.00 | 26 |
| SC | 5 | 1319 | F | 0.03 | -0.02 | 0.19 | M | -0.04 | 0.43 | 0.25 | -0.46 | 0.32 | -1.44 | 215 | 0.15 | 3.70 | 0.05 | -0.66 | 32.00 | 27 |
| SC | 5 | 1318 | F | 0.01 | 0.50 | 0.21 | M | -0.01 | 0.63 | 0.27 | -0.13 | 0.34 | -0.38 | 222 | 0.71 | 0.03 | 0.86 | 0.21 | 32.00 | 28 |
| SC | 5 | 1354 | F | 0.02 | 0.21 | 0.20 | M | -0.03 | 0.50 | 0.26 | -0.29 | 0.33 | -0.89 | 218 | 0.37 | 0.63 | 0.43 | -0.38 | 32.00 | 29 |
| SC | 5 | 1341 | F | 0.04 | -0.45 | 0.09 | M | -0.05 | -0.33 | 0.11 | -0.12 | 0.15 | -0.82 | 226 | 0.41 | 0.07 | 0.80 | -0.07 | 32.00 | 30 |
| SC | 5 | 1321 | F | -0.02 | -1.75 | 0.19 | M | 0.02 | -1.95 | 0.21 | 0.21 | 0.29 | 0.72 | 234 | 0.47 | 0.00 | 1.00 | -0.05 | 32.00 | 31 |
| SC | 5 | 1330 | F | -0.01 | -0.27 | 0.19 | M | 0.01 | -0.40 | 0.21 | 0.13 | 0.28 | 0.47 | 233 | 0.64 | 0.06 | 0.80 | 0.13 | 32.00 | 32 |
| SC | 5 | 1356 | F | 0.04 | -1.52 | 0.13 | M | -0.05 | -1.33 | 0.14 | -0.20 | 0.19 | -1.04 | 238 | 0.30 | 0.22 | 0.64 | -0.13 | 32.00 | 33 |
| SC | 5 | 1371 | F | 0.03 | -0.92 | 0.18 | M | -0.04 | -0.62 | 0.21 | -0.30 | 0.27 | -1.11 | 231 | 0.27 | 0.15 | 0.70 | -0.16 | 32.00 | 34 |
| SC | 5 | 1374 | F | 0.00 | 0.11 | 0.20 | M | 0.00 | 0.14 | 0.23 | -0.03 | 0.30 | -0.10 | 227 | 0.92 | 1.65 | 0.20 | -0.46 | 32.00 | 35 |
| SC | 5 | 1329 | F | 0.01 | -0.60 | 0.18 | M | -0.02 | -0.45 | 0.21 | -0.16 | 0.28 | -0.57 | 230 | 0.57 | 0.00 | 0.97 | -0.06 | 32.00 | 36 |
| SC | 5 | 1350 | F | 0.03 | 0.41 | 0.10 | M | -0.03 | 0.53 | 0.14 | -0.12 | 0.17 | -0.66 | 210 | 0.51 | 0.62 | 0.43 | -0.30 | 32.00 | 37 |
| SC | 5 | 1322 | F | 0.01 | -1.97 | 0.20 | M | -0.02 | -1.82 | 0.21 | -0.15 | 0.29 | -0.52 | 240 | 0.60 | 0.00 | 0.97 | -0.04 | 32.00 | 38 |
| SC | 5 | 1363 | F | 0.02 | 1.16 | 0.26 | M | -0.02 | 1.60 | 0.37 | -0.44 | 0.46 | -0.97 | 202 | 0.34 | 1.34 | 0.25 | -0.67 | 32.00 | 39 |
| SC | 5 | 1367 | F | -0.04 | -0.47 | 0.18 | M | 0.05 | -0.91 | 0.20 | 0.44 | 0.27 | 1.62 | 236 | 0.11 | 1.30 | 0.25 | 0.38 | 32.00 | 40 |
| SC | 5 | 1336 | F | -0.04 | -0.37 | 0.18 | M | 0.04 | -0.75 | 0.20 | 0.37 | 0.27 | 1.36 | 235 | 0.17 | 0.75 | 0.39 | 0.29 | 32.00 | 41 |
| SC | 5 | 1323 | F | -0.04 | -0.95 | 0.18 | M | 0.06 | -1.40 | 0.20 | 0.44 | 0.27 | 1.65 | 234 | 0.10 | 2.57 | 0.11 | 0.53 | 32.00 | 42 |
| SC | 5 | 1364 | F | -0.03 | 0.91 | 0.24 | M | 0.04 | 0.43 | 0.25 | 0.48 | 0.35 | 1.38 | 241 | 0.17 | 0.47 | 0.49 | 0.33 | 32.00 | 43 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1357 | F | -0.03 | 1.95 | 0.35 | M | 0.04 | 1.03 | 0.30 | 0.92 | 0.46 | 1.98 | 248 | 0.05 | 1.42 | 0.23 | 0.70 | 32.00 | 44 |
| SC | 5 | 1360 | F | 0.01 | 1.95 | 0.35 | M | -0.02 | 2.65 | 0.59 | -0.70 | 0.69 | -1.02 | 181 | 0.31 | 0.14 | 0.70 | 0.01 | 32.00 | 45 |
| SC | 5 | 1346 | F | -0.02 | 1.37 | 0.28 | M | 0.03 | 0.86 | 0.29 | 0.51 | 0.40 | 1.28 | 243 | 0.20 | 0.13 | 0.72 | 0.24 | 32.00 | 46 |
| SC | 5 | 1315 | F | -0.03 | 0.65 | 0.11 | M | 0.04 | 0.51 | 0.13 | 0.14 | 0.17 | 0.81 | 227 | 0.42 | 3.17 | 0.08 | 0.62 | 32.00 | 47 |
| SC | 5 | 1317 | F | -0.03 | -0.99 | 0.18 | M | 0.04 | -1.28 | 0.20 | 0.29 | 0.27 | 1.08 | 234 | 0.28 | 0.52 | 0.47 | 0.24 | 32.00 | 48 |
| SC | 5 | 1333 | F | 0.02 | -0.27 | 0.19 | M | -0.03 | -0.02 | 0.23 | -0.25 | 0.29 | -0.86 | 225 | 0.39 | 0.75 | 0.39 | -0.30 | 32.00 | 49 |
| SC | 5 | 1351 | F | 0.01 | -0.24 | 0.19 | M | -0.02 | -0.07 | 0.22 | -0.17 | 0.29 | -0.57 | 227 | 0.57 | 0.11 | 0.75 | -0.14 | 32.00 | 50 |
| SC | 5 | 1337 | F | -0.07 | 0.37 | 0.21 | M | 0.09 | -0.49 | 0.21 | 0.86 | 0.29 | 2.93 | 244 | 0.00 | 2.81 | 0.09 | 0.53 | 32.00 | 51 |
| SC | 5 | 1338 | F | 0.00 | 0.09 | 0.20 | M | 0.01 | 0.03 | 0.23 | 0.06 | 0.30 | 0.19 | 230 | 0.85 | 0.01 | 0.93 | -0.08 | 32.00 | 52 |
| SC | 5 | 1339 | F | -0.02 | 0.29 | 0.20 | M | 0.03 | -0.02 | 0.23 | 0.31 | 0.30 | 1.01 | 236 | 0.31 | 0.84 | 0.36 | 0.34 | 32.00 | 53 |
| SC | 8 | 983 | F | -0.01 | 2.40 | 0.72 | M | 0.02 | 1.54 | 0.60 | 0.85 | 0.94 | 0.91 | 140 | 0.36 | 1.15 | 0.28 | 1.96 | 23.00 | 1 |
| SC | 8 | 962 | F | 0.02 | -2.32 | 0.25 | M | -0.02 | -2.14 | 0.27 | -0.18 | 0.37 | -0.49 | 138 | 0.62 | 0.56 | 0.45 | -0.41 | 23.00 | 2 |
| SC | 8 | 952 | F | 0.00 | -1.16 | 0.24 | M | 0.00 | -1.16 | 0.27 | 0.00 | 0.36 | 0.00 | 136 | 1.00 | 0.74 | 0.39 | -0.45 | 23.00 | 3 |
| SC | 8 | 951 | F | -0.02 | 1.97 | 0.60 | M | 0.03 | 0.98 | 0.47 | 0.99 | 0.76 | 1.30 | 139 | 0.20 | 1.32 | 0.25 | 1.43 | 23.00 | 4 |
| SC | 8 | 977 | F | -0.06 | -0.38 | 0.27 | M | 0.08 | -1.10 | 0.27 | 0.72 | 0.38 | 1.89 | 140 | 0.06 | 3.70 | 0.05 | 0.92 | 23.00 | 5 |
| SC | 8 | 1109 | F | 0.01 | -1.26 | 0.24 | M | -0.01 | -1.17 | 0.27 | -0.09 | 0.36 | -0.25 | 136 | 0.80 | 0.14 | 0.71 | -0.22 | 23.00 | 6 |
| SC | 8 | 956 | F | -0.02 | -1.03 | 0.24 | M | 0.03 | -1.24 | 0.27 | 0.21 | 0.36 | 0.59 | 137 | 0.55 | 0.44 | 0.51 | 0.37 | 23.00 | 7 |
| SC | 8 | 959 | F | 0.00 | 3.11 | 1.01 | M | 0.00 | 2.69 | 1.01 | 0.42 | 1.43 | 0.30 | 140 | 0.77 | 0.00 | 1.00 | | 23.00 | 8 |
| SC | 8 | 955 | F | 0.01 | 0.19 | 0.31 | M | -0.02 | 0.44 | 0.39 | -0.25 | 0.49 | -0.51 | 128 | 0.61 | 0.00 | 0.95 | -0.14 | 23.00 | 9 |
| SC | 8 | 1238 | F | -0.01 | 0.28 | 0.32 | M | 0.01 | 0.17 | 0.35 | 0.12 | 0.47 | 0.25 | 135 | 0.81 | 0.01 | 0.94 | -0.09 | 23.00 | 10 |
| SC | 8 | 1205 | F | -0.06 | -0.07 | 0.29 | M | 0.07 | -0.80 | 0.28 | 0.72 | 0.40 | 1.80 | 141 | 0.07 | 0.82 | 0.37 | 0.53 | 23.00 | 11 |
| SC | 8 | 1257 | F | -0.03 | -1.55 | 0.24 | M | 0.04 | -1.86 | 0.26 | 0.31 | 0.35 | 0.88 | 137 | 0.38 | 0.61 | 0.43 | 0.35 | 23.00 | 12 |
| SC | 8 | 932 | F | -0.01 | -1.03 | 0.24 | M | 0.02 | -1.17 | 0.27 | 0.14 | 0.36 | 0.40 | 137 | 0.69 | 0.13 | 0.72 | 0.23 | 23.00 | 13 |
| SC | 8 | 1111 | F | 0.01 | 0.19 | 0.31 | M | -0.01 | 0.30 | 0.37 | -0.11 | 0.48 | -0.23 | 131 | 0.82 | 0.69 | 0.41 | -0.61 | 23.00 | 14 |
| SC | 8 | 1260 | F | 0.01 | 0.29 | 0.32 | M | -0.01 | 0.44 | 0.39 | -0.16 | 0.50 | -0.31 | 130 | 0.76 | 0.08 | 0.78 | 0.01 | 23.00 | 15 |
| SC | 8 | 1265 | F | -0.01 | -0.52 | 0.26 | M | 0.01 | -0.63 | 0.29 | 0.11 | 0.39 | 0.29 | 136 | 0.77 | 0.01 | 0.91 | 0.04 | 23.00 | 16 |
| SC | 8 | 953 | F | 0.01 | -0.84 | 0.25 | M | -0.01 | -0.71 | 0.28 | -0.13 | 0.38 | -0.34 | 134 | 0.73 | 0.16 | 0.69 | -0.25 | 23.00 | 17 |
| SC | 8 | 954 | F | -0.03 | -0.38 | 0.27 | M | 0.03 | -0.71 | 0.28 | 0.33 | 0.39 | 0.86 | 138 | 0.39 | 0.01 | 0.93 | 0.14 | 23.00 | 18 |
| SC | 8 | 942 | F | -0.04 | -1.32 | 0.24 | M | 0.05 | -1.72 | 0.26 | 0.40 | 0.35 | 1.14 | 137 | 0.26 | 1.47 | 0.23 | 0.55 | 23.00 | 19 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 936 | F | 0.01 | -0.84 | 0.25 | M | -0.01 | -0.71 | 0.28 | -0.13 | 0.38 | -0.34 | 134 | 0.73 | 0.03 | 0.86 | 0.03 | 23.00 | 20 |
| SC | 8 | 964 | F | -0.02 | 0.10 | 0.30 | M | 0.02 | -0.17 | 0.32 | 0.27 | 0.44 | 0.61 | 138 | 0.54 | 0.71 | 0.40 | 0.59 | 23.00 | 21 |
| SC | 8 | 937 | F | 0.01 | -0.90 | 0.11 | M | -0.01 | -0.90 | 0.12 | 0.00 | 0.16 | 0.00 | 135 | 1.00 | 0.01 | 0.91 | -0.04 | 23.00 | 22 |
| SC | 8 | 971 | F | 0.00 | 3.11 | 1.01 | M | 0.00 | 2.69 | 1.01 | 0.42 | 1.43 | 0.30 | 140 | 0.77 | 0.05 | 0.82 | 0.88 | 23.00 | 23 |
| SC | 8 | 972 | F | 0.01 | -1.20 | 0.24 | M | -0.01 | -1.10 | 0.27 | -0.11 | 0.36 | -0.29 | 135 | 0.77 | 0.09 | 0.76 | -0.20 | 23.00 | 24 |
| SC | 8 | 1258 | F | -0.02 | 1.04 | 0.41 | M | 0.03 | 0.44 | 0.39 | 0.60 | 0.56 | 1.06 | 141 | 0.29 | 0.01 | 0.92 | 0.30 | 23.00 | 25 |
| SC | 8 | 947 | F | 0.01 | 1.04 | 0.41 | M | -0.02 | 1.54 | 0.60 | -0.51 | 0.72 | -0.70 | 116 | 0.49 | 0.68 | 0.41 | -1.20 | 23.00 | 26 |
| SC | 8 | 1114 | F | 0.07 | -1.10 | 0.13 | M | -0.08 | -0.91 | 0.15 | -0.20 | 0.19 | -1.00 | 132 | 0.32 | 0.04 | 0.83 | -0.07 | 23.00 | 27 |
| SC | 8 | 984 | F | 0.02 | 1.21 | 0.43 | M | -0.03 | 2.69 | 1.01 | -1.47 | 1.10 | -1.34 | 85 | 0.18 | 2.54 | 0.11 | -2.03 | 23.00 | 28 |
| SC | 8 | 948 | F | 0.04 | -0.91 | 0.25 | M | -0.06 | -0.37 | 0.31 | -0.53 | 0.39 | -1.35 | 127 | 0.18 | 1.46 | 0.23 | -0.62 | 23.00 | 29 |
| SC | 8 | 950 | F | 0.01 | -0.84 | 0.25 | M | -0.01 | -0.72 | 0.29 | -0.12 | 0.38 | -0.32 | 133 | 0.75 | 0.01 | 0.90 | -0.14 | 23.00 | 30 |
| SC | 8 | 961 | F | 0.00 | 3.11 | 1.01 | M | 0.00 | 2.68 | 1.01 | 0.43 | 1.43 | 0.30 | 139 | 0.77 | 0.49 | 0.48 | 0.01 | 23.00 | 31 |
| SC | 8 | 987 | F | 0.01 | 0.61 | 0.35 | M | -0.01 | 0.77 | 0.44 | -0.16 | 0.56 | -0.28 | 127 | 0.78 | 0.01 | 0.93 | -0.14 | 23.00 | 32 |
| SC | 8 | 970 | F | -0.01 | -0.07 | 0.29 | M | 0.01 | -0.18 | 0.32 | 0.10 | 0.43 | 0.24 | 134 | 0.81 | 0.01 | 0.91 | -0.04 | 23.00 | 33 |
| SC | 8 | 985 | F | -0.05 | -1.66 | 0.24 | M | 0.06 | -2.16 | 0.27 | 0.49 | 0.36 | 1.38 | 134 | 0.17 | 1.23 | 0.27 | 0.51 | 23.00 | 34 |
| SC | 8 | 949 | F | -0.04 | -0.38 | 0.27 | M | 0.04 | -0.80 | 0.28 | 0.42 | 0.39 | 1.08 | 137 | 0.28 | 0.68 | 0.41 | 0.42 | 23.00 | 35 |
| SC | 8 | 981 | F | 0.02 | -0.59 | 0.26 | M | -0.02 | -0.37 | 0.31 | -0.21 | 0.40 | -0.53 | 130 | 0.59 | 0.48 | 0.49 | -0.41 | 23.00 | 36 |
| SC | 8 | 946 | F | 0.04 | -1.89 | 0.24 | M | -0.05 | -1.46 | 0.26 | -0.43 | 0.36 | -1.21 | 135 | 0.23 | 0.17 | 0.68 | -0.29 | 23.00 | 37 |
| SC | 8 | 944 | F | 0.06 | -0.16 | 0.28 | M | -0.07 | 0.98 | 0.47 | -1.14 | 0.55 | -2.06 | 104 | 0.04 | 2.88 | 0.09 | -1.30 | 23.00 | 38 |
| SC | 8 | 978 | F | 0.01 | 1.04 | 0.41 | M | -0.02 | 1.54 | 0.60 | -0.50 | 0.72 | -0.70 | 114 | 0.49 | 0.00 | 0.96 | -0.35 | 23.00 | 39 |
| SC | 8 | 945 | F | 0.17 | -0.51 | 0.12 | M | -0.21 | 0.13 | 0.20 | -0.64 | 0.24 | -2.71 | 105 | 0.01 | 8.68 | 0.00 | -1.39 | 23.00 | 40 |
| SC | 8 | 1266 | F | 0.00 | -0.65 | 0.26 | M | 0.00 | -0.65 | 0.29 | 0.00 | 0.39 | 0.00 | 133 | 1.00 | 0.00 | 0.95 | 0.13 | 23.00 | 41 |
| SC | 8 | 986 | F | -0.04 | 1.21 | 0.43 | M | 0.05 | 0.29 | 0.37 | 0.92 | 0.57 | 1.61 | 140 | 0.11 | 0.71 | 0.40 | 0.69 | 23.00 | 42 |
| SC | 8 | 967 | F | -0.03 | 1.04 | 0.41 | M | 0.04 | 0.29 | 0.37 | 0.74 | 0.55 | 1.36 | 140 | 0.18 | 0.68 | 0.41 | 0.61 | 23.00 | 43 |
| SC | 8 | 969 | F | -0.01 | -0.72 | 0.25 | M | 0.02 | -0.88 | 0.28 | 0.16 | 0.38 | 0.43 | 135 | 0.67 | 0.76 | 0.38 | 0.51 | 23.00 | 44 |
| SC | 8 | 980 | F | -0.03 | 2.40 | 0.72 | M | 0.03 | 0.98 | 0.47 | 1.42 | 0.86 | 1.64 | 129 | 0.10 | 1.10 | 0.29 | 1.16 | 23.00 | 45 |
