Arizona

Arizona's Instrument to Measure Standards

2019
Technical Report

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Arizona Department of Education
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ALWAYS LEARNING PEARSON

FOREWORD

The technical information herein is intended for use by those who evaluate tests, interpret scores, or use test results in making educational decisions. It is assumed that the reader has technical knowledge of test construction and measurement procedures, as stated in *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, National Council on Measurement in Education, 1999, 2014).

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PART 1: EXECUTIVE SUMMARY

This document provides information regarding processes and procedures implemented in the Spring 2019 Arizona's Instrument to Measure Standards (AIMS) assessments for the development of tests, analysis of data, calibration, scoring, and scaling. This document also describes the results of the Spring 2019 AIMS assessments. The technical information in this report is intended for those who evaluate tests, interpret scores, or use test results in making educational decisions.

This document also provides information relevant to the *Standards for Educational and Psychological Testing* (American Education Research Association, American Psychological Association, National Council on Measurement in Education, 1999). The *Standards* were revised in 2014, *Standards for Educational and Psychological Testing* (American Education Research Association, American Psychological Association, National Council on Measurement in Education, 2014). The beginning of each part of this technical report will list the different standards addressed in each edition. Part 1 (the Executive Summary) of the technical report addresses 1999 standards 2.7, 3.2, 3.3, 6.3, 6.4, 6.15, and 13.6, and 2014 standards 4.1, 4.2, 7.0, 7.2, 7.4, and 12.9.

Structure of AIMS Science Technical Report

The Spring 2019 AIMS Science assessments were designed and developed to provide fair and accurate ability scores that support appropriate, meaningful, and useful educational decisions. In addition to the evidence provided in Part 2 (Involvement of Arizona Educators), additional validity evidence may be found in the following parts as described: Part 3 (Test Design), Part 4 (Test Development), Part 5 (Test Administration), Part 6 (Classical Item Analysis), Part 7 (Calibration, Scaling and Equating), Part 8 (Reliability), and Part 10 (Classification). As the technical report progresses chapter by chapter, it moves through the phases of the testing cycle. Each part of the technical report details the procedures and processes applied in the creation of AIMS Science, as well as their results. Each part also highlights the meaning and significance of the procedures, processes, and results in terms of content and construct validity and the relationship to the *Standards.*

The Spring 2019 AIMS Science tests were administered to students in grade 4, 8, and high school. Science tests remain mandatory for all students in these grades. Students with significant cognitive disabilities and whose current Individualized Education Program (IEP) designates them as eligible for an alternate assessment, AIMS A, are excluded from AIMS Science testing. The AIMS Science tests consist of multiple-choice items, which are written entirely by Arizona teachers.

The AIMS Science assessments are designed to measure Arizona students' performance on the Arizona content standards. All AIMS Science tests are written to Arizona content standards approved by the State Board on May 24, 2004 and updated on March 10, 2005.

Based on the input of Arizona educators' review of the content standards, a design was derived, developed, administered, and scored. The present technical report documents all aspects of the testing cycle in the subsequent chapters. A brief content summary of the report is provided below.

Involvement of Arizona Educators

- Part 2 of this report describes the involvement of Arizona educators in test development and the work they performed to help prepare the 2019 AIMS Science assessments.

Test Design and Development

- Part 3 of this report describes the test design and the item development process. It provides the content frameworks and the blueprints upon which all of the AIMS Science tests are based. This section also includes descriptions and the structure of each AIMS Science test administered in the 2018-2019 academic year.
- Part 4 of this report provides a chronological description of the passage, stimulus, and item development process including modification of specifications, committee passage/stimulus reviews, item content and sensitivity reviews, data analysis and item selection committees, and customer and contractor reviews to guarantee a quality, error-free product.

Administration

- Part 5 briefly describes test administration, security, and the written procedures available to all test administrations and school personnel and the accommodations that were available to eligible students while testing on Spring 2019 AIMS Science. This section also describes instituted procedures to ensure the security and standardization of test administrations.

Data for Operational Analysis

- Part 6 describes the data used for calibration and scaling and presents classical test statistics and item analysis statistics. This section includes steps taken to ensure the valid calibration and scaling of these tests as well as the resulting measures of internal consistency. Since the Spring 2019 AIMS tests were pre-equated, the classical test statistics and item analysis statistics presented in this technical report are based on Spring 2018 when the tests were post-equated.