| SC | 8 | 1267 | F | -0.02 | -0.84 | 0.25 | M | 0.03 | -1.11 | 0.27 | 0.26 | 0.37 | 0.71 | 136 | 0.48 | 1.20 | 0.27 | 0.50 | 23.00 | 46 |
| SC | 8 | 965 | F | 0.04 | -1.20 | 0.24 | M | -0.05 | -0.80 | 0.28 | -0.40 | 0.37 | -1.08 | 131 | 0.28 | 0.46 | 0.50 | -0.41 | 23.00 | 47 |
| SC | 8 | 960 | F | -0.03 | -0.52 | 0.26 | M | 0.04 | -0.88 | 0.28 | 0.36 | 0.38 | 0.94 | 137 | 0.35 | 0.17 | 0.68 | 0.27 | 23.00 | 48 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 958 | F | 0.01 | 1.66 | 0.52 | M | -0.02 | 2.68 | 1.01 | -1.02 | 1.14 | -0.90 | 95 | 0.37 | 0.60 | 0.44 | -2.00 | 23.00 | 49 |
| SC | 8 | 938 | F | -0.03 | -0.31 | 0.27 | M | 0.04 | -0.72 | 0.29 | 0.41 | 0.39 | 1.05 | 137 | 0.30 | 0.07 | 0.79 | 0.23 | 23.00 | 50 |
| SC | 8 | 979 | F | 0.01 | 0.88 | 0.38 | M | -0.01 | 1.23 | 0.52 | -0.35 | 0.65 | -0.53 | 120 | 0.60 | 0.17 | 0.68 | -0.63 | 23.00 | 51 |
| SC | 8 | 939 | F | 0.03 | -1.26 | 0.24 | M | -0.04 | -0.96 | 0.28 | -0.30 | 0.37 | -0.83 | 133 | 0.41 | 0.08 | 0.78 | -0.25 | 23.00 | 52 |
| SC | 8 | 974 | F | -0.01 | 1.04 | 0.41 | M | 0.01 | 0.77 | 0.44 | 0.26 | 0.60 | 0.44 | 136 | 0.66 | 0.27 | 0.61 | 0.58 | 23.00 | 53 |
| SC | 8 | 1056 | F | 0.03 | 0.50 | 0.34 | M | -0.04 | 1.54 | 0.60 | -1.04 | 0.69 | -1.52 | 100 | 0.13 | 0.85 | 0.36 | -0.89 | 23.00 | 54 |
| SC | 8 | 1110 | F | 0.00 | 1.97 | 0.60 | M | 0.00 | 1.97 | 0.72 | 0.00 | 0.94 | 0.00 | 129 | 1.00 | 0.16 | 0.69 | 0.13 | 23.00 | 55 |
| SC | 8 | 1263 | F | -0.02 | -0.23 | 0.28 | M | 0.03 | -0.55 | 0.29 | 0.32 | 0.40 | 0.80 | 136 | 0.43 | 0.08 | 0.78 | 0.22 | 23.00 | 56 |
| SC | 8 | 975 | F | -0.01 | 2.40 | 0.72 | M | 0.02 | 1.54 | 0.60 | 0.86 | 0.94 | 0.92 | 140 | 0.36 | 0.03 | 0.86 | 0.74 | 23.00 | 57 |
| SC | 8 | 1054 | F | 0.01 | -1.20 | 0.24 | M | -0.01 | -1.11 | 0.27 | -0.10 | 0.36 | -0.27 | 134 | 0.79 | 0.01 | 0.94 | -0.04 | 23.00 | 58 |
| SC | 8 | 983 | F | -0.01 | 2.37 | 0.72 | M | 0.02 | 1.53 | 0.60 | 0.84 | 0.94 | 0.90 | 134 | 0.37 | 1.15 | 0.28 | 1.96 | 23.00 | 1 |
| SC | 8 | 962 | F | 0.01 | -2.27 | 0.26 | M | -0.02 | -2.13 | 0.27 | -0.14 | 0.37 | -0.38 | 133 | 0.70 | 0.56 | 0.45 | -0.41 | 23.00 | 2 |
| SC | 8 | 952 | F | 0.00 | -1.16 | 0.25 | M | 0.01 | -1.20 | 0.27 | 0.05 | 0.37 | 0.13 | 131 | 0.90 | 0.74 | 0.39 | -0.44 | 23.00 | 3 |
| SC | 8 | 951 | F | -0.02 | 1.94 | 0.60 | M | 0.03 | 0.97 | 0.47 | 0.98 | 0.76 | 1.28 | 133 | 0.20 | 1.35 | 0.25 | 1.40 | 23.00 | 4 |
| SC | 8 | 977 | F | -0.06 | -0.36 | 0.27 | M | 0.07 | -1.06 | 0.27 | 0.70 | 0.39 | 1.80 | 134 | 0.07 | 3.23 | 0.07 | 0.90 | 23.00 | 5 |
| SC | 8 | 1109 | F | 0.01 | -1.28 | 0.25 | M | -0.01 | -1.20 | 0.27 | -0.08 | 0.37 | -0.21 | 131 | 0.84 | 0.17 | 0.68 | -0.24 | 23.00 | 6 |
| SC | 8 | 956 | F | 0.00 | -1.11 | 0.25 | M | 0.00 | -1.11 | 0.27 | 0.00 | 0.37 | 0.00 | 131 | 1.00 | 0.07 | 0.79 | 0.21 | 23.00 | 7 |
| SC | 8 | 959 | F | 0.00 | 3.08 | 1.01 | M | 0.00 | 2.67 | 1.01 | 0.41 | 1.43 | 0.29 | 134 | 0.77 | 0.00 | 1.00 | | 23.00 | 8 |
| SC | 8 | 955 | F | 0.02 | 0.25 | 0.32 | M | -0.02 | 0.58 | 0.41 | -0.33 | 0.52 | -0.64 | 121 | 0.52 | 0.03 | 0.86 | -0.32 | 23.00 | 9 |
| SC | 8 | 1238 | F | -0.01 | 0.46 | 0.34 | M | 0.01 | 0.28 | 0.37 | 0.18 | 0.50 | 0.36 | 131 | 0.72 | 0.04 | 0.84 | -0.04 | 23.00 | 10 |
| SC | 8 | 1205 | F | -0.05 | -0.12 | 0.29 | M | 0.06 | -0.74 | 0.29 | 0.62 | 0.41 | 1.53 | 135 | 0.13 | 0.68 | 0.41 | 0.51 | 23.00 | 11 |
| SC | 8 | 1257 | F | -0.03 | -1.52 | 0.25 | M | 0.04 | -1.84 | 0.27 | 0.32 | 0.36 | 0.89 | 132 | 0.38 | 0.69 | 0.41 | 0.37 | 23.00 | 12 |
| SC | 8 | 932 | F | 0.00 | -1.11 | 0.25 | M | 0.00 | -1.11 | 0.27 | 0.00 | 0.37 | 0.00 | 131 | 1.00 | 0.00 | 0.97 | 0.10 | 23.00 | 13 |
| SC | 8 | 1111 | F | 0.00 | 0.26 | 0.32 | M | 0.00 | 0.26 | 0.37 | 0.00 | 0.49 | 0.00 | 128 | 1.00 | 0.59 | 0.44 | -0.59 | 23.00 | 14 |
| SC | 8 | 1260 | F | 0.01 | 0.25 | 0.32 | M | -0.01 | 0.42 | 0.39 | -0.18 | 0.50 | -0.35 | 125 | 0.73 | 0.07 | 0.78 | 0.01 | 23.00 | 15 |
| SC | 8 | 1265 | F | -0.01 | -0.50 | 0.27 | M | 0.01 | -0.57 | 0.30 | 0.07 | 0.40 | 0.18 | 131 | 0.86 | 0.03 | 0.86 | -0.01 | 23.00 | 16 |
| SC | 8 | 953 | F | 0.01 | -0.84 | 0.25 | M | -0.01 | -0.74 | 0.29 | -0.10 | 0.38 | -0.26 | 130 | 0.80 | 0.29 | 0.59 | -0.32 | 23.00 | 17 |
| SC | 8 | 954 | F | -0.04 | -0.28 | 0.28 | M | 0.05 | -0.74 | 0.29 | 0.46 | 0.40 | 1.16 | 134 | 0.25 | 0.11 | 0.74 | 0.28 | 23.00 | 18 |
| SC | 8 | 942 | F | -0.04 | -1.28 | 0.25 | M | 0.05 | -1.70 | 0.26 | 0.42 | 0.36 | 1.16 | 132 | 0.25 | 1.43 | 0.23 | 0.56 | 23.00 | 19 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 936 | F | 0.01 | -0.91 | 0.25 | M | -0.02 | -0.74 | 0.29 | -0.16 | 0.38 | -0.43 | 130 | 0.67 | 0.04 | 0.85 | -0.02 | 23.00 | 20 |
| SC | 8 | 964 | F | -0.02 | 0.06 | 0.30 | M | 0.02 | -0.19 | 0.32 | 0.25 | 0.44 | 0.57 | 132 | 0.57 | 0.53 | 0.47 | 0.54 | 23.00 | 21 |
| SC | 8 | 937 | F | 0.01 | -0.91 | 0.11 | M | -0.01 | -0.91 | 0.12 | 0.00 | 0.16 | 0.00 | 130 | 1.00 | 0.00 | 0.98 | -0.01 | 23.00 | 22 |
| SC | 8 | 971 | F | 0.00 | 3.08 | 1.01 | M | 0.00 | 2.67 | 1.01 | 0.41 | 1.43 | 0.29 | 134 | 0.77 | 0.18 | 0.67 | 0.56 | 23.00 | 23 |
| SC | 8 | 972 | F | 0.01 | -1.28 | 0.25 | M | -0.02 | -1.13 | 0.27 | -0.15 | 0.37 | -0.40 | 131 | 0.69 | 0.15 | 0.70 | -0.23 | 23.00 | 24 |
| SC | 8 | 1258 | F | -0.04 | 1.39 | 0.47 | M | 0.04 | 0.42 | 0.39 | 0.97 | 0.61 | 1.58 | 134 | 0.12 | 0.51 | 0.48 | 0.90 | 23.00 | 25 |
| SC | 8 | 947 | F | 0.01 | 1.01 | 0.41 | M | -0.02 | 1.53 | 0.60 | -0.52 | 0.72 | -0.72 | 112 | 0.47 | 0.94 | 0.33 | -1.35 | 23.00 | 26 |
| SC | 8 | 1114 | F | 0.07 | -1.11 | 0.13 | M | -0.08 | -0.92 | 0.15 | -0.19 | 0.20 | -0.97 | 127 | 0.33 | 0.03 | 0.87 | -0.06 | 23.00 | 27 |
| SC | 8 | 984 | F | 0.02 | 1.18 | 0.43 | M | -0.03 | 2.67 | 1.01 | -1.49 | 1.10 | -1.35 | 83 | 0.18 | 2.24 | 0.13 | -1.90 | 23.00 | 28 |
| SC | 8 | 948 | F | 0.05 | -0.91 | 0.25 | M | -0.06 | -0.30 | 0.31 | -0.61 | 0.40 | -1.50 | 122 | 0.14 | 1.94 | 0.16 | -0.70 | 23.00 | 29 |
| SC | 8 | 950 | F | 0.01 | -0.91 | 0.25 | M | -0.02 | -0.75 | 0.29 | -0.16 | 0.38 | -0.41 | 128 | 0.68 | 0.08 | 0.78 | -0.21 | 23.00 | 30 |
| SC | 8 | 961 | F | 0.00 | 3.08 | 1.01 | M | 0.00 | 2.67 | 1.01 | 0.41 | 1.43 | 0.29 | 133 | 0.77 | 0.44 | 0.51 | -0.07 | 23.00 | 31 |
| SC | 8 | 987 | F | 0.01 | 0.58 | 0.35 | M | -0.01 | 0.76 | 0.44 | -0.18 | 0.56 | -0.32 | 122 | 0.75 | 0.00 | 0.95 | -0.16 | 23.00 | 32 |
| SC | 8 | 970 | F | -0.01 | -0.03 | 0.29 | M | 0.01 | -0.20 | 0.32 | 0.17 | 0.44 | 0.38 | 130 | 0.70 | 0.05 | 0.83 | 0.00 | 23.00 | 33 |
| SC | 8 | 985 | F | -0.05 | -1.64 | 0.25 | M | 0.06 | -2.15 | 0.27 | 0.50 | 0.37 | 1.38 | 129 | 0.17 | 1.12 | 0.29 | 0.49 | 23.00 | 34 |
| SC | 8 | 949 | F | -0.03 | -0.43 | 0.27 | M | 0.04 | -0.83 | 0.28 | 0.40 | 0.39 | 1.02 | 132 | 0.31 | 0.81 | 0.37 | 0.46 | 23.00 | 35 |
| SC | 8 | 981 | F | 0.01 | -0.50 | 0.27 | M | -0.01 | -0.40 | 0.31 | -0.11 | 0.41 | -0.26 | 127 | 0.80 | 0.23 | 0.63 | -0.32 | 23.00 | 36 |
| SC | 8 | 946 | F | 0.04 | -1.95 | 0.25 | M | -0.05 | -1.50 | 0.27 | -0.45 | 0.37 | -1.22 | 131 | 0.22 | 0.22 | 0.64 | -0.33 | 23.00 | 37 |
| SC | 8 | 944 | F | 0.05 | -0.12 | 0.29 | M | -0.07 | 0.97 | 0.47 | -1.08 | 0.56 | -1.95 | 102 | 0.05 | 2.88 | 0.09 | -1.29 | 23.00 | 38 |
| SC | 8 | 978 | F | 0.01 | 1.01 | 0.41 | M | -0.02 | 1.52 | 0.60 | -0.52 | 0.72 | -0.72 | 110 | 0.48 | 0.00 | 0.96 | -0.35 | 23.00 | 39 |
| SC | 8 | 945 | F | 0.16 | -0.48 | 0.13 | M | -0.18 | 0.10 | 0.20 | -0.58 | 0.24 | -2.42 | 104 | 0.02 | 7.00 | 0.01 | -1.24 | 23.00 | 40 |
| SC | 8 | 1266 | F | 0.01 | -0.64 | 0.26 | M | -0.01 | -0.58 | 0.30 | -0.06 | 0.40 | -0.16 | 128 | 0.87 | 0.04 | 0.84 | 0.01 | 23.00 | 41 |
| SC | 8 | 986 | F | -0.04 | 1.18 | 0.44 | M | 0.05 | 0.27 | 0.37 | 0.91 | 0.57 | 1.59 | 134 | 0.11 | 0.73 | 0.39 | 0.69 | 23.00 | 42 |
| SC | 8 | 967 | F | -0.03 | 1.01 | 0.41 | M | 0.04 | 0.27 | 0.37 | 0.73 | 0.55 | 1.33 | 134 | 0.19 | 0.67 | 0.41 | 0.61 | 23.00 | 43 |
| SC | 8 | 969 | F | -0.01 | -0.71 | 0.26 | M | 0.01 | -0.83 | 0.28 | 0.12 | 0.38 | 0.31 | 130 | 0.75 | 1.07 | 0.30 | 0.59 | 23.00 | 44 |
| SC | 8 | 980 | F | -0.03 | 2.37 | 0.72 | M | 0.04 | 0.96 | 0.47 | 1.41 | 0.86 | 1.63 | 123 | 0.11 | 0.79 | 0.37 | 1.02 | 23.00 | 45 |
| SC | 8 | 1267 | F | -0.02 | -0.91 | 0.25 | M | 0.03 | -1.14 | 0.27 | 0.23 | 0.37 | 0.62 | 131 | 0.53 | 0.85 | 0.36 | 0.45 | 23.00 | 46 |
| SC | 8 | 965 | F | 0.04 | -1.22 | 0.25 | M | -0.04 | -0.83 | 0.28 | -0.39 | 0.38 | -1.03 | 127 | 0.30 | 0.29 | 0.59 | -0.36 | 23.00 | 47 |
| SC | 8 | 960 | F | -0.03 | -0.57 | 0.26 | M | 0.04 | -0.91 | 0.28 | 0.34 | 0.39 | 0.87 | 131 | 0.38 | 0.15 | 0.70 | 0.27 | 23.00 | 48 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 958 | F | 0.01 | 1.63 | 0.52 | M | -0.02 | 2.67 | 1.01 | -1.04 | 1.14 | -0.91 | 92 | 0.36 | 0.65 | 0.42 | -2.03 | 23.00 | 49 |
| SC | 8 | 938 | F | -0.04 | -0.28 | 0.28 | M | 0.05 | -0.75 | 0.29 | 0.47 | 0.40 | 1.17 | 132 | 0.24 | 0.21 | 0.65 | 0.32 | 23.00 | 50 |
| SC | 8 | 979 | F | 0.02 | 0.85 | 0.38 | M | -0.02 | 1.52 | 0.60 | -0.67 | 0.71 | -0.95 | 106 | 0.34 | 0.20 | 0.66 | -0.67 | 23.00 | 51 |
| SC | 8 | 939 | F | 0.04 | -1.28 | 0.25 | M | -0.04 | -0.91 | 0.28 | -0.37 | 0.37 | -0.99 | 128 | 0.32 | 0.09 | 0.77 | -0.27 | 23.00 | 52 |
| SC | 8 | 974 | F | -0.01 | 1.01 | 0.41 | M | 0.01 | 0.76 | 0.44 | 0.25 | 0.60 | 0.42 | 131 | 0.68 | 0.35 | 0.55 | 0.63 | 23.00 | 53 |
| SC | 8 | 1056 | F | 0.04 | 0.46 | 0.34 | M | -0.04 | 1.52 | 0.60 | -1.06 | 0.69 | -1.55 | 97 | 0.12 | 1.23 | 0.27 | -1.03 | 23.00 | 54 |
| SC | 8 | 1110 | F | 0.00 | 1.95 | 0.60 | M | 0.00 | 1.95 | 0.72 | 0.00 | 0.94 | 0.00 | 124 | 1.00 | 0.12 | 0.73 | 0.20 | 23.00 | 55 |
| SC | 8 | 1263 | F | -0.02 | -0.28 | 0.28 | M | 0.03 | -0.58 | 0.30 | 0.30 | 0.41 | 0.74 | 131 | 0.46 | 0.02 | 0.88 | 0.16 | 23.00 | 56 |
| SC | 8 | 975 | F | -0.01 | 2.37 | 0.72 | M | 0.02 | 1.52 | 0.60 | 0.85 | 0.94 | 0.90 | 133 | 0.37 | 0.02 | 0.90 | 0.71 | 23.00 | 57 |
| SC | 8 | 1054 | F | 0.00 | -1.10 | 0.25 | M | 0.01 | -1.14 | 0.27 | 0.04 | 0.37 | 0.12 | 130 | 0.91 | 0.00 | 0.98 | 0.09 | 23.00 | 58 |