Calibration, Scaling, and Equating

- Part 7 reviews calibration, equating, scoring methods, and calibration results. This section includes considerations for the evaluation of the calibration results and anchor items. It also presents the relationships between raw scores and scale score through scoring tables and scaling results including the standard error of measurement. Since the Spring 2019 AIMS tests were pre-equated, the calibration and equating results presented in this technical report are based on Spring 2018 when the tests were post-equated.

Test Results

- Part 8 summarizes information about the results of the Spring 2019 AIMS Science administration. The test results for different ethnic backgrounds and special program membership status are provided. Students in cohorts 2021 and 2022 are included separately in the high school science results. The results presented include frequency distributions and longitudinal comparisons of scale scores.

Validity Evidence

- Part 9 reviews the main validity issues discussed in all prior chapters and provides additional validity evidence supporting the AIMS Science tests. The evidence presented includes the results of an analysis of differential item functioning. Since the Spring 2019 AIMS tests were pre-equated, the differential item functioning statistics presented in this technical report are based on Spring 2018 when the tests were post-equated.

Classification

- Part 10 provides information regarding classification consistency and accuracy when students were classified into proficiency categories. These analyses used cut scores that were determined during standard setting and adopted by the State Board of Education. Since the Spring 2019 AIMS tests were pre-equated, the classification consistency and accuracy statistics presented in this technical report are based on Spring 2018 when the tests were post-equated.

PART 2: INVOLVEMENT OF ARIZONA EDUCATORS AT ALL LEVELS

Part 2 of the technical report addresses the involvement of Arizona educators in test development. This part of the technical report addresses standard 3.5 of the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999), and standard 4.6 in the 2014 edition.

Typically, several committees meet in preparation for AIMS Science assessments. These committees included teachers, curriculum specialists, and administrators from across the state and were an integral part of both the AIMS test development processes and AIMS results interpretation. The criteria on selecting the Arizona educators for the committee meetings are presented in Appendix A. However, starting spring 2015, because ADE had developed a sufficient number and quality of items in the Science item bank, they chose to change their process for the development of the spring assessments.

The Spring 2019 AIMS Science called for administering three operational online tests and one special paper version test for grade 4, 8, and high school in science. All items available for placement on an operational test had been previously field-tested, and passed through multiple educator committees, including development, bias and content, and data analysis meetings, prior to the start of the development of these tests. The AIMS Science tests for the spring 2019 administration were originally built for Spring 2015, 2016, and 2017 administrations in a paper-and-pencil format during the summer of 2014 to match the blueprint, difficulty distribution, and include as many higher Depth-of-Knowledge (DOK) items as possible. In spring 2018, these forms were converted to online forms, and one of forms was also available in a paper-and-pencil format as the special paper version. For Spring 2019 administration, the online forms from the Spring 2018 administration remain intact, and one of forms was also available in a paper-and-pencil format as the special version. Item selections for these tests were performed by trained ADE staff, most of whom also held Arizona teacher certificates.

PART 3: TEST DESIGN

Part 3 of the technical report provides information regarding test design. The following AERA/APA/NCME *Standards* from the 1999 edition are addressed: 1.2, 1.6, 3.1, 3.2, 3.3, 3.11, 6.4, 6.15, 13.3, and 13.5. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this part of the technical report are 1.1, 1.11, 4.0, 4.1, 4.2, 4.12, 7.0, 7.2, 12.4, and 12.8.

3.1 Content Standards

The AIMS Science assessments are designed to measure performance on the Arizona content standards adopted in March 2005 for science. These standards are organized by strand, concept, and performance objective. The AIMS Science test blueprints are based on the concepts and strands of the Arizona content standards, presented in Figures 3.1.1 through 3.1.3.

Figure 3.1.1
Arizona Science Concepts and Strands – Grade 4

- **Strand 1: Inquiry Process**
  - **Concept 1: Observations, Questions, and Hypotheses**
  - **Concept 2: Scientific Testing (Investigating and Modeling)**
  - **Concept 3: Analysis and Conclusions**
  - **Concept 4: Communication**
- **Strand 2: History and Nature of Science**
  - **Concept 1: History of Science as a Human Endeavor**
  - **Concept 2: Nature of Scientific Knowledge**
- **Strand 3: Science in Personal and Social Perspectives**
  - **Concept 1: Changes in Environments**
  - **Concept 2: Science and Technology in Society**
- **Strand 4: Life Science**
  - **Concept 1: Characteristics of Organisms**
  - **Concept 2: Life Cycles**
  - **Concept 3: Organisms and Environments**
  - **Concept 4: Diversity, Adaptation, and Behavior**
- **Strand 5: Physical Science**
  - **Concept 1: Properties of Objects and Materials**
  - **Concept 2: Position and Motion of Objects**
  - **Concept 3: Energy and Magnetism**
- **Strand 6: Earth and Space Science**
  - **Concept 1: Properties of Earth Materials**
  - **Concept 2: Earth's Processes and Systems**
  - **Concept 3: Changes in the Earth and Sky**

Figure 3.1.2
Arizona Science Concepts and Strands – Grade 8

- **Strand 1: Inquiry Process**
  - **Concept 1: Observations, Questions, and Hypotheses**
  - **Concept 2: Scientific Testing (Investigating and Modeling)**
  - **Concept 3: Analysis and Conclusions**
  - **Concept 4: Communication**
- **Strand 2: History and Nature of Science**
  - **Concept 1: History of Science as a Human Endeavor**
  - **Concept 2: Nature of Scientific Knowledge**
- **Strand 3: Science in Personal and Social Perspectives**
  - **Concept 1: Changes in Environments**
  - **Concept 2: Science and Technology in Society**
- **Strand 4: Life Science**
  - **Concept 1: Structure and Function in Living Systems**
  - **Concept 2: Reproduction and Heredity**
  - **Concept 3: Populations of Organisms in an Ecosystem**
  - **Concept 4: Diversity, Adaptation, and Behavior**
- **Strand 5: Physical Science**
  - **Concept 1: Properties and Changes of Properties in Matter**
  - **Concept 2: Motion and Forces**
  - **Concept 3: Transfer of Energy**
- **Strand 6: Earth and Space Science**
  - **Concept 1: Structure of the Earth**
  - **Concept 2: Earth's Processes and Systems**
  - **Concept 3: Earth in the Solar System**

Figure 3.1.3
Arizona Science Concepts and Strands – High School

Strand 1: Inquiry Process
- **Concept 1: Observations, Questions, and Hypotheses**
- **Concept 2: Scientific Testing (Investigating and Modeling)**
- **Concept 3: Analysis, Conclusions, and Refinements**
- **Concept 4: Communication**

Strand 2: History and Nature of Science
- **Concept 1: History of Science as a Human Endeavor**
- **Concept 2: Nature of Scientific Knowledge**

Strand 3: Science in Personal and Social Perspectives
- **Concept 1: Changes in Environments**
- **Concept 2: Science and Technology in Society**
- **Concept 3: Human Population Characteristics**

Strand 4: Life Science
- **Concept 1: The Cell**
- **Concept 2: Molecular Basis of Heredity**
- **Concept 3: Interdependence of Organisms**
- **Concept 4: Biological Evolution**
- **Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems)**

Strand 5: Physical Science
- **Concept 1: Structure and Properties of Matter**
- **Concept 2: Motions and Forces**
- **Concept 3: Conservation of Energy and Increase in Disorder**
- **Concept 4: Chemical Reactions**
- **Concept 5: Interactions of Energy and Matter**

Strand 6: Earth and Space Science
- **Concept 1: Geochemical Cycles**
- **Concept 2: Energy in the Earth System (Both Internal and External)**
- **Concept 3: Origin and Evolution of the Earth System**
- **Concept 4: Origin and Evolution of the Universe**

3.2 Test Blueprints

A test blueprint designates the percentage of items that should measure each strand and concept. AIMS assessments in science were designed in accordance with blueprints provided in Tables 3.2.1 through 3.2.3. Further discussion of item selection to match the blueprints is included in Part 4 of this report.