## Appendix Table I.9:Science: DIF Survey

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1369 | 0 | -0.04 | 1.72 | 0.53 | 1 | 0.01 | 1.00 | 0.22 | 0.72 | 0.57 | 1.26 | 88 | 0.21 | 0.64 | 0.42 | 0.61 | 25 | 1 |
| SC | 5 | 1327 | 0 | -0.08 | 0.41 | 0.33 | 1 | 0.03 | -0.25 | 0.16 | 0.66 | 0.37 | 1.79 | 98 | 0.08 | 3.93 | 0.05 | 0.90 | 25 | 2 |
| SC | 5 | 1365 | 0 | 0.00 | 0.54 | 0.34 | 1 | 0.00 | 0.54 | 0.19 | 0.00 | 0.39 | 0.00 | 107 | 1.00 | 0.00 | 0.99 | 0.09 | 25 | 3 |
| SC | 5 | 1320 | 0 | -0.01 | 1.47 | 0.47 | 1 | 0.00 | 1.38 | 0.25 | 0.09 | 0.54 | 0.17 | 102 | 0.86 | 0.18 | 0.67 | 0.34 | 25 | 4 |
| SC | 5 | 1372 | 0 | 0.12 | 0.24 | 0.17 | 1 | -0.04 | 0.57 | 0.10 | -0.33 | 0.20 | -1.69 | 115 | 0.09 | 6.66 | 0.01 | -1.18 | 25 | 5 |
| SC | 5 | 1344 | 0 | 0.00 | -0.48 | 0.27 | 1 | 0.00 | -0.48 | 0.16 | 0.00 | 0.32 | 0.00 | 111 | 1.00 | 0.22 | 0.64 | 0.20 | 25 | 6 |
| SC | 5 | 1373 | 0 | 0.00 | -0.76 | 0.27 | 1 | 0.00 | -0.74 | 0.16 | -0.02 | 0.31 | -0.07 | 113 | 0.95 | 0.02 | 0.89 | -0.11 | 25 | 7 |
| SC | 5 | 1324 | 0 | 0.04 | 0.20 | 0.31 | 1 | -0.02 | 0.62 | 0.19 | -0.42 | 0.37 | -1.13 | 118 | 0.26 | 0.11 | 0.74 | -0.23 | 25 | 8 |
| SC | 5 | 1334 | 0 | -0.03 | 0.45 | 0.24 | 1 | 0.01 | 0.32 | 0.13 | 0.13 | 0.27 | 0.47 | 102 | 0.64 | 0.27 | 0.61 | -0.20 | 25 | 9 |
| SC | 5 | 1366 | 0 | -0.09 | 0.92 | 0.39 | 1 | 0.03 | 0.06 | 0.17 | 0.86 | 0.43 | 2.03 | 91 | 0.04 | 3.17 | 0.08 | 0.92 | 25 | 10 |
| SC | 5 | 1358 | 0 | 0.00 | -0.69 | 0.27 | 1 | 0.00 | -0.69 | 0.16 | 0.00 | 0.31 | 0.00 | 113 | 1.00 | 0.02 | 0.90 | 0.09 | 25 | 11 |
| SC | 5 | 1349 | 0 | -0.01 | 0.78 | 0.37 | 1 | 0.00 | 0.66 | 0.20 | 0.12 | 0.42 | 0.28 | 103 | 0.78 | 0.03 | 0.85 | -0.02 | 25 | 12 |
| SC | 5 | 1359 | 0 | -0.08 | 0.41 | 0.33 | 1 | 0.03 | -0.22 | 0.16 | 0.63 | 0.37 | 1.71 | 98 | 0.09 | 2.40 | 0.12 | 0.76 | 25 | 13 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1328 | 0 | 0.06 | -2.01 | 0.27 | 1 | -0.02 | -1.59 | 0.16 | -0.42 | 0.32 | -1.32 | 114 | 0.19 | 3.35 | 0.07 | -0.77 | 25 | 14 |
| SC | 5 | 1370 | 0 | -0.10 | 0.11 | 0.31 | 1 | 0.04 | -0.61 | 0.16 | 0.72 | 0.35 | 2.08 | 101 | 0.04 | 4.64 | 0.03 | 0.93 | 25 | 15 |
| SC | 5 | 1361 | 0 | -0.05 | -0.07 | 0.29 | 1 | 0.02 | -0.46 | 0.16 | 0.39 | 0.34 | 1.15 | 105 | 0.25 | 0.96 | 0.33 | 0.42 | 25 | 16 |
| SC | 5 | 1331 | 0 | -0.12 | 0.31 | 0.19 | 1 | 0.04 | -0.01 | 0.09 | 0.32 | 0.21 | 1.52 | 98 | 0.13 | 0.85 | 0.36 | 0.32 | 25 | 17 |
| SC | 5 | 1348 | 0 | 0.05 | 0.53 | 0.34 | 1 | -0.02 | 1.20 | 0.23 | -0.68 | 0.41 | -1.64 | 129 | 0.10 | 0.01 | 0.94 | -0.06 | 25 | 18 |
| SC | 5 | 1326 | 0 | 0.01 | -0.16 | 0.29 | 1 | 0.00 | -0.10 | 0.17 | -0.06 | 0.33 | -0.17 | 111 | 0.87 | 0.00 | 0.97 | 0.08 | 25 | 19 |
| SC | 5 | 1325 | 0 | 0.11 | -1.24 | 0.26 | 1 | -0.04 | -0.53 | 0.16 | -0.71 | 0.30 | -2.33 | 117 | 0.02 | 2.86 | 0.09 | -0.64 | 25 | 20 |
| SC | 5 | 1332 | 0 | -0.06 | -0.40 | 0.28 | 1 | 0.02 | -0.81 | 0.16 | 0.41 | 0.32 | 1.29 | 109 | 0.20 | 0.25 | 0.62 | 0.24 | 25 | 21 |
| SC | 5 | 1353 | 0 | -0.01 | 2.03 | 0.60 | 1 | 0.00 | 1.73 | 0.28 | 0.31 | 0.66 | 0.46 | 95 | 0.64 | 0.08 | 0.78 | 0.43 | 25 | 22 |
| SC | 5 | 1368 | 0 | -0.04 | 1.72 | 0.53 | 1 | 0.02 | 0.96 | 0.21 | 0.77 | 0.57 | 1.35 | 87 | 0.18 | 0.93 | 0.33 | 0.80 | 25 | 23 |
| SC | 5 | 1347 | 0 | 0.08 | -1.65 | 0.26 | 1 | -0.03 | -1.16 | 0.16 | -0.50 | 0.31 | -1.62 | 114 | 0.11 | 0.25 | 0.62 | -0.22 | 25 | 24 |
| SC | 5 | 1340 | 0 | 0.01 | 0.92 | 0.39 | 1 | 0.00 | 0.98 | 0.22 | -0.06 | 0.45 | -0.14 | 108 | 0.89 | 0.02 | 0.90 | 0.06 | 25 | 25 |
| SC | 5 | 1362 | 0 | 0.01 | -1.04 | 0.26 | 1 | -0.01 | -0.96 | 0.16 | -0.08 | 0.30 | -0.28 | 115 | 0.78 | 0.02 | 0.87 | 0.00 | 25 | 26 |
| SC | 5 | 1319 | 0 | -0.02 | 0.31 | 0.32 | 1 | 0.01 | 0.12 | 0.17 | 0.19 | 0.37 | 0.51 | 105 | 0.61 | 1.40 | 0.24 | 0.49 | 25 | 27 |
| SC | 5 | 1318 | 0 | -0.06 | 1.08 | 0.41 | 1 | 0.02 | 0.41 | 0.18 | 0.68 | 0.45 | 1.50 | 92 | 0.14 | 0.28 | 0.60 | 0.45 | 25 | 28 |
| SC | 5 | 1354 | 0 | -0.02 | 0.41 | 0.33 | 1 | 0.01 | 0.27 | 0.18 | 0.14 | 0.38 | 0.37 | 105 | 0.72 | 0.21 | 0.65 | 0.28 | 25 | 29 |
| SC | 5 | 1341 | 0 | -0.06 | -0.32 | 0.15 | 1 | 0.02 | -0.43 | 0.08 | 0.11 | 0.17 | 0.64 | 106 | 0.53 | 0.04 | 0.83 | -0.07 | 25 | 30 |
| SC | 5 | 1321 | 0 | 0.07 | -2.17 | 0.28 | 1 | -0.03 | -1.70 | 0.17 | -0.47 | 0.33 | -1.43 | 113 | 0.15 | 0.81 | 0.37 | -0.41 | 25 | 31 |
| SC | 5 | 1330 | 0 | 0.01 | -0.40 | 0.28 | 1 | -0.01 | -0.30 | 0.16 | -0.10 | 0.32 | -0.30 | 112 | 0.77 | 0.17 | 0.68 | -0.20 | 25 | 32 |
| SC | 5 | 1356 | 0 | -0.05 | -1.31 | 0.18 | 1 | 0.02 | -1.46 | 0.11 | 0.16 | 0.21 | 0.75 | 118 | 0.45 | 0.10 | 0.76 | 0.10 | 25 | 33 |
| SC | 5 | 1371 | 0 | 0.07 | -1.11 | 0.26 | 1 | -0.03 | -0.69 | 0.16 | -0.42 | 0.30 | -1.39 | 116 | 0.17 | 2.45 | 0.12 | -0.58 | 25 | 34 |
| SC | 5 | 1374 | 0 | 0.04 | -0.07 | 0.29 | 1 | -0.01 | 0.21 | 0.18 | -0.28 | 0.34 | -0.83 | 114 | 0.41 | 0.27 | 0.61 | 0.27 | 25 | 35 |
| SC | 5 | 1329 | 0 | 0.00 | -0.54 | 0.27 | 1 | 0.00 | -0.54 | 0.16 | 0.00 | 0.31 | 0.00 | 112 | 1.00 | 0.10 | 0.75 | -0.17 | 25 | 36 |
| SC | 5 | 1350 | 0 | -0.06 | 0.59 | 0.20 | 1 | 0.02 | 0.42 | 0.09 | 0.17 | 0.22 | 0.80 | 94 | 0.42 | 0.02 | 0.88 | 0.06 | 25 | 37 |
| SC | 5 | 1322 | 0 | 0.01 | -1.94 | 0.27 | 1 | 0.00 | -1.91 | 0.17 | -0.03 | 0.32 | -0.09 | 119 | 0.93 | 0.39 | 0.53 | -0.33 | 25 | 38 |
| SC | 5 | 1363 | 0 | 0.05 | 0.78 | 0.37 | 1 | -0.02 | 1.51 | 0.26 | -0.73 | 0.45 | -1.61 | 133 | 0.11 | 1.89 | 0.17 | -0.74 | 25 | 39 |
| SC | 5 | 1367 | 0 | 0.01 | -0.69 | 0.27 | 1 | 0.00 | -0.67 | 0.16 | -0.02 | 0.31 | -0.08 | 113 | 0.94 | 0.02 | 0.88 | 0.10 | 25 | 40 |
| SC | 5 | 1336 | 0 | 0.04 | -0.76 | 0.27 | 1 | -0.02 | -0.48 | 0.16 | -0.28 | 0.31 | -0.91 | 115 | 0.37 | 0.01 | 0.94 | -0.08 | 25 | 41 |
| SC | 5 | 1323 | 0 | 0.06 | -1.45 | 0.26 | 1 | -0.02 | -1.08 | 0.16 | -0.37 | 0.30 | -1.20 | 115 | 0.23 | 2.55 | 0.11 | -0.65 | 25 | 42 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 5 | 1364 | 0 | 0.00 | 0.65 | 0.36 | 1 | 0.00 | 0.69 | 0.20 | -0.04 | 0.41 | -0.10 | 108 | 0.92 | 0.00 | 0.98 | 0.10 | 25 | 43 |
| SC | 5 | 1357 | 0 | 0.02 | 1.26 | 0.44 | 1 | -0.01 | 1.58 | 0.27 | -0.31 | 0.51 | -0.61 | 116 | 0.54 | 0.01 | 0.93 | 0.25 | 25 | 44 |
| SC | 5 | 1360 | 0 | -0.01 | 2.47 | 0.73 | 1 | 0.00 | 2.10 | 0.33 | 0.37 | 0.80 | 0.46 | 93 | 0.65 | 0.03 | 0.87 | -0.59 | 25 | 45 |
| SC | 5 | 1346 | 0 | 0.03 | 0.78 | 0.37 | 1 | -0.01 | 1.26 | 0.24 | -0.48 | 0.44 | -1.09 | 121 | 0.28 | 0.01 | 0.90 | -0.18 | 25 | 46 |
| SC | 5 | 1315 | 0 | -0.04 | 0.68 | 0.19 | 1 | 0.02 | 0.57 | 0.09 | 0.11 | 0.21 | 0.52 | 98 | 0.60 | 0.19 | 0.66 | -0.19 | 25 | 47 |
| SC | 5 | 1317 | 0 | 0.00 | -1.13 | 0.26 | 1 | 0.00 | -1.13 | 0.16 | 0.00 | 0.30 | 0.00 | 115 | 1.00 | 0.00 | 0.96 | 0.07 | 25 | 48 |
| SC | 5 | 1333 | 0 | -0.02 | 0.02 | 0.30 | 1 | 0.01 | -0.17 | 0.17 | 0.18 | 0.34 | 0.54 | 106 | 0.59 | 0.74 | 0.39 | 0.35 | 25 | 49 |
| SC | 5 | 1351 | 0 | 0.01 | -0.24 | 0.29 | 1 | -0.01 | -0.14 | 0.17 | -0.10 | 0.33 | -0.30 | 112 | 0.76 | 0.38 | 0.54 | -0.25 | 25 | 50 |
| SC | 5 | 1337 | 0 | 0.07 | -0.40 | 0.28 | 1 | -0.03 | 0.12 | 0.17 | -0.52 | 0.33 | -1.58 | 119 | 0.12 | 0.07 | 0.79 | -0.15 | 25 | 51 |
| SC | 5 | 1338 | 0 | 0.01 | 0.02 | 0.30 | 1 | 0.00 | 0.05 | 0.17 | -0.03 | 0.35 | -0.09 | 110 | 0.93 | 0.01 | 0.92 | 0.03 | 25 | 52 |
| SC | 5 | 1339 | 0 | 0.05 | -0.16 | 0.29 | 1 | -0.02 | 0.24 | 0.18 | -0.40 | 0.34 | -1.18 | 117 | 0.24 | 0.10 | 0.76 | -0.16 | 25 | 53 |
| SC | 8 | 983 | 0 | -0.02 | 2.91 | 1.01 | 1 | 0.02 | 1.48 | 0.52 | 1.43 | 1.14 | 1.26 | 106 | 0.21 | 0.83 | 0.36 | 1.14 | 21 | 1 |
| SC | 8 | 962 | 0 | -0.02 | -1.70 | 0.20 | 1 | 0.01 | -1.78 | 0.19 | 0.08 | 0.28 | 0.28 | 137 | 0.78 | 0.47 | 0.49 | 0.33 | 21 | 2 |
| SC | 8 | 952 | 0 | 0.02 | -1.07 | 0.23 | 1 | -0.03 | -0.87 | 0.25 | -0.20 | 0.34 | -0.60 | 136 | 0.55 | 0.07 | 0.79 | -0.10 | 21 | 3 |
| SC | 8 | 951 | 0 | -0.02 | 2.20 | 0.72 | 1 | 0.02 | 1.23 | 0.47 | 0.96 | 0.86 | 1.12 | 122 | 0.27 | 2.00 | 0.16 | 1.53 | 21 | 4 |
| SC | 8 | 977 | 0 | 0.00 | -0.61 | 0.26 | 1 | 0.00 | -0.61 | 0.26 | 0.00 | 0.36 | 0.00 | 137 | 1.00 | 0.00 | 0.96 | 0.02 | 21 | 5 |
| SC | 8 | 1109 | 0 | 0.00 | -1.06 | 0.23 | 1 | 0.00 | -1.06 | 0.24 | 0.00 | 0.33 | 0.00 | 137 | 1.00 | 0.81 | 0.37 | 0.40 | 21 | 6 |
| SC | 8 | 956 | 0 | 0.00 | -0.98 | 0.24 | 1 | 0.00 | -0.98 | 0.24 | 0.00 | 0.34 | 0.00 | 137 | 1.00 | 1.07 | 0.30 | 0.44 | 21 | 7 |
| SC | 8 | 959 | 0 | -0.01 | 4.13 | 1.83 | 1 | 0.01 | 2.21 | 0.72 | 1.92 | 1.97 | 0.97 | 93 | 0.33 | | | | 21 | 8 |
| SC | 8 | 955 | 0 | -0.01 | 0.43 | 0.35 | 1 | 0.01 | 0.21 | 0.32 | 0.22 | 0.47 | 0.46 | 137 | 0.65 | 0.05 | 0.82 | -0.13 | 21 | 9 |
| SC | 8 | 1238 | 0 | 0.03 | 0.11 | 0.31 | 1 | -0.03 | 0.56 | 0.36 | -0.46 | 0.48 | -0.95 | 132 | 0.34 | 1.86 | 0.17 | -0.82 | 21 | 10 |
| SC | 8 | 1205 | 0 | 0.02 | -0.46 | 0.26 | 1 | -0.02 | -0.24 | 0.28 | -0.22 | 0.39 | -0.56 | 136 | 0.57 | 0.39 | 0.53 | -0.23 | 21 | 11 |
| SC | 8 | 1257 | 0 | 0.01 | -1.50 | 0.21 | 1 | -0.02 | -1.40 | 0.22 | -0.10 | 0.30 | -0.33 | 136 | 0.74 | 0.01 | 0.92 | -0.04 | 21 | 12 |
| SC | 8 | 932 | 0 | 0.02 | -1.02 | 0.23 | 1 | -0.02 | -0.87 | 0.25 | -0.15 | 0.34 | -0.44 | 136 | 0.66 | 0.77 | 0.38 | -0.37 | 21 | 13 |
| SC | 8 | 1111 | 0 | 0.02 | 0.11 | 0.31 | 1 | -0.02 | 0.44 | 0.35 | -0.33 | 0.47 | -0.70 | 134 | 0.48 | 0.01 | 0.94 | 0.04 | 21 | 14 |
| SC | 8 | 1260 | 0 | 0.01 | 0.31 | 0.33 | 1 | -0.01 | 0.44 | 0.35 | -0.12 | 0.48 | -0.25 | 136 | 0.80 | 0.19 | 0.66 | 0.23 | 21 | 15 |
| SC | 8 | 1265 | 0 | -0.03 | -0.32 | 0.28 | 1 | 0.03 | -0.61 | 0.26 | 0.30 | 0.38 | 0.78 | 137 | 0.44 | 0.22 | 0.64 | 0.19 | 21 | 16 |
| SC | 8 | 953 | 0 | -0.02 | -0.53 | 0.26 | 1 | 0.02 | -0.74 | 0.25 | 0.21 | 0.36 | 0.58 | 137 | 0.56 | 0.75 | 0.39 | 0.38 | 21 | 17 |
| SC | 8 | 954 | 0 | 0.00 | -0.47 | 0.26 | 1 | 0.00 | -0.47 | 0.27 | 0.00 | 0.38 | 0.00 | 137 | 1.00 | 0.05 | 0.82 | 0.11 | 21 | 18 |

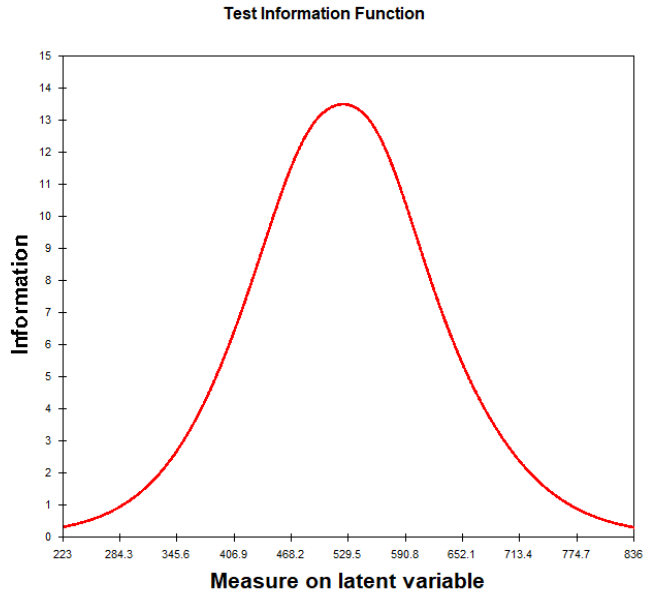
| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 942 | 0 | 0.01 | -1.36 | 0.21 | 1 | -0.02 | -1.25 | 0.22 | -0.11 | 0.31 | -0.36 | 136 | 0.72 | 0.53 | 0.47 | -0.30 | 21 | 19 |
| SC | 8 | 936 | 0 | -0.01 | -0.66 | 0.25 | 1 | 0.01 | -0.74 | 0.25 | 0.08 | 0.36 | 0.22 | 137 | 0.82 | 0.47 | 0.49 | 0.35 | 21 | 20 |
| SC | 8 | 964 | 0 | 0.01 | -0.08 | 0.29 | 1 | -0.02 | 0.11 | 0.31 | -0.18 | 0.43 | -0.43 | 136 | 0.67 | 0.05 | 0.82 | 0.13 | 21 | 21 |
| SC | 8 | 937 | 0 | -0.09 | -2.68 | 0.14 | 1 | 0.10 | -2.92 | 0.13 | 0.24 | 0.19 | 1.26 | 137 | 0.21 | 1.74 | 0.19 | 0.50 | 21 | 22 |
| SC | 8 | 971 | 0 | -0.01 | 4.13 | 1.83 | 1 | 0.01 | 2.21 | 0.72 | 1.92 | 1.97 | 0.97 | 93 | 0.33 | 1.42 | 0.23 | | 21 | 23 |
| SC | 8 | 972 | 0 | 0.05 | -1.22 | 0.22 | 1 | -0.06 | -0.81 | 0.25 | -0.42 | 0.33 | -1.25 | 134 | 0.21 | 2.26 | 0.13 | -0.67 | 21 | 24 |
| SC | 8 | 1258 | 0 | 0.02 | 0.56 | 0.36 | 1 | -0.02 | 1.03 | 0.43 | -0.48 | 0.56 | -0.85 | 131 | 0.40 | 0.45 | 0.50 | -0.40 | 21 | 25 |
| SC | 8 | 947 | 0 | 0.02 | 1.02 | 0.43 | 1 | -0.02 | 1.79 | 0.60 | -0.77 | 0.74 | -1.05 | 122 | 0.30 | 0.07 | 0.79 | 0.22 | 21 | 26 |
| SC | 8 | 1114 | 0 | -0.06 | -2.47 | 0.15 | 1 | 0.06 | -2.65 | 0.14 | 0.18 | 0.21 | 0.85 | 137 | 0.40 | 0.00 | 0.96 | 0.02 | 21 | 27 |
| SC | 8 | 984 | 0 | 0.02 | 1.22 | 0.47 | 1 | -0.02 | 2.22 | 0.72 | -0.99 | 0.86 | -1.16 | 114 | 0.25 | 1.00 | 0.32 | -0.75 | 21 | 28 |
| SC | 8 | 948 | 0 | 0.03 | -0.73 | 0.25 | 1 | -0.04 | -0.40 | 0.27 | -0.33 | 0.37 | -0.88 | 135 | 0.38 | 1.59 | 0.21 | -0.54 | 21 | 29 |
| SC | 8 | 950 | 0 | -0.02 | -0.60 | 0.26 | 1 | 0.02 | -0.74 | 0.25 | 0.15 | 0.36 | 0.40 | 137 | 0.69 | 0.05 | 0.82 | 0.10 | 21 | 30 |
| SC | 8 | 961 | 0 | 0.00 | 2.91 | 1.01 | 1 | 0.00 | 2.91 | 1.01 | 0.00 | 1.43 | 0.00 | 137 | 1.00 | 0.13 | 0.72 | 1.19 | 21 | 31 |
| SC | 8 | 987 | 0 | -0.01 | 0.85 | 0.40 | 1 | 0.01 | 0.56 | 0.36 | 0.28 | 0.54 | 0.52 | 137 | 0.60 | 0.38 | 0.54 | 0.36 | 21 | 32 |
| SC | 8 | 970 | 0 | -0.04 | 0.21 | 0.32 | 1 | 0.04 | -0.25 | 0.28 | 0.45 | 0.43 | 1.06 | 137 | 0.29 | 0.92 | 0.34 | 0.47 | 21 | 33 |
| SC | 8 | 985 | 0 | 0.06 | -1.74 | 0.19 | 1 | -0.07 | -1.35 | 0.22 | -0.39 | 0.29 | -1.32 | 134 | 0.19 | 1.41 | 0.23 | -0.48 | 21 | 34 |
| SC | 8 | 949 | 0 | 0.05 | -0.73 | 0.25 | 1 | -0.05 | -0.25 | 0.28 | -0.48 | 0.38 | -1.28 | 133 | 0.20 | 0.29 | 0.59 | -0.23 | 21 | 35 |
| SC | 8 | 981 | 0 | 0.02 | -0.53 | 0.26 | 1 | -0.02 | -0.32 | 0.28 | -0.21 | 0.38 | -0.55 | 136 | 0.59 | 0.31 | 0.58 | -0.26 | 21 | 36 |
| SC | 8 | 946 | 0 | -0.03 | -1.32 | 0.22 | 1 | 0.03 | -1.54 | 0.21 | 0.22 | 0.30 | 0.72 | 137 | 0.47 | 0.33 | 0.56 | 0.33 | 21 | 37 |
| SC | 8 | 944 | 0 | 0.03 | 0.01 | 0.30 | 1 | -0.04 | 0.56 | 0.36 | -0.55 | 0.47 | -1.16 | 131 | 0.25 | 0.83 | 0.36 | -0.55 | 21 | 38 |
| SC | 8 | 978 | 0 | -0.01 | 1.46 | 0.52 | 1 | 0.01 | 1.03 | 0.43 | 0.43 | 0.68 | 0.64 | 135 | 0.52 | 0.68 | 0.41 | 0.64 | 21 | 39 |
| SC | 8 | 945 | 0 | -0.15 | -1.22 | 0.22 | 1 | 0.16 | -2.06 | 0.18 | 0.83 | 0.28 | 2.94 | 133 | 0.00 | 0.06 | 0.81 | 0.11 | 21 | 40 |
| SC | 8 | 1266 | 0 | 0.03 | -0.73 | 0.25 | 1 | -0.04 | -0.40 | 0.27 | -0.33 | 0.37 | -0.88 | 135 | 0.38 | 0.02 | 0.89 | 0.07 | 21 | 41 |
| SC | 8 | 986 | 0 | 0.05 | 0.31 | 0.33 | 1 | -0.05 | 1.48 | 0.52 | -1.16 | 0.62 | -1.89 | 113 | 0.06 | 2.47 | 0.12 | -1.09 | 21 | 42 |
| SC | 8 | 967 | 0 | -0.01 | 0.85 | 0.40 | 1 | 0.01 | 0.56 | 0.36 | 0.28 | 0.54 | 0.52 | 137 | 0.60 | 0.27 | 0.60 | 0.30 | 21 | 43 |
| SC | 8 | 969 | 0 | -0.04 | -0.53 | 0.26 | 1 | 0.04 | -0.87 | 0.25 | 0.33 | 0.36 | 0.94 | 137 | 0.35 | 1.05 | 0.31 | 0.50 | 21 | 44 |
| SC | 8 | 980 | 0 | 0.01 | 1.46 | 0.52 | 1 | -0.01 | 1.79 | 0.59 | -0.32 | 0.79 | -0.41 | 133 | 0.68 | 0.07 | 0.79 | 0.25 | 21 | 45 |
| SC | 8 | 1267 | 0 | -0.02 | -0.79 | 0.24 | 1 | 0.02 | -0.93 | 0.24 | 0.14 | 0.34 | 0.40 | 137 | 0.69 | 0.24 | 0.62 | 0.22 | 21 | 46 |
| SC | 8 | 965 | 0 | -0.03 | -0.73 | 0.25 | 1 | 0.03 | -0.98 | 0.24 | 0.26 | 0.34 | 0.75 | 137 | 0.46 | 0.46 | 0.50 | 0.36 | 21 | 47 |

| subject | grade | Item | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | Person Class | Obs-Exp Average | DIF Measure | DIF S.E | DIF Contrast | Joint S.E | Rasch-Welch | | | Mantel | | Size Active ITEM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | T | Df | Prob | Chi-sq | Prob | CUMLOR | Slices | Number |
| SC | 8 | 960 | 0 | 0.02 | -0.66 | 0.25 | 1 | -0.02 | -0.47 | 0.27 | -0.19 | 0.37 | -0.52 | 136 | 0.61 | 0.04 | 0.84 | -0.08 | 21 | 48 |
| SC | 8 | 958 | 0 | -0.02 | 2.91 | 1.01 | 1 | 0.02 | 1.48 | 0.52 | 1.43 | 1.14 | 1.26 | 106 | 0.21 | 1.12 | 0.29 | 1.76 | 21 | 49 |
| SC | 8 | 938 | 0 | 0.03 | -0.53 | 0.26 | 1 | -0.03 | -0.25 | 0.28 | -0.29 | 0.39 | -0.75 | 135 | 0.46 | 0.22 | 0.64 | -0.25 | 21 | 50 |
| SC | 8 | 979 | 0 | 0.01 | 0.85 | 0.40 | 1 | -0.02 | 1.24 | 0.47 | -0.39 | 0.62 | -0.63 | 132 | 0.53 | 0.23 | 0.63 | -0.35 | 21 | 51 |
| SC | 8 | 939 | 0 | -0.07 | -0.66 | 0.25 | 1 | 0.08 | -1.25 | 0.22 | 0.59 | 0.34 | 1.75 | 137 | 0.08 | 1.93 | 0.16 | 0.70 | 21 | 52 |
| SC | 8 | 974 | 0 | -0.02 | 1.22 | 0.47 | 1 | 0.02 | 0.70 | 0.38 | 0.52 | 0.60 | 0.86 | 134 | 0.39 | 0.02 | 0.89 | -0.12 | 21 | 53 |
| SC | 8 | 1056 | 0 | 0.03 | 0.55 | 0.36 | 1 | -0.04 | 1.48 | 0.52 | -0.93 | 0.63 | -1.46 | 119 | 0.15 | 4.44 | 0.04 | -1.31 | 21 | 54 |
| SC | 8 | 1110 | 0 | 0.02 | 1.46 | 0.52 | 1 | -0.02 | 2.93 | 1.01 | -1.47 | 1.14 | -1.29 | 98 | 0.20 | 0.92 | 0.34 | -1.05 | 21 | 55 |
| SC | 8 | 1263 | 0 | 0.05 | -0.53 | 0.26 | 1 | -0.05 | 0.01 | 0.31 | -0.55 | 0.40 | -1.37 | 132 | 0.17 | 2.82 | 0.09 | -0.73 | 21 | 56 |
| SC | 8 | 975 | 0 | 0.02 | 1.46 | 0.52 | 1 | -0.02 | 2.93 | 1.01 | -1.47 | 1.14 | -1.29 | 98 | 0.20 | 0.69 | 0.41 | -0.76 | 21 | 57 |
| SC | 8 | 1054 | 0 | 0.02 | -1.07 | 0.23 | 1 | -0.02 | -0.93 | 0.24 | -0.14 | 0.33 | -0.42 | 136 | 0.67 | 0.43 | 0.51 | -0.29 | 21 | 58 |

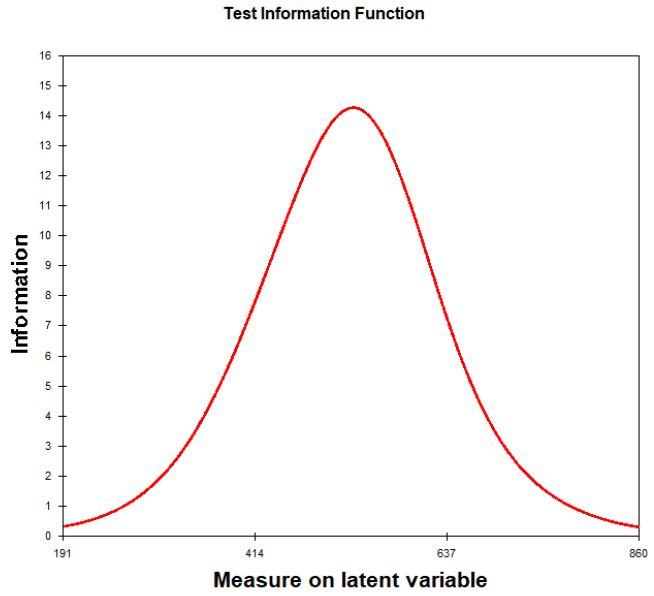
# Appendix J: Person By Test Information Functions

This appendix contains the Test Information Functions from Winsteps

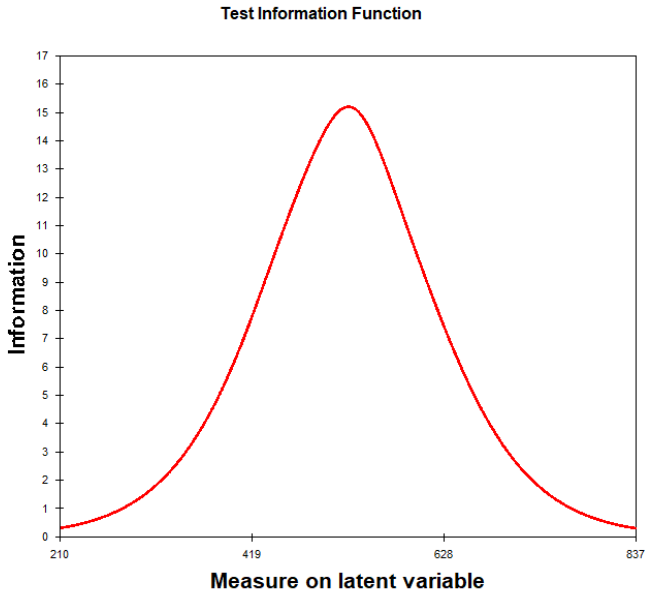
## Appendix Figure J.1: Grade 3 HL Test Information Function



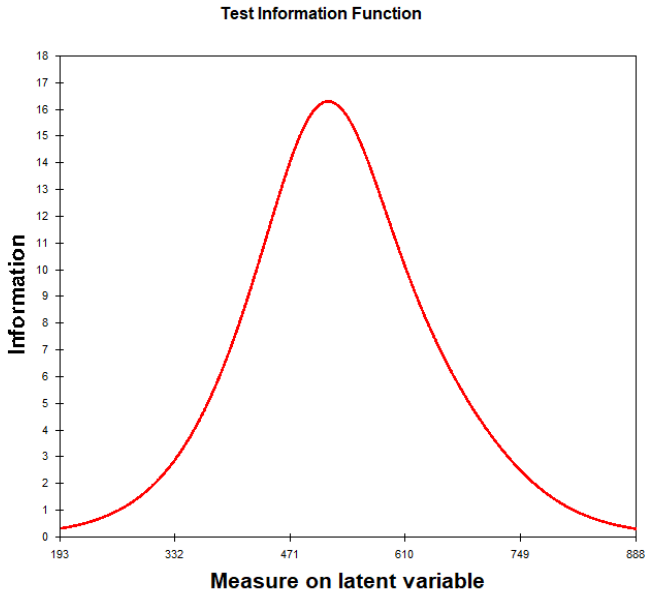

## Appendix Figure J.2: Grade 4 HL Test Information Function



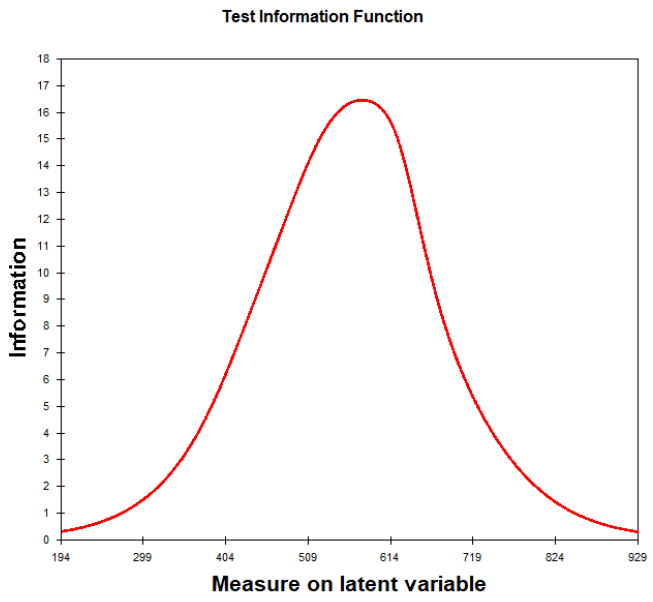

## Appendix Figure J.3: Grade 5 HL Test Information Function



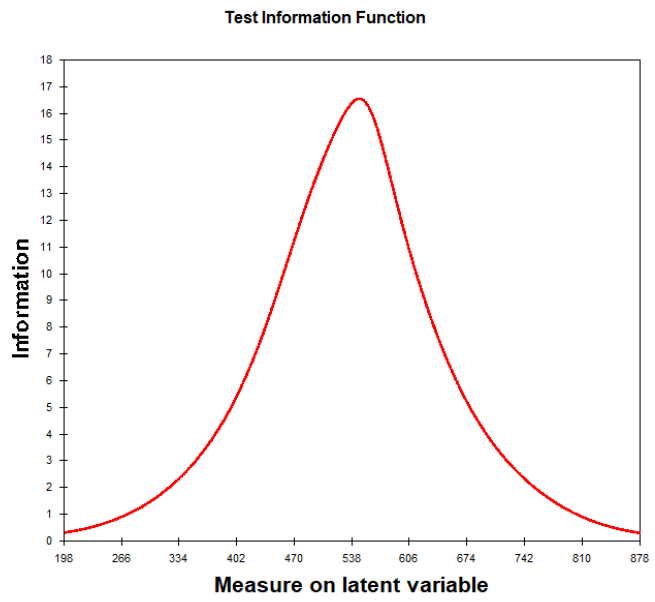

## Appendix Figure J.4: Grade 6 HL Test Information Function



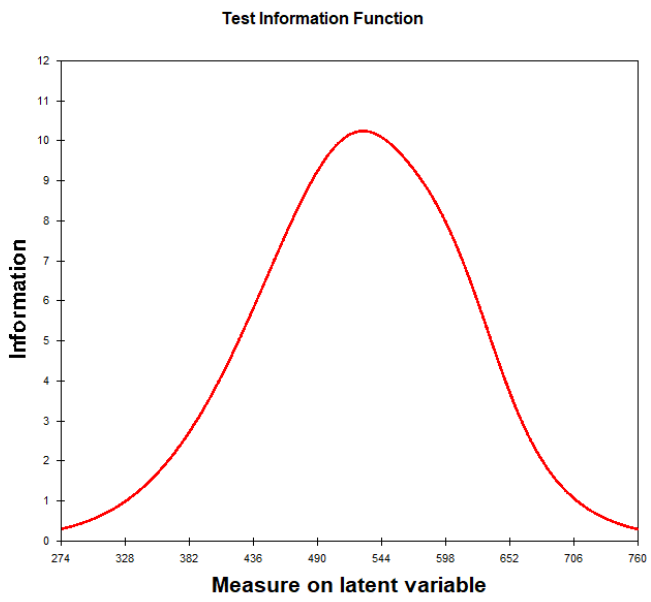
## Appendix Figure J.5 : Grade 7 HL Test Information Function



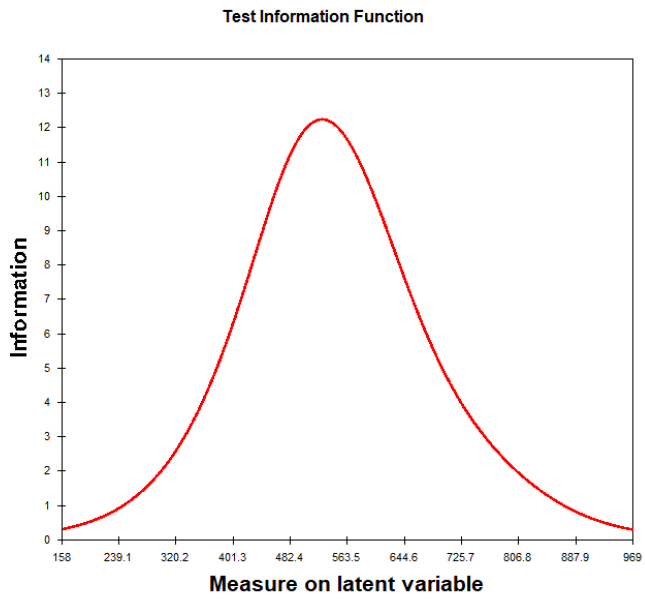

## Appendix Figure J.6: Grade 8 HL Test Information Function



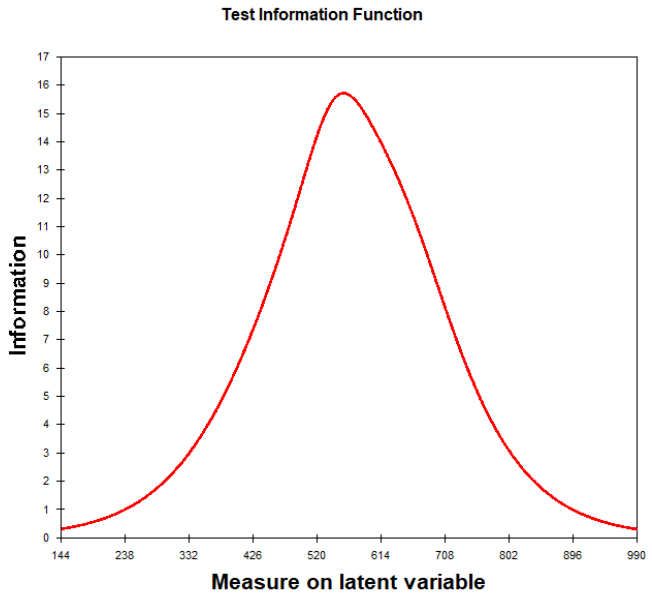

## Appendix Figure J.7: Grade 3 MA Test Information Function



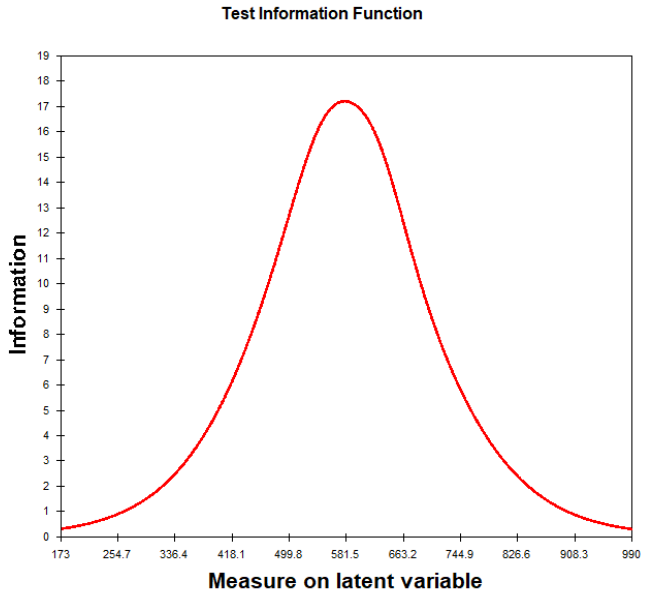

## Appendix Figure J.8: Grade 4 MA Test Information Function



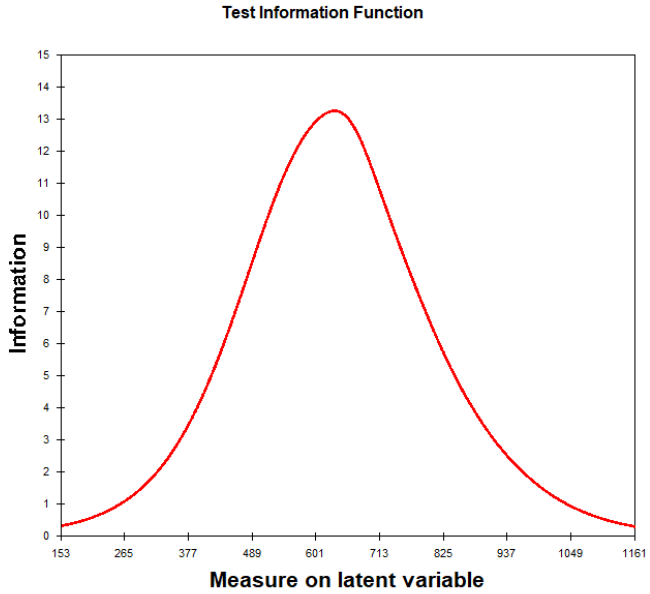
## Appendix Figure J.9: Grade 5 MA Test Information Function