Table 3.2.1
AIMS Blueprint for Science Grade 4

AIMS Science
Grade 4 Test Blueprint

Strand/Concept	% of Test
Strand 1: Inquiry Process	**33.3%**
Concept 1: Observations, Questions, and Hypotheses	11.1%
Concept 2: Scientific Testing (Investigating and Modeling)	11.1%
Concept 3: Analysis and Conclusions	11.1%
Concept 4: Communications	
Strand 2: History and Nature of Science	**11.1%**
Concept 1: History of Science as a Human Endeavor	11.1%
Concept 2: Nature of Scientific Knowledge	
Strand 3: Science in Personal and Social Perspectives	**11.1%**
Concept 1: Changes in Environments	11.1%
Concept 2: Science and Technology in Society	
Strand 4: Life Science	**11.1%**
Concept 1: Characteristics of Organisms	11.1%
Concept 3: Organisms and Environments	
Concept 4: Diversity, Adaptations, and Behavior	
Strand 5: Physical Science	**11.1%**
Concept 3: Energy and Magnetism	11.1%
Strand 6: Earth and Space Science	**22.2%**
Concept 2: Earth's Processes and Systems	11.1%
Concept 3: Changes in the Earth and Sky	11.1%

According to the Science Standard, the following Strands and Concepts do not have Performance Objectives for Grade 4: **Strand 4: Life Science, Concept 2** (Life Cycles); **Strand 5: Physical Science, Concept 1** (Properties of Objects and Materials) and **Concept 2** (Position and Motion of Objects); **Strand 6: Earth and Space Science, Concept 1** (Properties of Earth Materials).

Table 3.2.2
AIMS Blueprint for Science Grade 8

AIMS Science
Grade 8 Test Blueprint

Strand/Concept	% of Test
Strand 1: Inquiry Process	**34.5%**
Concept 1: Observations, Questions, and Hypotheses	10.3%
Concept 2: Scientific Testing (Investigating and Modeling)	6.9%
Concept 3: Analysis and Conclusions	10.3%
Concept 4: Communications	6.9%
Strand 2: History and Nature of Science	**10.3%**
Concept 1: History of Science as a Human Endeavor	10.3%
Concept 2: Nature of Scientific Knowledge	
Strand 3: Science in Personal and Social Perspectives	**10.3%**
Concept 1: Changes in Environments	10.3%
Concept 2: Science and Technology in Society	
Strand 4: Life Science	**13.8%**
Concept 2: Reproduction and Heredity	13.8%
Concept 4: Diversity, Adaptations, and Behavior	
Strand 5: Physical Science	**31.0%**
Concept 1: Properties and Changes of Properties in Matter	17.2%
Concept 2: Motion and Forces	13.8%

According to the Science Standard, the following Strands and Concepts do not have Performance Objectives for Grade 8: **Strand 4: Life Science**, **Concept 1** (Structure and Function in Living Organisms) and **Concept 3** (Populations of Organisms in an Ecosystem); **Strand 5: Physical Science, Concept 3** (Transfer of Energy).

Table 3.2.3
AIMS Blueprint for Science High School

AIMS Science
High School Test Blueprint

Strand/Concept	% of Test
Strand 1: Inquiry Process	**33.8%**
Concept 1: Observations, Questions, and Hypotheses	9.2%
Concept 2: Scientific Testing (Investigating and Modeling)	9.2%
Concept 3: Analysis, Conclusions, and Refinements	9.2%
Concept 4: Communications	6.2%
Strand 2: History and Nature of Science	**9.2%**
Concept 1: History of Science as a Human Endeavor	9.2%
Concept 2: Nature of Scientific Knowledge	
Strand 3: Science in Personal and Social Perspectives	**10.8%**
Concept 1: Changes in Environments	10.8%
Concept 2: Science and Technology in Society	
Concept 3: Human Population Characteristics	
Strand 4: Life Science	**13.8%**
Concept 1: The Cell	9.2%
Concept 2: Molecular Basis of Heredity	9.2%
Concept 3: Interdependence of Organisms	9.2%
Concept 4: Biological Evolution	9.2%
Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems)	9.2%

Source: http://www.azed.gov/assessment/files/2014/06/science-blueprint-with-item-counts-11-10-09.pdf

3.3 Description of 2019 AIMS Tests

The test blueprints were used with the processes described in detail in Part 4 to develop all AIMS tests administered in 2019. The resulting test configurations are as follows.