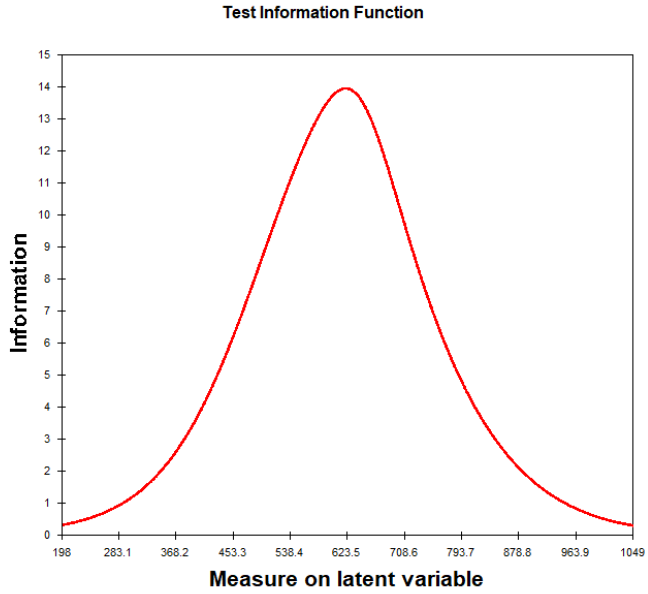

## Appendix Figure J.10: Grade 6 MA Test Information Function



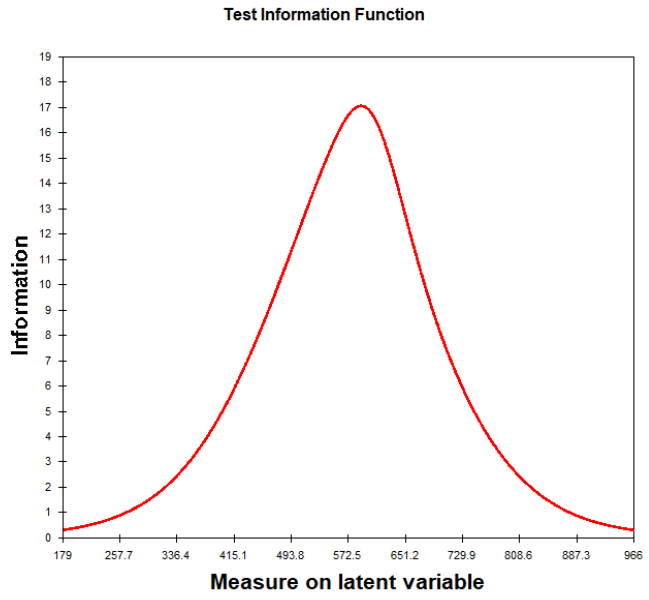

## Appendix Figure J.11: Grade 7 MA Test Information Function



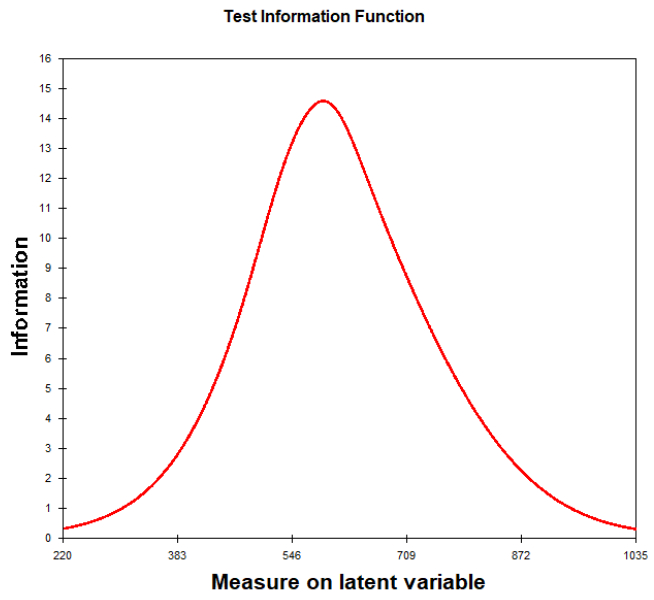

## Appendix Figure J.12: Grade 8 MA Test Information Function



## Appendix Figure J.13: Grade 5 SC Test Information Function




## Appendix Figure J.14: Grade 8 SC Test Information Function



# Appendix K: : Dimensionality Tables

This appendix contains the details of the dimensionality analysis from Winsteps

### Appendix Table K.1: 2021 Grade 3 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .51 | -1.26 | .81 | .74 | A | 47 | 145 | -.43 | -0.13 | 1.26 | 1.33 | a | 33 | 119 |
| 1 | .34 | -1.83 | .83 | .70 | B | 12 | 91 | -.43 | 0.49 | 1.37 | 1.73 | b | 51 | 1277 |
| 1 | .32 | 0.65 | .66 | .57 | C | 27 | 1024 | -.41 | -0.51 | 1.34 | 1.53 | c | 38 | 123 |
| 1 | .31 | 2.01 | .87 | .66 | D | 34 | 379 | -.37 | -0.23 | 1.42 | 1.60 | d | 32 | 1022 |
| 1 | .30 | 1.02 | .87 | .64 | E | 29 | 1020 | -.34 | 0.24 | 1.15 | 1.29 | e | 44 | 156 |
| 1 | .29 | 0.62 | .88 | .77 | F | 8 | 1026 | -.32 | -0.25 | 1.24 | 1.35 | f | 35 | 130 |
| 1 | .29 | -2.20 | .86 | .74 | G | 11 | 90 | -.28 | -0.38 | 1.08 | 1.17 | g | 49 | 1282 |
| 1 | .28 | -0.95 | .83 | .78 | H | 9 | 84 | -.26 | 0.49 | 1.13 | 1.27 | h | 37 | 143 |
| 1 | .28 | 0.91 | .88 | .74 | I | 13 | 87 | -.24 | -1.71 | 1.11 | 1.32 | i | 21 | 383 |
| 1 | .27 | -1.24 | .88 | .81 | J | 28 | 117 | -.21 | -0.52 | 1.14 | 1.24 | j | 30 | 114 |
| 1 | .27 | 0.57 | .79 | .70 | K | 54 | 1284 | -.18 | -0.49 | 1.11 | 1.09 | k | 52 | 1281 |
| 1 | .26 | 0.16 | .87 | .78 | L | 3 | 381 | -.17 | -0.07 | 1.08 | 1.11 | l | 25 | 110 |
| 1 | .26 | -0.01 | .80 | .73 | M | 4 | 108 | -.17 | -0.95 | 1.18 | 1.18 | m | 42 | 1021 |
| 1 | .26 | 1.16 | .97 | .81 | N | 46 | 138 | -.15 | -0.64 | 1.09 | 1.11 | n | 7 | 89 |
| 1 | .24 | 1.47 | .80 | .51 | O | 20 | 104 | -.14 | -0.17 | 1.08 | 1.15 | o | 55 | 1478 |
| 1 | .22 | 1.87 | .96 | .62 | P | 31 | 112 | -.13 | -0.99 | 1.15 | 1.13 | p | 19 | 107 |
| 1 | .21 | 0.18 | .90 | .81 | Q | 10 | 88 | -.13 | 1.55 | 1.14 | 1.25 | q | 24 | 1025 |
| 1 | .19 | 0.08 | .85 | .76 | R | 14 | 92 | -.12 | -0.23 | 1.06 | 1.09 | r | 41 | 158 |
| 1 | .18 | -1.91 | .87 | .79 | S | 5 | 94 | -.11 | -0.50 | .99 | .99 | s | 22 | 161 |
| 1 | .16 | -0.48 | .97 | .98 | T | 6 | 99 | -.10 | -0.17 | 1.07 | 1.09 | t | 39 | 137 |
| 1 | .15 | 0.94 | .89 | .74 | U | 18 | 96 | -.09 | 2.41 | .99 | 1.10 | u | 26 | 113 |
| 1 | .14 | 0.16 | .92 | .86 | V | 2 | 101 | -.09 | -1.44 | 1.15 | 1.16 | v | 43 | 384 |
| 1 | .12 | 0.14 | .89 | .87 | W | 17 | 97 | -.05 | 0.16 | .94 | 1.03 | w | 16 | 95 |
| 1 | .11 | 0.88 | .92 | .83 | X | 15 | 1023 | -.05 | 1.82 | .98 | 1.06 | x | 48 | 1286 |
| 1 | .10 | 3.34 | .86 | .42 | Y | 40 | 127 | -.05 | -1.00 | .96 | .93 | y | 53 | 1283 |
| 1 | .10 | -1.66 | .92 | .89 | Z | 45 | 150 | -.04 | 2.65 | .93 | .72 | z | 50 | 1285 |
| 1 | .07 | -2.10 | .95 | .90 | | 1 | 93 | -.03 | -0.61 | .98 | .98 | | 36 | 125 |
| 1 | .07 | -1.03 | .95 | .91 | | 23 | 162 | | | | | | | |
| 1 | .02 | -0.28 | 1.11 | 1.08 | | 56 | 394 | | | | | | | |

### Appendix Table K.2: 2021 Grade 4 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .48 | -1.40 | .79 | .69 | A | 17 | 20 | -.37 | 0.75 | 1.26 | 1.45 | a | 31 | 25 |
| 1 | .38 | -1.82 | .86 | .84 | B | 4 | 7 | -.37 | 0.31 | 1.18 | 1.27 | b | 34 | 55 |
| 1 | .38 | -1.27 | .91 | .84 | C | 6 | 64 | -.35 | 0.02 | 1.17 | 1.23 | c | 45 | 51 |
| 1 | .37 | -1.63 | .83 | .73 | D | 2 | 389 | -.35 | -0.12 | 1.06 | 1.09 | d | 52 | 1015 |
| 1 | .36 | 0.92 | .75 | .66 | E | 38 | 42 | -.34 | 0.99 | 1.23 | 1.46 | e | 37 | 57 |
| 1 | .33 | -0.71 | .86 | .84 | F | 7 | 8 | -.27 | 1.04 | 1.14 | 1.34 | f | 36 | 56 |
| 1 | .29 | 1.60 | .76 | .54 | G | 22 | 35 | -.25 | 0.15 | 1.16 | 1.20 | g | 28 | 37 |
| 1 | .26 | -1.34 | .96 | .95 | H | 5 | 12 | -.25 | 0.00 | 1.00 | 1.03 | h | 39 | 387 |
| 1 | .26 | 0.66 | .88 | .80 | I | 23 | 24 | -.24 | 0.05 | 1.19 | 1.24 | i | 19 | 23 |
| 1 | .25 | -0.13 | .88 | .87 | J | 15 | 17 | -.24 | 0.05 | 1.25 | 1.32 | j | 24 | 36 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .24 | 0.62 | .84 | .76 | K | 56 | 1013 | -.21 | 0.00 | 1.09 | 1.16 | k | 46 | 62 |
| 1 | .23 | -0.43 | .91 | .87 | L | 14 | 15 | -.20 | 1.53 | 1.17 | 1.74 | l | 49 | 63 |
| 1 | .23 | 0.87 | .93 | .89 | M | 25 | 1291 | -.20 | 0.42 | 1.15 | 1.15 | m | 57 | 395 |
| 1 | .22 | -1.07 | .87 | .82 | N | 13 | 16 | -.19 | -0.71 | 1.09 | 1.19 | n | 27 | 27 |
| 1 | .21 | -1.68 | .91 | .81 | O | 16 | 65 | -.17 | 0.91 | 1.11 | 1.33 | o | 35 | 41 |
| 1 | .20 | 0.91 | .82 | .75 | P | 55 | 1012 | -.17 | 0.21 | 1.06 | 1.09 | p | 40 | 46 |
| 1 | .18 | 0.60 | .95 | .90 | Q | 11 | 1019 | -.17 | 0.66 | 1.06 | 1.17 | q | 50 | 1016 |
| 1 | .16 | 1.85 | .92 | .83 | R | 10 | 11 | -.15 | -0.50 | 1.04 | 1.05 | r | 21 | 34 |
| 1 | .15 | -1.11 | .87 | .79 | S | 44 | 49 | -.14 | -0.17 | 1.09 | 1.13 | s | 20 | 30 |
| 1 | .14 | -2.16 | .95 | .90 | T | 9 | 13 | -.13 | 0.29 | 1.08 | 1.11 | t | 18 | 22 |
| 1 | .13 | 0.29 | .93 | .89 | U | 8 | 9 | -.13 | 0.55 | .98 | 1.01 | u | 54 | 1011 |
| 1 | .13 | -0.23 | .95 | .95 | V | 41 | 47 | -.10 | 0.00 | 1.08 | 1.12 | v | 3 | 21 |
| 1 | .11 | -0.99 | .87 | .85 | W | 47 | 60 | -.10 | 0.13 | 1.06 | 1.06 | w | 48 | 61 |
| 1 | .10 | -1.21 | .88 | .83 | X | 42 | 48 | -.08 | 0.19 | .99 | 1.02 | x | 33 | 40 |
| 1 | .10 | -0.12 | .86 | .85 | Y | 43 | 50 | -.03 | 2.02 | .95 | .80 | y | 53 | 1014 |
| 1 | .09 | -0.26 | .95 | .96 | Z | 32 | 54 | -.01 | -0.82 | 1.07 | 1.08 | z | 1 | 18 |
| 1 | .05 | 0.00 | 1.04 | 1.03 | | 26 | 26 | -.01 | -1.25 | 1.04 | .98 | | 12 | 14 |
| 1 | .04 | 3.89 | .92 | .37 | | 51 | 1017 | | | | | | | |
| 1 | .03 | -1.21 | 1.07 | 1.09 | | 29 | 38 | | | | | | | |
| 1 | .02 | -0.10 | 1.03 | 1.06 | | 30 | 31 | | | | | | | |

## Appendix Table K.3: 2021 Grade 5 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .42 | 0.25 | .80 | .71 | A | 55 | 719 | -.42 | -1.57 | 1.12 | 1.29 | a | 24 | 729 |
| 1 | .35 | 1.33 | .83 | .72 | B | 44 | 712 | -.41 | 0.15 | 1.24 | 1.37 | b | 4 | 716 |
| 1 | .34 | 0.45 | .84 | .74 | C | 11 | 713 | -.41 | -0.92 | 1.21 | 1.30 | c | 19 | 672 |
| 1 | .34 | -0.58 | .83 | .83 | D | 41 | 696 | -.38 | 0.57 | 1.29 | 1.68 | d | 18 | 1215 |
| 1 | .32 | -1.79 | .77 | .63 | E | 31 | 1222 | -.33 | 0.52 | 1.21 | 1.44 | e | 56 | 1208 |
| 1 | .30 | 1.04 | .81 | .66 | F | 6 | 723 | -.31 | -0.41 | 1.17 | 1.22 | f | 14 | 724 |
| 1 | .30 | -0.33 | .84 | .81 | G | 49 | 684 | -.31 | -0.47 | 1.22 | 1.29 | g | 16 | 627 |
| 1 | .27 | 0.45 | .83 | .75 | H | 48 | 727 | -.26 | 1.22 | 1.22 | 1.55 | h | 26 | 718 |
| 1 | .25 | 1.96 | .83 | .49 | I | 35 | 677 | -.22 | -0.45 | 1.12 | 1.19 | i | 23 | 1186 |
| 1 | .25 | -0.10 | .91 | .93 | J | 45 | 720 | -.22 | -0.85 | 1.17 | 1.27 | j | 36 | 625 |
| 1 | .25 | 0.09 | .89 | .85 | K | 46 | 714 | -.20 | 0.13 | 1.05 | 1.02 | k | 27 | 1193 |
| 1 | .23 | -0.27 | .86 | .81 | L | 9 | 690 | -.19 | 0.11 | 1.13 | 1.09 | l | 20 | 1183 |
| 1 | .22 | -1.14 | .87 | .82 | M | 28 | 689 | -.18 | 0.15 | 1.11 | 1.13 | m | 47 | 630 |
| 1 | .20 | 0.50 | .95 | .86 | N | 1 | 642 | -.15 | -0.62 | 1.10 | 1.12 | n | 57 | 1030 |
| 1 | .18 | 1.04 | .84 | .79 | O | 42 | 637 | -.14 | 0.50 | 1.15 | 1.25 | o | 8 | 711 |
| 1 | .15 | -2.52 | .80 | .65 | P | 2 | 644 | -.11 | 1.69 | 1.07 | 1.45 | p | 22 | 673 |
| 1 | .15 | -1.24 | .86 | .79 | Q | 12 | 721 | -.11 | 0.39 | 1.12 | 1.30 | q | 38 | 730 |
| 1 | .15 | 0.87 | .94 | .84 | R | 43 | 708 | -.10 | 1.91 | 1.03 | 1.24 | r | 51 | 707 |
| 1 | .15 | 2.60 | .85 | .47 | S | 52 | 706 | -.05 | -0.02 | 1.03 | 1.04 | s | 13 | 726 |
| 1 | .14 | -1.40 | .92 | .87 | T | 53 | 626 | -.05 | -0.18 | .98 | 1.01 | t | 15 | 725 |
| 1 | .13 | -0.48 | .92 | .91 | U | 3 | 636 | -.03 | 1.35 | 1.00 | 1.00 | u | 21 | 681 |
| 1 | .13 | -0.20 | .93 | .92 | V | 29 | 631 | -.03 | 0.64 | 1.07 | 1.04 | v | 34 | 693 |
| 1 | .12 | 0.17 | .90 | .89 | W | 37 | 702 | -.03 | -1.20 | 1.01 | 1.03 | w | 50 | 699 |
| 1 | .11 | -0.62 | .96 | .94 | X | 33 | 728 | -.02 | 0.62 | 1.07 | 1.12 | x | 7 | 1072 |
| 1 | .11 | -0.92 | .95 | .93 | Y | 39 | 709 | -.02 | -2.48 | .96 | 1.03 | y | 10 | 1074 |
| 1 | .09 | 0.04 | 1.07 | 1.21 | Z | 5 | 633 | -.02 | -0.56 | 1.07 | 1.06 | z | 30 | 648 |
| 1 | .08 | -0.67 | 1.03 | 1.02 | | 40 | 646 | | | | | | | |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .05 | 1.38 | 1.01 | .94 | | 25 | 640 | | | | | | | |
| 1 | .03 | 0.19 | .92 | .88 | | 32 | 629 | | | | | | | |
| 1 | .01 | 0.88 | .95 | .88 | | 17 | 722 | | | | | | | |
| 1 | .01 | -1.22 | 1.04 | 1.01 | | 54 | 634 | | | | | | | |

## Appendix Table K.4: 2021 Grade 6 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .48 | -0.52 | .74 | .70 | A | 37 | 680 | -.40 | -0.34 | 1.34 | 1.46 | a | 32 | 682 |
| 1 | .46 | -0.08 | .78 | .68 | B | 23 | 688 | -.35 | -0.28 | 1.15 | 1.22 | b | 11 | 661 |
| 1 | .40 | 1.66 | .72 | .60 | C | 48 | 694 | -.35 | -0.15 | 1.19 | 1.37 | c | 28 | 649 |
| 1 | .35 | -0.84 | .78 | .72 | D | 15 | 678 | -.34 | -2.46 | 1.18 | 1.61 | d | 3 | 638 |
| 1 | .30 | -1.69 | .85 | .78 | E | 31 | 653 | -.33 | -1.17 | 1.20 | 1.27 | e | 6 | 703 |
| 1 | .29 | 1.21 | .89 | .65 | F | 26 | 651 | -.27 | -0.56 | 1.29 | 1.42 | f | 12 | 659 |
| 1 | .27 | -0.08 | .77 | .68 | G | 14 | 665 | -.26 | 0.65 | 1.21 | 1.71 | g | 42 | 692 |
| 1 | .27 | 1.15 | .84 | .77 | H | 50 | 668 | -.26 | -0.22 | 1.04 | 1.10 | h | 55 | 656 |
| 1 | .24 | 0.21 | .86 | .75 | I | 4 | 641 | -.24 | -0.28 | 1.21 | 1.34 | i | 18 | 1075 |
| 1 | .23 | -1.33 | .92 | .88 | J | 46 | 700 | -.23 | 2.72 | 1.04 | 1.20 | j | 54 | 663 |
| 1 | .22 | -1.14 | .96 | .93 | K | 16 | 652 | -.21 | -1.79 | .94 | .99 | k | 1 | 624 |
| 1 | .21 | -0.34 | 1.00 | 1.21 | L | 17 | 639 | -.21 | -0.75 | 1.30 | 1.30 | l | 57 | 1031 |
| 1 | .21 | 0.21 | 1.01 | .88 | M | 29 | 1173 | -.20 | 2.92 | 1.06 | 1.32 | m | 49 | 676 |
| 1 | .20 | 0.66 | .84 | .56 | N | 20 | 664 | -.18 | -1.14 | 1.02 | 1.01 | n | 19 | 662 |
| 1 | .17 | -0.72 | .87 | .84 | O | 36 | 657 | -.16 | 2.41 | .95 | 1.16 | o | 41 | 1170 |
| 1 | .15 | 2.92 | 1.01 | .74 | P | 9 | 660 | -.15 | -1.09 | 1.03 | 1.00 | p | 40 | 667 |
| 1 | .15 | 1.46 | .94 | .83 | Q | 24 | 687 | -.15 | 0.28 | 1.09 | 1.07 | q | 43 | 679 |
| 1 | .10 | -1.79 | .87 | .84 | R | 7 | 628 | -.14 | -0.35 | 1.01 | 1.06 | r | 53 | 669 |
| 1 | .10 | -0.38 | .90 | .97 | S | 8 | 645 | -.10 | 1.86 | 1.05 | .96 | s | 33 | 698 |
| 1 | .08 | 2.72 | .92 | .33 | T | 45 | 701 | -.10 | -1.73 | 1.07 | 1.15 | t | 34 | 1172 |
| 1 | .07 | -1.35 | .90 | .92 | U | 5 | 704 | -.09 | -2.84 | .97 | .93 | u | 2 | 635 |
| 1 | .07 | 0.99 | 1.01 | .98 | V | 21 | 647 | -.06 | 0.61 | .87 | .72 | v | 25 | 1309 |
| 1 | .07 | -0.41 | .97 | .91 | W | 30 | 1083 | -.05 | 2.16 | 1.00 | 1.48 | w | 22 | 691 |
| 1 | .07 | 0.28 | 1.08 | 1.23 | X | 52 | 1169 | -.05 | -0.41 | 1.07 | 1.20 | x | 47 | 697 |
| 1 | .04 | -0.79 | 1.08 | 1.05 | Y | 13 | 643 | -.05 | 0.28 | .94 | .95 | y | 51 | 650 |
| 1 | .04 | 2.72 | .92 | .67 | Z | 39 | 674 | -.04 | -0.41 | 1.07 | 1.20 | z | 35 | 632 |
| 1 | .03 | -1.89 | .92 | .94 | | 27 | 683 | -.04 | 0.68 | 1.10 | 1.01 | | 44 | 666 |
| 1 | .01 | 0.20 | .95 | .84 | | 38 | 675 | -.02 | -0.18 | 1.07 | 1.14 | | 10 | 1171 |
| 1 | .00 | -1.49 | .96 | .95 | | 56 | 655 | | | | | | | |

## Appendix Table K.5: 2021 Grade 7 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .45 | -2.26 | 1.15 | 1.38 | A | 3 | 888 | -.45 | 1.12 | .88 | .64 | a | 43 | 1179 |
| 1 | .45 | -0.09 | 1.28 | 1.59 | B | 38 | 879 | -.43 | 0.36 | .83 | .82 | b | 40 | 1182 |
| 1 | .31 | -0.96 | 1.16 | 1.25 | C | 27 | 877 | -.41 | -1.77 | .83 | .75 | c | 31 | 887 |
| 1 | .29 | -1.77 | 1.19 | 1.24 | D | 8 | 763 | -.36 | -0.62 | .89 | .87 | d | 52 | 834 |
| 1 | .28 | 0.51 | 1.11 | 1.14 | E | 10 | 1098 | -.34 | -0.03 | .90 | .80 | e | 54 | 902 |
| 1 | .28 | -0.31 | 1.19 | 1.29 | F | 29 | 777 | -.28 | 2.01 | .83 | .44 | f | 37 | 869 |
| 1 | .27 | -2.11 | 1.23 | 1.40 | G | 1 | 1118 | -.26 | -0.68 | .87 | .80 | g | 49 | 899 |
| 1 | .27 | -0.94 | 1.25 | 1.35 | H | 47 | 829 | -.25 | 1.57 | .93 | .68 | h | 42 | 874 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .27 | 0.91 | 1.26 | 1.60 | I | 50 | 876 | -.22 | 1.06 | .88 | .81 | i | 14 | 774 |
| 1 | .26 | -1.74 | 1.06 | 1.11 | J | 2 | 784 | -.22 | 0.45 | .89 | .71 | j | 22 | 878 |
| 1 | .26 | 1.06 | 1.01 | 1.07 | K | 4 | 883 | -.22 | 0.31 | .91 | 1.14 | k | 41 | 891 |
| 1 | .25 | 1.24 | 1.13 | 2.27 | L | 28 | 1185 | -.21 | 2.00 | .87 | 1.14 | l | 44 | 870 |
| 1 | .14 | 0.14 | 1.03 | 1.03 | M | 26 | 803 | -.21 | 0.31 | .87 | .78 | m | 48 | 839 |
| 1 | .13 | 0.39 | 1.15 | 1.24 | N | 55 | 1104 | -.20 | -0.90 | .92 | .91 | n | 35 | 875 |
| 1 | .12 | -0.58 | 1.15 | 1.17 | O | 32 | 930 | -.19 | -0.50 | .82 | .77 | o | 11 | 1175 |
| 1 | .11 | 0.04 | 1.01 | 1.01 | P | 21 | 806 | -.19 | 0.63 | 1.17 | .99 | p | 45 | 872 |
| 1 | .09 | 0.14 | 1.02 | 1.07 | Q | 18 | 892 | -.18 | 3.11 | 1.04 | .74 | q | 30 | 903 |
| 1 | .08 | 2.11 | 1.01 | 1.43 | R | 56 | 822 | -.17 | 1.91 | .98 | .76 | r | 19 | 843 |
| 1 | .07 | -0.82 | 1.06 | 1.07 | S | 39 | 897 | -.14 | -0.79 | .95 | .96 | s | 16 | 1099 |
| 1 | .06 | -0.69 | .82 | .79 | T | 15 | 1097 | -.14 | 0.79 | .83 | .63 | t | 51 | 770 |
| 1 | .05 | 1.36 | .97 | .75 | U | 53 | 884 | -.12 | -1.84 | .83 | .84 | u | 13 | 790 |
| 1 | .02 | 1.57 | 1.06 | 1.10 | V | 17 | 1089 | -.08 | -0.82 | .96 | .91 | v | 9 | 762 |
| 1 | .02 | 0.81 | .92 | .83 | W | 20 | 1178 | -.08 | -1.97 | 1.03 | .97 | w | 12 | 871 |
| 1 | .01 | 2.12 | 1.10 | 1.86 | X | 6 | 886 | -.08 | 0.55 | .91 | 1.02 | x | 24 | 1088 |
| 1 | .01 | -1.94 | 1.03 | 1.15 | Y | 25 | 769 | -.08 | 0.91 | .99 | .93 | y | 33 | 880 |
| 1 | .00 | -1.91 | 1.01 | .94 | Z | 7 | 882 | -.06 | -0.44 | .95 | .91 | z | 23 | 808 |
| 1 | .00 | -0.33 | 1.04 | .97 | | 34 | 1096 | -.03 | -2.19 | .93 | .86 | | 5 | 885 |
| 1 | .00 | -0.78 | .92 | .93 | | 57 | 1032 | -.03 | 0.32 | .97 | .83 | | 46 | 889 |
| | | | | | | | | -.02 | 0.00 | .98 | .91 | | 36 | 811 |

## Appendix Table K.6: 2021 Grade 8 HLA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .57 | -0.06 | 1.27 | 1.51 | A | 36 | 926 | -.50 | -3.35 | .85 | .47 | a | 2 | 917 |
| 1 | .49 | -0.04 | 1.22 | 1.35 | B | 54 | 826 | -.47 | -2.14 | .80 | .64 | b | 6 | 929 |
| 1 | .42 | 0.26 | 1.35 | 1.59 | C | 35 | 1078 | -.34 | -0.45 | .80 | .80 | c | 45 | 1199 |
| 1 | .40 | 1.69 | 1.27 | 3.24 | D | 51 | 1092 | -.32 | -2.56 | .76 | .57 | d | 11 | 1126 |
| 1 | .38 | 0.44 | 1.18 | 1.56 | E | 17 | 914 | -.31 | -0.94 | .91 | .93 | e | 18 | 921 |
| 1 | .37 | 0.43 | 1.31 | 1.55 | F | 34 | 893 | -.30 | -1.22 | .85 | .78 | f | 20 | 833 |
| 1 | .34 | 0.06 | 1.30 | 1.53 | G | 23 | 796 | -.29 | 0.20 | .81 | .71 | g | 46 | 1201 |
| 1 | .27 | -0.48 | 1.23 | 1.29 | H | 50 | 805 | -.26 | 0.57 | .89 | .89 | h | 19 | 911 |
| 1 | .25 | 0.26 | 1.23 | 1.44 | I | 33 | 1105 | -.26 | -0.64 | .89 | .85 | i | 32 | 1190 |
| 1 | .19 | -1.91 | 1.00 | 1.09 | J | 7 | 904 | -.25 | 0.66 | .73 | .68 | j | 38 | 820 |
| 1 | .18 | 0.14 | 1.15 | 1.11 | K | 42 | 905 | -.23 | -1.60 | .95 | .90 | k | 44 | 1192 |
| 1 | .12 | -0.02 | 1.00 | 1.04 | L | 21 | 912 | -.21 | 1.01 | .82 | .77 | l | 39 | 780 |
| 1 | .11 | 1.04 | 1.07 | 1.40 | M | 48 | 764 | -.21 | 0.98 | .77 | .57 | m | 47 | 901 |
| 1 | .10 | -0.58 | 1.02 | .96 | N | 15 | 785 | -.19 | -0.78 | .90 | .87 | n | 41 | 925 |
| 1 | .10 | -0.57 | .94 | .97 | O | 56 | 1034 | -.16 | 0.56 | .81 | .67 | o | 28 | 761 |
| 1 | .09 | -0.39 | 1.02 | 1.06 | P | 30 | 906 | -.13 | 0.00 | 1.02 | 1.06 | p | 52 | 920 |
| 1 | .08 | 0.67 | .89 | .88 | Q | 3 | 894 | -.11 | -2.62 | .88 | 1.15 | q | 1 | 909 |
| 1 | .08 | 1.30 | 1.14 | 1.11 | R | 5 | 913 | -.11 | -1.22 | 1.01 | .98 | r | 29 | 910 |
| 1 | .06 | 0.83 | .99 | 1.34 | S | 49 | 924 | -.10 | 0.28 | 1.03 | 1.00 | s | 55 | 778 |
| 1 | .04 | -2.29 | .92 | .96 | T | 12 | 848 | -.09 | 3.06 | 1.01 | .72 | t | 13 | 802 |
| 1 | .03 | 0.86 | 1.17 | 1.64 | U | 4 | 867 | -.09 | -0.53 | .87 | .81 | u | 31 | 922 |
| 1 | .03 | -1.65 | .95 | .97 | V | 8 | 927 | -.06 | 0.25 | .88 | .98 | v | 43 | 1214 |
| 1 | .01 | -0.90 | 1.01 | 1.09 | W | 10 | 855 | -.05 | 1.48 | .85 | .70 | w | 25 | 772 |
| 1 | .01 | 0.84 | 1.22 | 1.74 | X | 22 | 916 | -.05 | 3.05 | .99 | .63 | x | 26 | 810 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .01 | 4.02 | .95 | .40 | Y | 24 | 793 | -.04 | 0.91 | .95 | .91 | y | 9 | 1127 |
| 1 | .01 | -0.75 | 1.03 | .99 | Z | 40 | 1212 | -.04 | -0.34 | .90 | .78 | z | 16 | 767 |
| 1 | .00 | 2.39 | .97 | .77 | | 53 | 766 | -.03 | 0.40 | .85 | .71 | | 14 | 771 |
| | | | | | | | | -.03 | -0.53 | .99 | 1.01 | | 27 | 1079 |
| | | | | | | | | -.02 | -0.09 | 1.04 | 1.12 | | 37 | 1210 |

## Appendix Table K.7: 2021 Grade 3 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .45 | 1.68 | 1.10 | 1.39 | A | 55 | 185 | -.43 | 0.31 | .80 | .70 | a | 22 | 172 |
| 1 | .39 | 0.66 | 1.18 | 1.38 | B | 35 | 211 | -.38 | -2.28 | .95 | .86 | b | 31 | 184 |
| 1 | .37 | 0.68 | 1.08 | 1.15 | C | 50 | 217 | -.35 | -2.15 | .98 | .95 | c | 23 | 198 |
| 1 | .35 | 1.17 | 1.17 | 1.66 | D | 9 | 219 | -.31 | -0.32 | .89 | .86 | d | 7 | 169 |
| 1 | .35 | 0.39 | 1.05 | 1.12 | E | 33 | 1035 | -.31 | -0.56 | 1.02 | 1.02 | e | 29 | 229 |
| 1 | .35 | -0.27 | 1.13 | 1.15 | F | 48 | 223 | -.30 | -1.49 | .93 | .90 | f | 34 | 201 |
| 1 | .31 | -0.11 | 1.10 | 1.12 | G | 49 | 205 | -.28 | 0.77 | .85 | .71 | g | 24 | 368 |
| 1 | .28 | -0.41 | 1.01 | 1.00 | H | 14 | 173 | -.26 | -0.48 | .81 | .77 | h | 17 | 174 |
| 1 | .26 | -0.20 | 1.10 | 1.12 | I | 8 | 231 | -.25 | 2.41 | 1.01 | .87 | i | 51 | 1305 |
| 1 | .23 | 0.17 | 1.19 | 1.27 | J | 5 | 225 | -.24 | 0.23 | .85 | .80 | j | 11 | 221 |
| 1 | .21 | -0.01 | 1.02 | 1.04 | K | 2 | 182 | -.22 | 0.04 | .84 | .81 | k | 21 | 212 |
| 1 | .21 | 0.68 | 1.10 | 1.28 | L | 54 | 218 | -.20 | -0.80 | .89 | .88 | l | 46 | 188 |
| 1 | .19 | 0.71 | 1.13 | 1.11 | M | 28 | 995 | -.19 | -2.31 | .93 | .79 | m | 10 | 202 |
| 1 | .17 | 0.57 | 1.09 | 1.24 | N | 15 | 226 | -.19 | -1.28 | 1.01 | .98 | n | 44 | 190 |
| 1 | .15 | -0.58 | 1.04 | 1.04 | O | 37 | 216 | -.18 | -2.22 | .93 | .92 | o | 6 | 215 |
| 1 | .14 | -0.27 | 1.07 | 1.10 | P | 32 | 186 | -.17 | -0.05 | .89 | .88 | p | 53 | 208 |
| 1 | .12 | 0.50 | 1.07 | 1.09 | Q | 19 | 210 | -.16 | -1.88 | 1.00 | 1.37 | q | 27 | 189 |
| 1 | .12 | 0.53 | .93 | .94 | R | 40 | 213 | -.12 | 0.61 | .96 | .88 | r | 25 | 191 |
| 1 | .09 | 0.15 | 1.21 | 1.27 | S | 30 | 374 | -.12 | 0.37 | 1.10 | 1.11 | s | 43 | 230 |
| 1 | .07 | -0.07 | .87 | .85 | T | 47 | 214 | -.06 | -1.37 | .95 | .93 | t | 3 | 206 |
| 1 | .06 | 2.07 | .98 | 1.16 | U | 18 | 1036 | -.06 | 3.37 | .87 | .62 | u | 12 | 992 |
| 1 | .02 | -0.45 | .97 | .95 | V | 45 | 180 | -.05 | -3.65 | .95 | .91 | v | 1 | 178 |
| 1 | .01 | 1.51 | 1.17 | 1.16 | W | 4 | 1303 | -.05 | 1.84 | .84 | .89 | w | 36 | 234 |
| 1 | .00 | 0.28 | 1.08 | 1.15 | X | 39 | 209 | -.04 | 0.78 | .98 | 1.10 | x | 13 | 371 |
| 1 | .00 | -0.05 | 1.06 | 1.09 | Y | 41 | 224 | -.04 | 2.62 | 1.13 | .62 | y | 16 | 233 |
| 1 | .00 | -0.35 | .86 | .84 | Z | 42 | 204 | -.03 | -1.00 | .95 | .93 | z | 20 | 207 |
| | | | | | | | | -.03 | -1.18 | 1.05 | 1.11 | | 26 | 193 |
| | | | | | | | | -.03 | -1.51 | .92 | .87 | | 52 | 187 |
| | | | | | | | | -.01 | 2.18 | .89 | .64 | | 38 | 235 |

## Appendix Table K.8: 2021 Grade 4 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .47 | 0.25 | 1.23 | 1.31 | A | 48 | 1007 | -.42 | -0.08 | .91 | .89 | a | 49 | 377 |
| 1 | .45 | -1.01 | 1.14 | 1.17 | B | 21 | 265 | -.40 | -0.33 | .84 | .82 | b | 51 | 378 |
| 1 | .45 | 0.00 | 1.22 | 1.25 | C | 37 | 264 | -.39 | -0.90 | .89 | .89 | c | 3 | 109 |
| 1 | .35 | -1.30 | 1.10 | 1.19 | D | 11 | 268 | -.36 | 2.04 | .88 | .51 | d | 19 | 239 |
| 1 | .32 | -0.66 | 1.13 | 1.17 | E | 7 | 170 | -.36 | -1.15 | .85 | .80 | e | 42 | 267 |
| 1 | .31 | 0.02 | 1.11 | 1.18 | F | 25 | 164 | -.35 | -0.20 | .92 | .90 | f | 24 | 250 |
| 1 | .27 | 0.36 | 1.16 | 1.22 | G | 52 | 241 | -.22 | -0.90 | .88 | .86 | g | 17 | 1005 |
| 1 | .22 | 0.41 | .98 | 1.04 | H | 28 | 261 | -.22 | -1.41 | 1.01 | .98 | h | 30 | 163 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .18 | 0.16 | 1.11 | 1.16 | I | 46 | 373 | -.22 | 0.12 | .93 | .96 | i | 31 | 103 |
| 1 | .18 | -0.46 | 1.06 | 1.06 | J | 54 | 258 | -.20 | -1.10 | .87 | .85 | j | 1 | 135 |
| 1 | .17 | 3.58 | 1.03 | 1.67 | K | 13 | 244 | -.19 | -0.48 | .98 | .99 | k | 20 | 165 |
| 1 | .15 | 0.34 | 1.08 | 1.10 | L | 4 | 257 | -.19 | 0.02 | .88 | .84 | l | 29 | 168 |
| 1 | .15 | 0.10 | 1.06 | 1.09 | M | 50 | 243 | -.19 | -0.78 | .88 | .85 | m | 38 | 154 |
| 1 | .12 | 0.06 | 1.09 | 1.11 | N | 18 | 254 | -.17 | -1.35 | .92 | .91 | n | 2 | 140 |
| 1 | .12 | 0.41 | 1.07 | 1.05 | O | 47 | 278 | -.17 | -0.10 | .94 | .94 | o | 6 | 236 |
| 1 | .12 | -0.14 | 1.03 | 1.02 | P | 55 | 249 | -.17 | 3.35 | .98 | .72 | p | 34 | 1010 |
| 1 | .11 | -0.97 | .98 | 1.04 | Q | 9 | 262 | -.15 | 0.04 | .99 | 1.03 | q | 23 | 256 |
| 1 | .11 | 0.56 | 1.06 | 1.12 | R | 40 | 253 | -.13 | -0.28 | .94 | .93 | r | 16 | 171 |
| 1 | .10 | 0.27 | 1.12 | 1.16 | S | 26 | 1006 | -.13 | 3.00 | .90 | .36 | s | 53 | 252 |
| 1 | .08 | -0.02 | 1.02 | 1.02 | T | 15 | 247 | -.12 | 0.29 | .97 | .98 | t | 8 | 1009 |
| 1 | .08 | 0.24 | .97 | .94 | U | 41 | 375 | -.11 | 0.41 | .93 | .94 | u | 14 | 166 |
| 1 | .03 | -0.80 | 1.09 | 1.11 | V | 33 | 167 | -.10 | -0.66 | .94 | .92 | v | 39 | 271 |
| 1 | .01 | -0.20 | .99 | 1.00 | W | 32 | 245 | -.09 | 2.52 | .98 | .84 | w | 36 | 240 |
| 1 | .01 | 0.43 | .97 | 1.00 | X | 45 | 246 | -.08 | -0.16 | .94 | .96 | x | 5 | 157 |
| 1 | .00 | -0.31 | .99 | 1.00 | Y | 10 | 238 | -.06 | 0.27 | 1.03 | 1.07 | y | 12 | 276 |
| 1 | .00 | -0.50 | 1.02 | 1.02 | Z | 27 | 263 | -.05 | -0.18 | .93 | .93 | z | 35 | 277 |
| | | | | | | | | -.04 | -0.33 | 1.01 | .99 | | 44 | 274 |
| | | | | | | | | -.03 | 0.29 | 1.07 | 1.09 | | 22 | 259 |
| | | | | | | | | -.01 | -2.77 | .96 | .85 | | 43 | 242 |

## Appendix Table K.9: 2021 Grade 5 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .51 | -0.34 | 1.38 | 1.45 | A | 20 | 414 | -.42 | -1.22 | .92 | .88 | a | 15 | 413 |
| 1 | .43 | -2.19 | 1.06 | 1.21 | B | 45 | 458 | -.41 | -0.56 | .86 | .84 | b | 19 | 1130 |
| 1 | .32 | -0.44 | 1.12 | 1.14 | C | 50 | 452 | -.36 | 0.43 | .83 | .78 | c | 34 | 412 |
| 1 | .30 | -0.95 | 1.07 | 1.08 | D | 21 | 444 | -.34 | 0.48 | .92 | .91 | d | 33 | 445 |
| 1 | .26 | -0.58 | 1.06 | 1.06 | E | 9 | 424 | -.33 | 0.80 | .92 | .83 | e | 57 | 453 |
| 1 | .22 | 0.26 | 1.09 | 1.15 | F | 58 | 428 | -.32 | 0.36 | .93 | .91 | f | 18 | 1202 |
| 1 | .21 | -0.25 | 1.11 | 1.13 | G | 42 | 425 | -.30 | -0.40 | .92 | .92 | g | 47 | 456 |
| 1 | .18 | 1.00 | 1.03 | 1.15 | H | 13 | 1223 | -.28 | 0.00 | .93 | .91 | h | 41 | 454 |
| 1 | .17 | -0.84 | 1.06 | 1.06 | I | 38 | 446 | -.26 | 0.07 | .96 | .98 | i | 29 | 439 |
| 1 | .17 | 0.55 | 1.12 | 1.17 | J | 43 | 419 | -.26 | -0.32 | .93 | .93 | j | 51 | 1187 |
| 1 | .17 | -0.03 | 1.04 | 1.06 | K | 53 | 1058 | -.25 | 1.25 | .89 | .70 | k | 27 | 1229 |
| 1 | .16 | -0.05 | 1.16 | 1.19 | L | 11 | 1136 | -.24 | -0.30 | .92 | .89 | l | 52 | 451 |
| 1 | .15 | -0.70 | 1.06 | 1.06 | M | 28 | 457 | -.22 | -0.56 | .86 | .84 | m | 12 | 431 |
| 1 | .14 | -1.33 | 1.02 | 1.07 | N | 2 | 1128 | -.22 | 1.02 | .89 | .75 | n | 54 | 464 |
| 1 | .13 | 1.00 | .96 | .90 | O | 23 | 1232 | -.18 | 0.78 | .83 | .72 | o | 14 | 463 |
| 1 | .11 | 0.46 | 1.09 | 1.17 | P | 7 | 432 | -.17 | 2.91 | .99 | .72 | p | 24 | 420 |
| 1 | .10 | 1.29 | 1.09 | 1.39 | Q | 30 | 440 | -.13 | 0.81 | 1.00 | .96 | q | 3 | 459 |
| 1 | .08 | -0.32 | 1.03 | 1.05 | R | 4 | 455 | -.12 | -0.59 | 1.01 | 1.03 | r | 31 | 415 |
| 1 | .07 | -1.59 | .94 | .89 | S | 22 | 460 | -.12 | -0.53 | .86 | .84 | s | 46 | 416 |
| 1 | .06 | 1.56 | .93 | .76 | T | 8 | 417 | -.11 | 0.71 | 1.04 | 1.01 | t | 48 | 449 |
| 1 | .06 | -1.38 | .99 | .97 | U | 37 | 421 | -.10 | -0.23 | 1.07 | 1.12 | u | 56 | 1121 |
| 1 | .04 | 1.53 | 1.04 | .88 | V | 39 | 1093 | -.07 | -0.41 | .97 | .97 | v | 36 | 448 |
| 1 | .03 | 0.15 | .99 | .97 | W | 26 | 436 | -.05 | -0.05 | 1.08 | 1.12 | w | 55 | 437 |
| 1 | .03 | 0.43 | 1.05 | 1.13 | X | 32 | 429 | -.04 | -0.51 | .95 | .94 | x | 1 | 422 |
| 1 | .03 | 0.45 | 1.03 | 1.06 | Y | 40 | 443 | -.04 | 0.20 | 1.06 | 1.08 | y | 16 | 442 |
| 1 | .02 | 1.38 | 1.10 | 1.27 | Z | 5 | 1217 | -.04 | -0.05 | .98 | 1.03 | z | 17 | 450 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .00 | -0.02 | 1.02 | 1.03 | | 35 | 426 | -.04 | 0.15 | 1.03 | .92 | | 49 | 435 |
| | | | | | | | | -.03 | 0.36 | 1.07 | 1.14 | | 25 | 462 |
| | | | | | | | | -.03 | -1.92 | .90 | .82 | | 44 | 433 |
| | | | | | | | | -.02 | -0.40 | 1.00 | 1.00 | | 6 | 434 |
| | | | | | | | | -.01 | -1.35 | .93 | .90 | | 10 | 441 |