3.3.1 Science for Grades 4, 8, and High School

The 2019 AIMS Science tests consisted of one operational form with 54 multiple-choice items on the grade 4 test, 58 multiple-choice items on the grade 8 test, and 65 multiple-choice items on the high school test. All items on each test were developed by Arizona teachers, were operational, and reported to a criterion-referenced score. Since item development and associated field-testing (FT) had been halted starting with the Spring 2014 administration, no field-test items were included on any of the science tests. The scale scores for each test range from 200 to 800. Table 3.3.1.1 displays the structure of the science tests.

Table 3.3.1.1
Spring 2019 AIMS Test Structure of Science

Subject	Grade	Field-test Items on Test	Operational Items on Test	Total Items on Test
Science	4	N/A	54	54
	8	N/A	58	58
	HS	N/A	65	65

*Grades 4, 8, and HS science each had no field test items on the spring 2019 tests.

3.3.2 AIMS Score Ranges

Raw score and scale score ranges of 2019 AIMS Science in grades 4, 8, and high school are presented in Table 3.3.2.1.

Table 3.3.2.1
Raw Score and Scale Score ranges of 2019 AIMS Assessments

Content	Grade	Raw Score Range	Scale Score range
Science	4	0-54	200-800
	8	0-58	200-800
	HS	0-65	200-800

PART 4: TEST DEVELOPMENT

Part 4 of the technical report provides a summary of the development activities that occurred for the Spring 2019 AIMS Science tests. Information is provided relating to the following topics as they pertain to AIMS:

- a discussion of the AIMS test development and editing process;
- a description of the use of previously created AIMS item specifications;
- a description of the AIMS item editing procedures;
- a description of the data analysis committee procedures;
- a description of the AIMS item selection committee meetings; and

A comprehensive, multi-segment development process guides the development of assessment materials. The following section outlines this process in general terms. The remainder of Part 4 provides details of how these processes were implemented in Arizona. This section of the technical report addresses the following AERA/APA/NCME *Standards* from the 1999 edition: 1.6, 3.1, 3.5, 3.6, 3.7, 3.9, 3.11, 3.16, 6.4, 6.15, 7.3, 7.4, 7.7, 13.3, and 13.5, and Standards 1.11, 3.2, 3.6, 4.0, 4.6, 4.7, 4.8, 4.10, 4.12, 7.0, 7.2, 12.4, 12.8 in the new edition of *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014).

4.1 AIMS Test Development and Editing Process

4.1.1 Test Development Process

Test development for the 2019 test administration began with the planning meeting held in Phoenix, July 27-28, 2017. During this meeting, the project deliverables were defined, such as number of forms, answer documents, test administration manuals, test coordinator manuals, test interpretation guides, and materials to support special accommodations, including Braille and large print books. The actual test form design was unchanged from the previous year. The ancillary materials were modified, and all modifications were discussed and shared among all team members to ensure understanding.

4.1.2 Documents and Materials Development

Following definition of project deliverables, Pearson's entire test development team reviewed the blueprints, item specifications, and the *ADE Style Guide* to ensure that the 2019 assessment would meet all of the required, previously-developed criteria.

4.1.3 Item Writing for Science

Though no new items were developed for field testing in the Spring 2019 AIMS Science assessments since there were sufficient items of sufficient quality in the AIMS Science item bank.

4.1.4 Quality Reviews

ADE and Pearson personnel implemented a series of quality review checks at various stages of production to ensure all AIMS Science materials were error free.

ADE first reviewed each component at a relatively early stage of forms production. Items were

compared to the way they were presented to the content/bias review committee to be sure no unauthorized changes had been introduced. Answer keys were checked. All changes were approved in writing by ADE.

A smooth AIMS test administration requires that all test materials, including test books, answer documents, and directions to students and test coordinators align with each other. Therefore, Pearson and ADE conducted a review of all materials as the second quality check.

Prior to creation of proofs (blueline stage), Pearson performed a Final Forms review. The purpose of the Final Forms review was to ensure that all publishable products met ADE's high quality standards and expectations.

After Pearson conducted their Final Forms review, all test forms were again submitted to ADE for review. All final forms and documents were reviewed and approved by ADE content specialists.

4.2 Pool of Items Used for Test Construction

4.2.1 Item Specifications

The item specifications were developed by Pearson and ADE in May 2009. The item specifications provide a definition of what is tested by each Performance Objective (PO) and, where needed, provide clarification of the PO statements, the content limits, and the stimulus and response attribute descriptions. Taken together, these help to inform instruction by explaining in detail what each PO means at each grade level and by describing how each PO is to be tested.