## Appendix Table K.10: 2021 Grade 6 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .46 | 0.55 | .61 | .39 | A | 18 | 1062 | -.42 | 0.96 | 1.25 | 1.46 | a | 21 | 577 |
| 1 | .45 | -0.78 | .83 | .79 | B | 5 | 468 | -.40 | 0.06 | 1.20 | 1.32 | b | 24 | 580 |
| 1 | .44 | -0.02 | .71 | .54 | C | 17 | 1131 | -.40 | -0.72 | 1.09 | 1.08 | c | 25 | 526 |
| 1 | .42 | -1.99 | .90 | .82 | D | 32 | 571 | -.34 | 1.03 | 1.16 | 1.34 | d | 55 | 466 |
| 1 | .37 | 0.23 | .86 | .83 | E | 42 | 491 | -.32 | -0.99 | 1.07 | 1.07 | e | 50 | 514 |
| 1 | .36 | 0.51 | .81 | .76 | F | 15 | 502 | -.31 | -0.34 | 1.06 | 1.09 | f | 7 | 551 |
| 1 | .30 | -0.78 | .89 | .87 | G | 35 | 550 | -.31 | 0.18 | 1.10 | 1.22 | g | 30 | 499 |
| 1 | .26 | 1.73 | .95 | .52 | H | 41 | 575 | -.29 | -0.44 | 1.08 | 1.08 | h | 6 | 1200 |
| 1 | .24 | -0.17 | 1.02 | 1.20 | I | 33 | 553 | -.25 | -0.17 | 1.04 | 1.02 | i | 8 | 480 |
| 1 | .24 | -1.08 | .97 | .95 | J | 48 | 1203 | -.23 | 0.10 | 1.30 | 1.46 | j | 23 | 487 |
| 1 | .23 | 2.73 | .95 | .56 | K | 56 | 482 | -.23 | -0.27 | 1.06 | 1.08 | k | 46 | 572 |
| 1 | .19 | 1.42 | .80 | .49 | L | 12 | 1251 | -.20 | -0.38 | 1.04 | 1.03 | l | 13 | 490 |
| 1 | .19 | -1.05 | .98 | .98 | M | 57 | 1254 | -.19 | -0.90 | 1.03 | 1.10 | m | 45 | 1101 |
| 1 | .17 | -0.17 | .92 | .79 | N | 9 | 469 | -.19 | 1.03 | 1.22 | 1.46 | n | 47 | 476 |
| 1 | .14 | 0.10 | .87 | .79 | O | 1 | 581 | -.17 | 0.23 | 1.10 | 1.16 | o | 14 | 1256 |
| 1 | .14 | 1.85 | .86 | .41 | P | 52 | 570 | -.14 | -0.66 | .97 | .93 | p | 40 | 478 |
| 1 | .12 | -1.13 | .94 | .91 | Q | 31 | 535 | -.12 | 0.23 | 1.29 | 1.38 | q | 44 | 521 |
| 1 | .11 | 0.61 | .97 | .95 | R | 16 | 484 | -.11 | 0.27 | .87 | .84 | r | 26 | 1253 |
| 1 | .11 | -0.06 | 1.00 | 1.04 | S | 53 | 545 | -.11 | -0.78 | 1.08 | 1.09 | s | 38 | 495 |
| 1 | .10 | -1.08 | .96 | .96 | T | 19 | 537 | -.10 | 0.46 | 1.16 | 1.20 | t | 43 | 512 |
| 1 | .08 | -0.41 | 1.02 | 1.04 | U | 11 | 578 | -.08 | 0.06 | 1.17 | 1.38 | u | 29 | 520 |
| 1 | .06 | 0.72 | 1.01 | 1.12 | V | 4 | 470 | -.07 | 2.49 | .98 | 1.56 | v | 10 | 585 |
| 1 | .04 | -1.13 | .99 | .97 | W | 2 | 568 | -.06 | 0.41 | 1.00 | 1.01 | w | 27 | 534 |
| 1 | .03 | -0.44 | 1.02 | 1.11 | X | 3 | 579 | -.04 | -0.63 | .99 | .97 | x | 34 | 563 |
| 1 | .02 | -0.24 | .94 | .91 | Y | 54 | 517 | -.03 | -0.99 | .95 | .93 | y | 22 | 1142 |
| 1 | .01 | -0.72 | 1.04 | 1.03 | Z | 36 | 515 | -.03 | 1.85 | 1.00 | .95 | z | 28 | 1225 |
| 1 | .00 | -0.63 | 1.03 | 1.03 | | 20 | 567 | -.03 | -0.47 | .91 | .86 | | 39 | 574 |
| 1 | .00 | -0.96 | .98 | .96 | | 37 | 509 | -.03 | 1.73 | 1.04 | 1.04 | | 49 | 524 |
| | | | | | | | | -.01 | -0.90 | 1.00 | .98 | | 51 | 1063 |

## Appendix Table K.11: 2021 Grade 7 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .50 | -0.40 | 1.05 | 1.06 | A | 16 | 559 | -.48 | -0.61 | .90 | .81 | a | 20 | 481 |
| 1 | .40 | -0.47 | 1.14 | 1.18 | B | 18 | 1234 | -.40 | -0.94 | .90 | .88 | b | 21 | 498 |
| 1 | .39 | 0.37 | 1.07 | 1.08 | C | 44 | 543 | -.40 | -0.22 | .86 | .78 | c | 51 | 527 |
| 1 | .35 | 0.44 | 1.07 | 1.20 | D | 10 | 477 | -.34 | -0.84 | .98 | .96 | d | 40 | 562 |
| 1 | .34 | -1.30 | 1.11 | 1.12 | E | 7 | 1134 | -.30 | -1.46 | .91 | .89 | e | 27 | 536 |
| 1 | .33 | 0.32 | 1.03 | 1.14 | F | 45 | 474 | -.29 | 0.91 | .98 | .85 | f | 26 | 552 |
| 1 | .27 | -0.54 | 1.10 | 1.11 | G | 17 | 486 | -.28 | -1.35 | .92 | .90 | g | 29 | 541 |
| 1 | .26 | -0.40 | 1.12 | 1.17 | H | 12 | 506 | -.26 | -0.74 | 1.02 | 1.03 | h | 46 | 565 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .24 | -0.14 | 1.01 | 1.04 | I | 55 | 1259 | -.24 | -1.28 | .89 | .88 | i | 50 | 523 |
| 1 | .23 | -0.82 | 1.14 | 1.16 | J | 3 | 505 | -.23 | -0.03 | .90 | .91 | j | 31 | 547 |
| 1 | .22 | -0.21 | 1.06 | 1.07 | K | 38 | 511 | -.23 | -0.13 | .92 | .90 | k | 37 | 492 |
| 1 | .20 | 0.38 | .95 | .95 | L | 1 | 475 | -.23 | -0.54 | .95 | .97 | l | 41 | 533 |
| 1 | .20 | -0.13 | 1.04 | 1.06 | M | 28 | 549 | -.18 | 0.55 | 1.07 | 1.01 | m | 42 | 467 |
| 1 | .15 | -0.21 | 1.03 | 1.14 | N | 22 | 485 | -.17 | -0.85 | .98 | .96 | n | 6 | 525 |
| 1 | .15 | 2.99 | 1.01 | .99 | O | 34 | 1252 | -.16 | 3.69 | 1.00 | .46 | o | 24 | 555 |
| 1 | .15 | -1.44 | 1.04 | 1.04 | P | 39 | 616 | -.16 | -0.83 | .95 | .94 | p | 48 | 489 |
| 1 | .15 | 0.62 | 1.04 | 1.13 | Q | 53 | 1244 | -.15 | 0.17 | .98 | .92 | q | 14 | 479 |
| 1 | .14 | -0.89 | .99 | 1.01 | R | 52 | 1241 | -.12 | -1.11 | .95 | .94 | r | 56 | 1065 |
| 1 | .13 | -1.24 | 1.04 | 1.05 | S | 25 | 557 | -.10 | -0.25 | .96 | 1.03 | s | 36 | 561 |
| 1 | .11 | 2.04 | 1.05 | 1.21 | T | 19 | 1247 | -.10 | 0.37 | .89 | .80 | t | 47 | 522 |
| 1 | .10 | -1.69 | 1.00 | 1.01 | U | 5 | 508 | -.09 | 0.13 | 1.12 | 1.15 | u | 15 | 483 |
| 1 | .08 | -0.70 | .97 | .95 | V | 11 | 494 | -.07 | 0.56 | .92 | .95 | v | 23 | 1237 |
| 1 | .08 | -0.36 | 1.05 | 1.07 | W | 35 | 493 | -.06 | 0.76 | .90 | .79 | w | 4 | 516 |
| 1 | .07 | 2.27 | .94 | 1.23 | X | 30 | 501 | -.04 | -0.85 | .98 | .96 | x | 13 | 496 |
| 1 | .06 | 2.03 | 1.05 | 1.26 | Y | 54 | 1264 | -.03 | -0.66 | 1.05 | 1.09 | y | 33 | 503 |
| 1 | .05 | -0.17 | 1.00 | 1.01 | Z | 2 | 564 | -.02 | 2.57 | .91 | 1.47 | z | 32 | 513 |
| 1 | .05 | -0.48 | .95 | .94 | | 49 | 540 | -.01 | 2.04 | 1.02 | .85 | | 8 | 1066 |
| 1 | .03 | -0.21 | 1.05 | 1.05 | | 9 | 488 | | | | | | | |
| 1 | .03 | 1.28 | 1.02 | .87 | | 43 | 471 | | | | | | | |

## Appendix Table K.12: 2021 Grade 8 MA Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .51 | -0.79 | 1.20 | 1.27 | A | 28 | 598 | -.48 | -0.06 | .86 | .76 | a | 42 | 612 |
| 1 | .39 | -0.79 | 1.16 | 1.20 | B | 52 | 530 | -.40 | -0.20 | .83 | .75 | b | 44 | 1274 |
| 1 | .38 | -0.37 | 1.06 | 1.08 | C | 51 | 532 | -.37 | -0.01 | .93 | .93 | c | 9 | 569 |
| 1 | .35 | -0.45 | 1.09 | 1.20 | D | 21 | 607 | -.37 | -2.07 | .95 | .94 | d | 18 | 618 |
| 1 | .32 | -1.03 | 1.02 | 1.04 | E | 14 | 596 | -.32 | -0.24 | .92 | .84 | e | 38 | 566 |
| 1 | .27 | 1.95 | .94 | 1.08 | F | 27 | 548 | -.27 | -1.00 | .92 | .91 | f | 46 | 614 |
| 1 | .23 | -0.86 | 1.08 | 1.09 | G | 2 | 594 | -.26 | -0.15 | 1.14 | 1.19 | g | 5 | 544 |
| 1 | .20 | -0.53 | 1.13 | 1.18 | H | 47 | 586 | -.26 | 0.02 | 1.02 | .65 | h | 11 | 1135 |
| 1 | .19 | 0.51 | 1.02 | 1.06 | I | 15 | 615 | -.25 | -1.00 | .89 | .86 | i | 36 | 1141 |
| 1 | .18 | 0.09 | 1.01 | 1.00 | J | 1 | 602 | -.23 | 0.81 | .85 | .60 | j | 12 | 590 |
| 1 | .18 | 1.09 | 1.08 | 1.26 | K | 24 | 576 | -.22 | 0.37 | .82 | .80 | k | 4 | 583 |
| 1 | .18 | 0.51 | .96 | .96 | L | 50 | 556 | -.22 | 1.41 | 1.11 | .56 | l | 19 | 1138 |
| 1 | .17 | -0.33 | 1.04 | 1.04 | M | 10 | 1230 | -.21 | -1.39 | .95 | .94 | m | 45 | 600 |
| 1 | .17 | -0.06 | .94 | .95 | N | 22 | 1270 | -.20 | -0.79 | .91 | .87 | n | 25 | 1269 |
| 1 | .16 | -0.06 | 1.11 | 1.21 | O | 8 | 1236 | -.20 | 0.15 | .92 | .90 | o | 31 | 613 |
| 1 | .14 | -0.49 | 1.16 | 1.18 | P | 3 | 593 | -.15 | 0.15 | .99 | .92 | p | 17 | 601 |
| 1 | .13 | -0.20 | 1.03 | 1.04 | Q | 13 | 573 | -.14 | -0.49 | 1.00 | 1.02 | q | 40 | 1228 |
| 1 | .13 | -1.06 | 1.05 | 1.06 | R | 48 | 608 | -.13 | 1.31 | .98 | .86 | r | 30 | 591 |
| 1 | .13 | -0.96 | 1.06 | 1.06 | S | 55 | 589 | -.13 | 2.19 | 1.02 | .73 | s | 34 | 1218 |
| 1 | .11 | 0.15 | .95 | .93 | T | 35 | 529 | -.12 | -0.61 | 1.08 | 1.06 | t | 6 | 604 |
| 1 | .11 | 1.75 | 1.08 | 1.51 | U | 43 | 542 | -.11 | -1.49 | 1.03 | 1.07 | u | 33 | 621 |
| 1 | .10 | -1.61 | .99 | .98 | V | 49 | 611 | -.11 | -1.39 | .99 | .98 | v | 53 | 603 |
| 1 | .06 | -0.45 | 1.02 | 1.00 | W | 32 | 592 | -.09 | -0.93 | .88 | .87 | w | 7 | 597 |
| 1 | .05 | 0.20 | 1.00 | 1.07 | X | 16 | 531 | -.07 | 1.75 | 1.01 | 1.11 | x | 41 | 588 |
| 1 | .04 | 0.15 | 1.00 | 1.04 | Y | 23 | 1273 | -.06 | 2.91 | 1.03 | 1.07 | y | 20 | 620 |
| 1 | .04 | 1.95 | .94 | .95 | Z | 56 | 1140 | -.06 | 1.16 | 1.02 | 1.00 | z | 26 | 582 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .02 | -0.06 | 1.02 | 1.06 | | 29 | 617 | | | | | | | |
| 1 | .02 | -0.45 | .96 | .92 | | 37 | 584 | | | | | | | |
| 1 | .01 | 1.95 | .97 | 1.07 | | 39 | 1268 | | | | | | | |
| 1 | .01 | -0.15 | .99 | .93 | | 54 | 599 | | | | | | | |

## Appendix Table K.13: 2021 Grade 5 SC Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .50 | 0.11 | 1.24 | 1.36 | A | 35 | 1374 | -.43 | -0.40 | .80 | .77 | a | 30 | 1341 |
| 1 | .40 | -0.17 | 1.14 | 1.24 | B | 49 | 1333 | -.41 | -1.90 | .85 | .79 | b | 38 | 1322 |
| 1 | .37 | 0.96 | 1.20 | 1.78 | C | 18 | 1348 | -.38 | -1.44 | .84 | .82 | c | 33 | 1356 |
| 1 | .36 | -0.37 | 1.08 | 1.08 | D | 16 | 1361 | -.35 | 0.60 | .85 | .70 | d | 47 | 1315 |
| 1 | .33 | -0.13 | 1.11 | 1.19 | E | 19 | 1326 | -.34 | 0.46 | .79 | .62 | e | 37 | 1350 |
| 1 | .32 | -0.02 | 1.18 | 1.30 | F | 51 | 1337 | -.28 | 0.36 | .96 | .82 | f | 9 | 1334 |
| 1 | .31 | 0.15 | 1.23 | 1.44 | G | 27 | 1319 | -.28 | 0.07 | .79 | .75 | g | 17 | 1331 |
| 1 | .30 | -1.29 | 1.16 | 1.24 | H | 24 | 1347 | -.27 | 0.56 | .82 | .65 | h | 28 | 1318 |
| 1 | .29 | 0.96 | 1.07 | 1.45 | I | 25 | 1340 | -.21 | 0.50 | .77 | .59 | i | 5 | 1372 |
| 1 | .24 | -0.50 | 1.16 | 1.18 | J | 6 | 1344 | -.21 | 1.11 | .97 | .88 | j | 23 | 1368 |
| 1 | .23 | 1.41 | 1.05 | 1.61 | K | 4 | 1320 | -.19 | 0.56 | 1.01 | .96 | k | 3 | 1365 |
| 1 | .19 | 0.15 | 1.07 | 1.05 | L | 53 | 1339 | -.16 | -1.72 | .89 | .87 | l | 14 | 1328 |
| 1 | .18 | -0.67 | 1.06 | 1.07 | M | 40 | 1367 | -.16 | 1.80 | 1.03 | 1.04 | m | 22 | 1353 |
| 1 | .16 | -0.67 | 1.02 | 1.02 | N | 11 | 1358 | -.15 | -0.99 | .92 | .90 | n | 26 | 1362 |
| 1 | .14 | 0.06 | 1.04 | 1.02 | O | 52 | 1338 | -.13 | -0.42 | .94 | .93 | o | 15 | 1370 |
| 1 | .13 | -0.11 | 1.06 | 1.10 | P | 2 | 1327 | -.12 | 2.18 | .92 | .59 | p | 45 | 1360 |
| 1 | .07 | 1.32 | 1.06 | 1.07 | Q | 39 | 1363 | -.09 | -1.84 | 1.02 | 1.07 | q | 31 | 1321 |
| 1 | .07 | -0.54 | 1.05 | 1.08 | R | 41 | 1336 | -.09 | -1.15 | .94 | .91 | r | 42 | 1323 |
| 1 | .06 | 0.50 | 1.02 | .96 | S | 8 | 1324 | -.08 | 1.15 | 1.00 | .99 | s | 1 | 1369 |
| 1 | .06 | 0.67 | .97 | .90 | T | 12 | 1349 | -.06 | 0.70 | .98 | .98 | t | 43 | 1364 |
| 1 | .05 | -0.33 | 1.02 | 1.00 | U | 32 | 1330 | -.02 | -0.54 | .93 | .93 | u | 36 | 1329 |
| 1 | .04 | -1.11 | 1.04 | 1.05 | V | 48 | 1317 | -.02 | 1.51 | .99 | .92 | v | 44 | 1357 |
| 1 | .03 | -0.70 | .97 | .97 | W | 20 | 1325 | -.01 | 0.25 | 1.01 | 1.03 | w | 10 | 1366 |
| 1 | .03 | -0.74 | .95 | .95 | X | 21 | 1332 | \| | | | | | | |
| 1 | .03 | -0.17 | .98 | 1.02 | Y | 50 | 1351 | \| | | | | | | |
| 1 | .01 | -0.09 | .96 | .90 | Z | 13 | 1359 | \| | | | | | | |
| 1 | .01 | 0.32 | .95 | .97 | | 29 | 1354 | \| | | | | | | |
| 1 | .01 | -0.79 | .94 | .93 | z | 34 | 1371 | \| | | | | | | |
| 1 | .01 | 1.15 | 1.11 | 1.35 | y | 46 | 1346 | \| | | | | | | |
| 1 | .00 | -0.74 | .94 | .95 | x | 7 | 1373 | \| | | | | | | |

## Appendix Table K.14: 2021 Grade 8 SC Dimensionality

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .56 | -1.11538 | .82 | .79 | A | 52 | 939 | -.47 | -1.66901 | 1.06 | 1.07 | a | 12 | 1257 |
| 1 | .55 | -1.74037 | .84 | .81 | B | 37 | 946 | -.43 | 1.587327 | 1.09 | 1.46 | b | 28 | 984 |
| 1 | .43 | -.833932 | .86 | .84 | C | 20 | 936 | -.32 | -1.21196 | .99 | .97 | c | 24 | 972 |
| 1 | .38 | -2.20208 | .88 | .85 | D | 2 | 962 | -.29 | -.106444 | 1.22 | 1.56 | d | 33 | 970 |
| 1 | .35 | -1.04730 | .82 | .81 | E | 47 | 965 | -.28 | -.494400 | .94 | .95 | e | 18 | 954 |
| 1 | .33 | .652187 | .95 | .82 | F | 32 | 987 | -.28 | -.614611 | 1.15 | 1.23 | f | 35 | 949 |
| 1 | .33 | -.497001 | .95 | .87 | G | 50 | 938 | -.28 | -.456641 | 1.05 | 1.11 | g | 36 | 981 |
| 1 | .22 | -1.02972 | .79 | .74 | H | 27 | 1114 | -.27 | .728950 | 1.06 | 1.13 | h | 42 | 986 |

| Contrast | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item | Loading | Measure | Infit mnsq | Outfit mnsq | Entry | Number | Item |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .22 | .896361 | .96 | .76 | I | 53 | 974 | -.26 | 1.196283 | 1.05 | 1.76 | i | 26 | 947 |
| 1 | .19 | -1.11152 | .94 | .92 | J | 13 | 932 | -.21 | -.413150 | 1.08 | 1.18 | j | 11 | 1205 |
| 1 | .19 | .259310 | .95 | .82 | K | 38 | 944 | -.21 | 2.900253 | 1.03 | 2.20 | k | 23 | 971 |
| 1 | .19 | 1.947479 | .98 | .63 | L | 49 | 958 | -.21 | 1.947479 | .96 | .95 | l | 55 | 1110 |
| 1 | .17 | -.056283 | .94 | .86 | M | 21 | 964 | -.19 | 1.443261 | 1.00 | .91 | m | 4 | 951 |
| 1 | .17 | -.837123 | .99 | .97 | N | 30 | 950 | -.19 | .652187 | 1.07 | 1.21 | n | 43 | 967 |
| 1 | .14 | .381400 | .97 | .97 | O | 9 | 955 | -.18 | -.614611 | 1.10 | 1.19 | o | 41 | 1266 |
| 1 | .14 | -.727724 | 1.07 | 1.22 | P | 48 | 960 | -.16 | .810121 | 1.12 | 1.53 | p | 54 | 1056 |
| 1 | .12 | 1.948752 | .98 | .66 | Q | 1 | 983 | -.15 | .381400 | 1.11 | 1.44 | q | 10 | 1238 |
| 1 | .12 | 1.947479 | 1.00 | .93 | R | 57 | 975 | -.14 | -1.24513 | 1.15 | 1.15 | r | 6 | 1109 |
| 1 | .11 | 1.194866 | .95 | .80 | S | 39 | 978 | -.14 | -1.47433 | 1.06 | 1.09 | s | 19 | 942 |
| 1 | .08 | -.764569 | .92 | .95 | T | 44 | 969 | -.12 | -1.11538 | 1.06 | 1.10 | t | 58 | 1054 |
| 1 | .06 | .320164 | .94 | .81 | U | 15 | 1260 | -.09 | -.652773 | 1.11 | 1.09 | u | 29 | 948 |
| 1 | .05 | -.277035 | 1.01 | .81 | V | 40 | 945 | -.08 | -1.17865 | 1.07 | 1.07 | v | 3 | 952 |
| 1 | .04 | 1.087550 | .97 | .89 | W | 51 | 979 | -.07 | .261144 | 1.04 | 1.05 | w | 14 | 1111 |
| 1 | .02 | -1.11152 | .95 | .91 | X | 7 | 956 | -.07 | 1.587327 | 1.07 | 1.41 | x | 45 | 980 |
| 1 | .02 | -.909604 | .86 | .81 | Y | 22 | 937 | -.05 | 2.899060 | 1.03 | 1.88 | y | 31 | 961 |
| | | | | | | | | -.05 | -.415637 | 1.05 | 1.03 | z | 56 | 1263 |
| | | | | | | | | -.04 | -.797909 | 1.12 | 1.17 | | 17 | 953 |
| | | | | | | | | -.04 | .897873 | .97 | .84 | | 25 | 1258 |
| | | | | | | | | -.02 | 2.900253 | .98 | .54 | | 8 | 959 |

# Appendix L: 2021 Discussion Guide

KĀʻEO
Kaiapuni Assessment of Educational Outcomes

2021
Educator & Student Surveys

# KĀʻEO 2021

## Discussion Guide

Developed by the University of Hawaiʻi at Mānoa
to be used in conjunction with the results from the
Kaiapuni Assessment for Educational Outcomes (KĀʻEO)

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# Discussion Guide

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Introduction _____ 3
Questions To Consider _____ 4
COVID-19 Impacts
on Instruction _____ 5
on Student Engagement _____ 7
on Hawaiian Language Proficiency _____ 9
on Student Readiness _____ 11



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# Introduction

**As you unpack your school's KĀ'EO results, you may find it helpful to have additional information available to facilitate conversations at your school.**

Opportunity To Learn (OTL) survey results are included in this document to provide some additional context for those conversations.

The results have been categorized according to **four major themes:**

1. Impacts on **instruction and learning**
2. Impacts on **student engagement**
3. Impacts to **Hawaiian language proficiency**
4. Impacts on **student readiness**

**On the next page, you will see questions provided as a starting point to facilitate discussion in your school and community, followed by the results of the OTL survey.**



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## Questions To Consider

**As you review the OTL results, consider the following questions and how they might apply across all four major themes:**

- ✓ What does (or does not) resonate in the OTL data in how it applies to your school's specific context? Were there grade levels or content areas that were particularly impacted?
- ✓ What additional information would you want to know from families, teachers and students this year?
- ✓ Are there results that were NOT expected?
- ✓ If you have seen impacts to Hawaiian language proficiency similar to what is reflected in this data, how do you think this has impacted students' learning and the ability to demonstrate what they know? What are some strategies that you can use to mitigate these impacts in your specific school context?
- ✓ Your school probably has a wealth of data from other sources – formative assessment data, performance assessment data, anecdotal data, school-specific measures, lived experiences, etc. How can these rich, additional sources of information be used along with KĀʻEO and OTL results to make informed decisions about next steps? What are your next steps?



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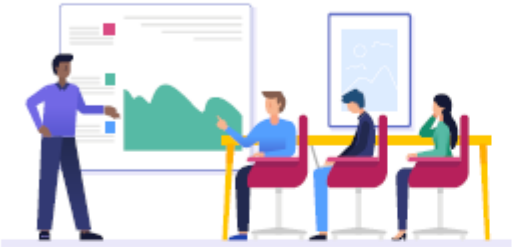
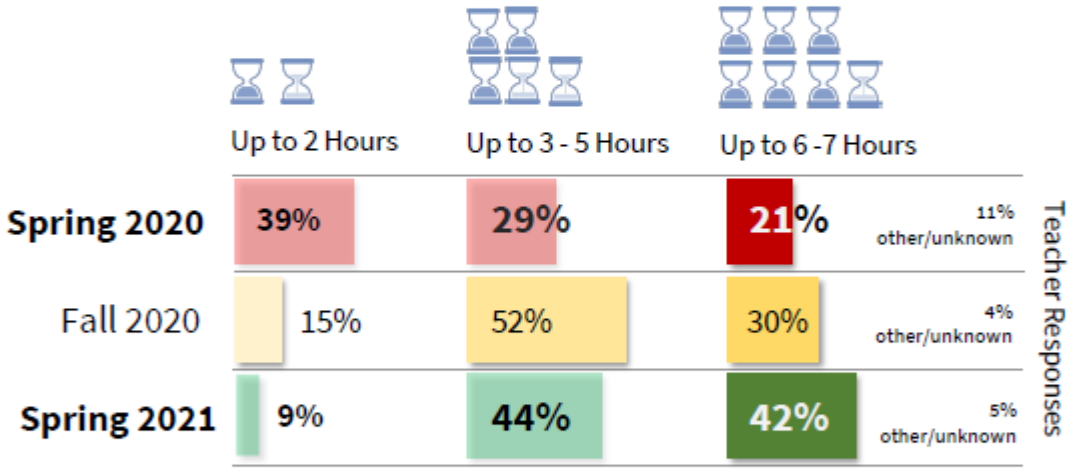
## COVID-19 had significant impacts on how students learned…



### Hours of synchronous, face-to-face instruction* (per school day)

* either virtual or in-person instruction



**"I can see clearly the difference in student participation … by returning to the classroom and teaching face to face."**

- Kaiapuni educator



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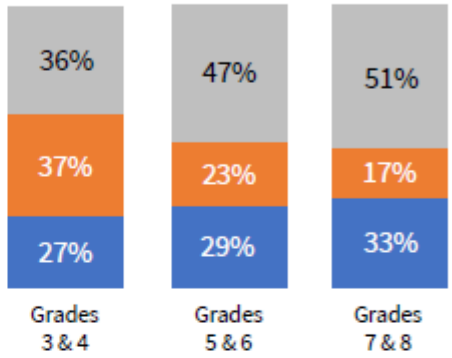
## …where students learned…

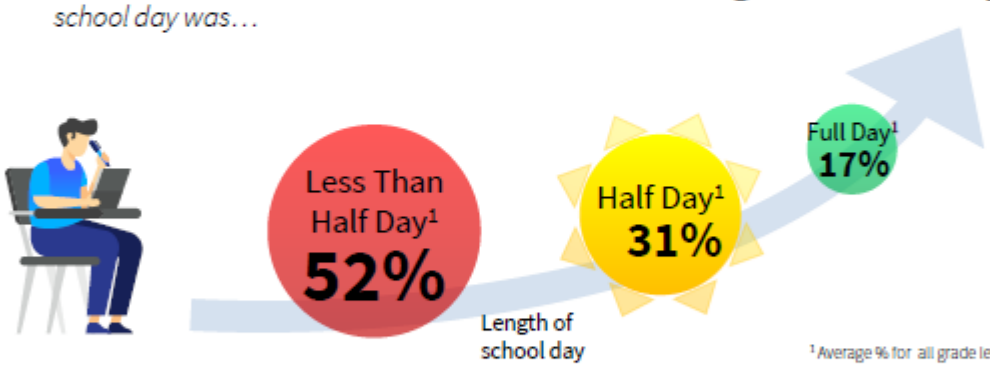
**Q:** *"During this school year, my school day was…*

at my school
a little of both +
online / at home




## …the length of school days…

**Q:** *"During this school year, my school day was…*




¹Average % for all grade levels.

## …and their opportunities to learn academic content.*

**Q:** *"Approximately what percentage of your standard curriculum were you able to cover?"*

*Educator Survey*

less coverage — more coverage

| | Up to 1/4 of the Curriculum | Up to 1/2 of the Curriculum | Up to 3/4 of the Curriculum | Up to 100% of the Curriculum |
|---|---|---|---|---|
| Spring 2020 | **15%** | **33%** | **26%** | **9%** |
| Fall 2020 | 8% | 34% | 35% | 23% |
| Spring 2021 | **3%** | **23%** | **45%** | **29%** |



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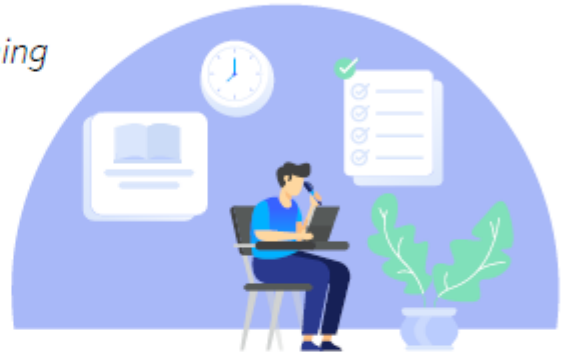
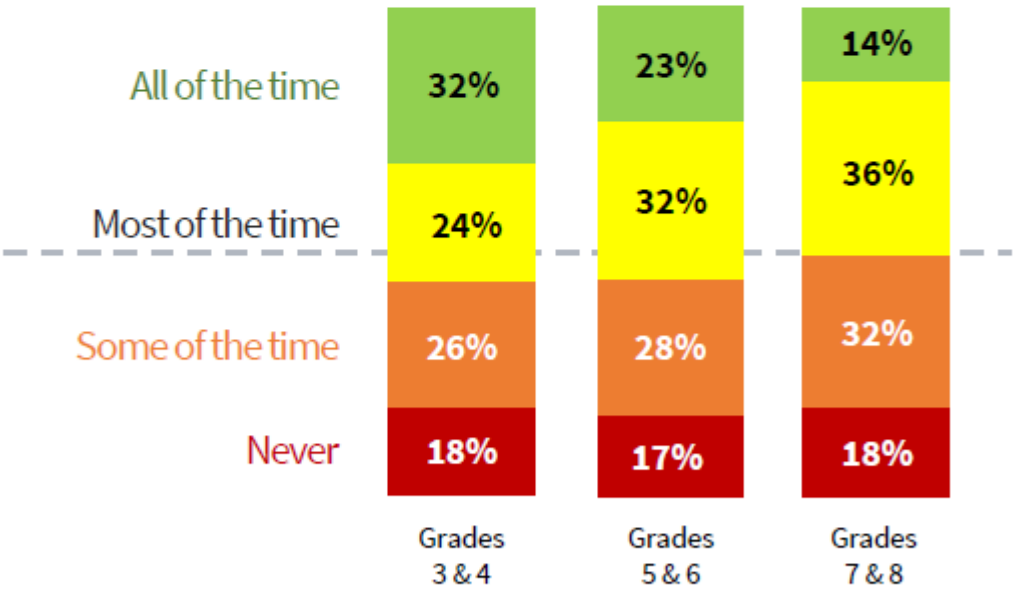
* In Educator Survey responses, 17% indicated "don't know" or "not applicable" for Spring 2020.

## COVID-19 impacted students' interest in learning…

***Q:*** *"During online school, I was as interested in learning as when I am in-person…*






**"The [students'] ability … to focus their attention can really be exhausted by staying at home."**

-Kaiapuni Educator



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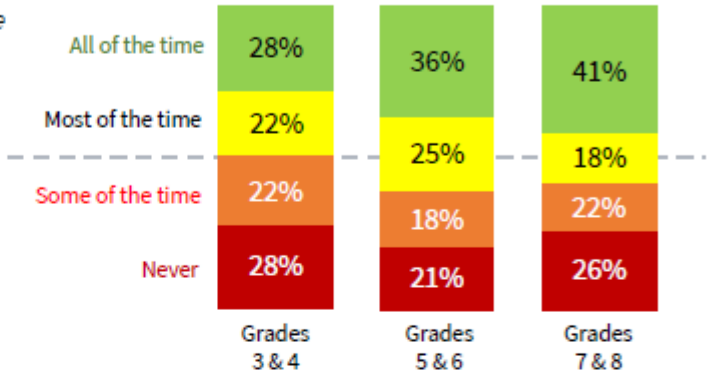
## . . . and computer access was an issue for many students .

**Q:** *"I have a computer at home so I can participate in online school. . .*




## Many students also reported internet access issues.

**Q:** *"I have reliable internet access at home. . .*

Some of the time or Never **37%**

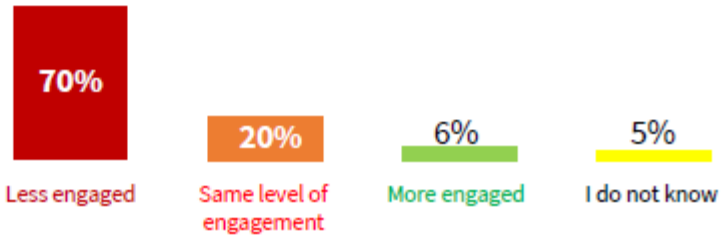
All of the time[1] or Most of the time **63%**

[1] Across all grades, only 20% reported having access "All of the Time."

## Overall, educators reported that students were less engaged.

**Q:** *"Compared to previous school years, how engaged are your students in school?"*

[2] Based on Educator Survey data.



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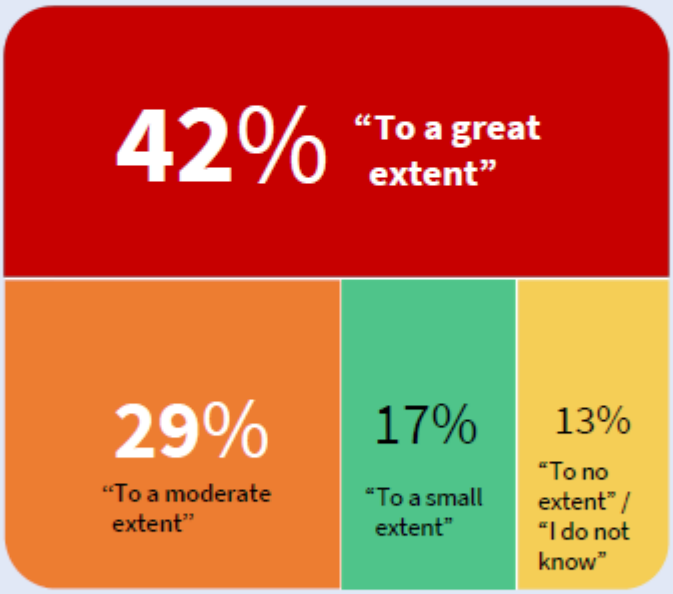
## Educators found that COVID-19 impacted their students' overall Hawaiian language learning and proficiency . . .

**Q:** *"Indicate the extent to which the disruption in school due to COVID-19 impacted the Hawaiian language learning and proficiency of your students."*

Educator Survey



**"Due to being online for the majority of the year, the students were not able to have collaborative conversations or hear the Hawaiian language as often."**

- Kaiapuni educator

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# … and COVID-19 also affected students' use of Hawaiian with teachers and peers.

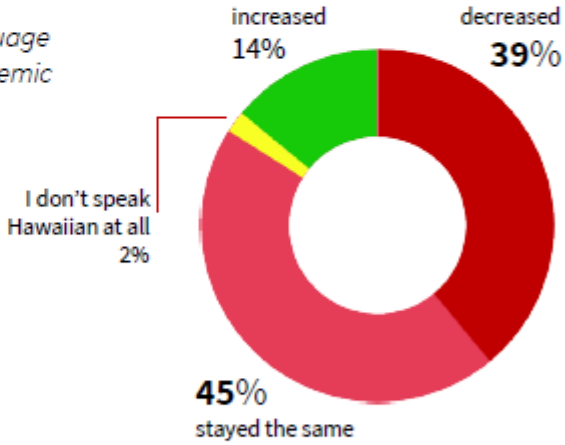
**Q:** *"Indicate the extent to which the disruption in school due to COVID-19 impacted student's ability to communicate with…*

*Educator Survey*

| | peers in Hawaiian | teachers in Hawaiian |
|---|---|---|
| "To a great extent" | 42% | 36% |
| "To a moderate extent" | 29% | 33% |
| "To a small extent" | 18% | 21% |
| "To no extent" / "I do not know" | 11% | 9% |

**Q:** *"When comparing my Hawaiian language proficiency before the covid-19 pandemic and now, my Hawaiian language proficiency has* …*

*Student Survey*




*Data from Student Survey, Grades 7 and 8.

**"When kids came back to school, many were struggling to express themselves in Hawaiian."**

- Kaiapuni Educator



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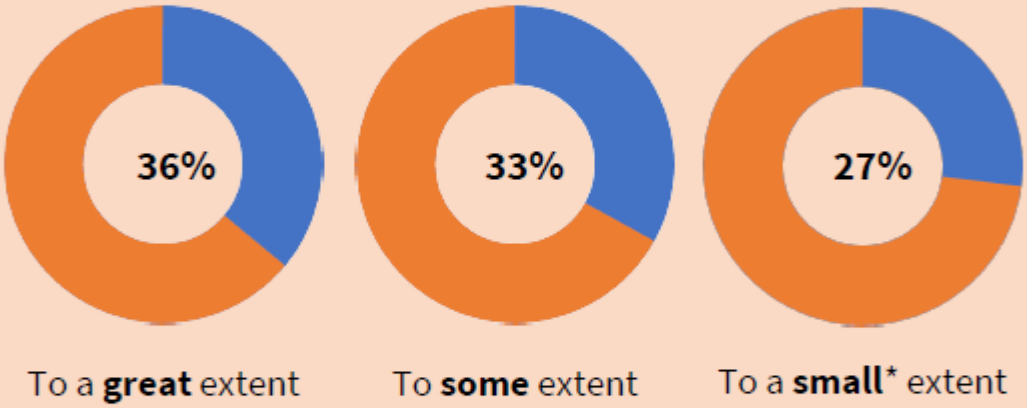
## Educators noted COVID-19's impact on student readiness…

***Q:*** *"To what extent has the disruption in school due to COVID-19 impacted your students' readiness for the next school year?"*

*Educator Survey*




**Additionally, 3% of Educator Survey participants indicated "To no extent."*

**"The language loss profoundly impacted their ability to do schoolwork in [our immersion environment]."**

-Kaiapuni Educator

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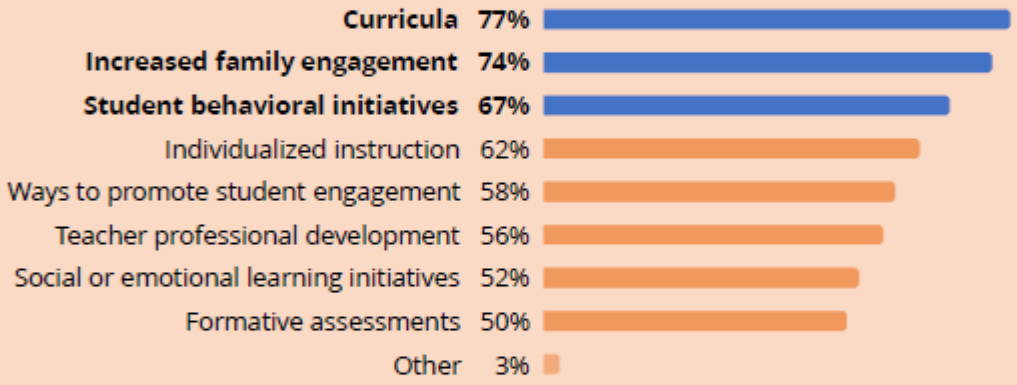
## … and identified strategies to use in response to the pandemic.

**Q:** *"Which of the following new strategies do you feel you will need to implement at your school next year because of the impact from COVID-19?" (Select all that apply.)*

Educator Survey




**"… being in a nurturing and safe learning environment … requires learners to be in the presence of a *kumu* where true Hawaiian Ways of Knowing can take place in our Indigenous way."**

- Kaiapuni Educator

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