4.2.2 Data Analysis

The most recent AIMS Data Analysis workshop was conducted for Science in June 2014. Primary responsibility for conducting this workshop rested with ADE. The primary purpose of the Data Analysis meeting was to examine the item data generated for field tested items within the Spring 2014 AIMS Science test. Each item was assigned a status code to be included with the item information in the item bank and determine each item's eligibility for possible selection as an operational item starting in spring 2015.

ADE staff were trained on how to interpret basic statistical concepts related to item data including *p*-values, Rasch values, infit/outfit, point biserial correlations, response distributions and race/ethnicity and gender differential item functioning (DIF) flags, omit rates, and population counts.

Items that measured the content they were intended to measure and whose statistics were within acceptable limits were assigned Item Available (IA) status. These items were eligible for selection as operational items. Throughout the meeting, content was stressed as the deciding factor over statistics for items to attain IA status. Across all grades in Science, approximately 87% of the items received IA status.

Items whose statistics indicated a fixable problem and that defined where the items could be improved were assigned Re-Field Test (RFT) status. These items would be revised during future item writing workshops and would be re-field tested in future assessments. None of items reviewed was coded RFT.

Items whose statistics indicated they would not function fairly and reliably were rejected and assigned Do Not Use (DNU) status. These items were removed from consideration as operational items. Across the content and grade levels, about 13% of the items were assigned DNU status.

Table 4.1 shows the number and portion of items classified into each category during the June 2014 Data Analysis workshop by grade level.

Table 4.1
Items Given Special Codes

Content Area	Grade	Items Reviewed	Items Assigned IA * Status		Items Assigned RFT* Status		Items Assigned DNU* Status	
Science	4	40	36	90%	0	0%	4	10%
	8	40	34	85%	0	0%	6	15%
	HS	40	34	85%	0	0%	6	15%
Science Total		**120**	**104**	**87%**	**0**	**0%**	**16**	**13%**

Note: * Item Available (IA) - Re-field Test (RFT) - Do Not Use (DNU)

4.2.3 AIMS Item Selection

During the planning meeting mentioned above, it was decided that test forms for the Spring 2019 administration were intact forms from Spring 2015, 2016, and 2017. They were converted from paper-and-pencil forms to online forms in Spring 2018. Also, one of them was available as the paper-and-pencil form as a special paper version for students with disabilities, whose Individualized Education Program (IEP) indicates they cannot participate in an online assessment. The item selection process for those forms were described below.

The Item Selection meeting for Spring 2015, 2016, and 2017 AIMS Science was conducted by ADE staff in July 2014. The purpose of the Item Selection meeting was to select items to place on test forms that would produce valid and reliable scores using items from previous test administrations as well as items from the 2014 field test administration that had been designated as "item accepted" (IA). Two sets of criteria primarily guided the selection of AIMS items: content representation and statistical requirements. In addition, the committee members were encouraged to select items with high-level DOKs that most reflect the expectation of skills represented within the Arizona Science Standard.

All of the items in the item bank that were available and eligible for selection as operational items in spring 2014 were displayed in grade level and content area item pool tables. With minor exceptions, the pool consisted of items field tested in 2008 through 2013. The items field tested in spring 2014 were also available in the data analysis materials. The item pool tables for the science committee were arranged by Performance Objective. All tables could also be sorted according to any of the columns, making them extremely useful tools for searching for items with specific characteristics. These items formed the pool for item selection. Item images could be viewed electronically via the item bank. The meeting room was equipped with a laptop with access to the item bank and a projection screen so that the entire group could view items at the same time.

Each entry on the table contained identification numbers, content alignment information (Strand, Concept, Performance Objective), the most recent test administration, and the most current statistical information about that item (*p*-value, Rasch values, point biserial, differential item functioning summary flags, Rasch model fit statistics, and the percent of students who omitted the item). Participants were given training to interpret these statistics and statistical guidelines for test selection. These guidelines included a target difficulty level for each test. Specifically, a target mean and range of selected item *p*-values, as well as a suggested distribution for the item *p*-values was provided for each grade/subject combination. Careful adherence to the specified distribution of *p*-values guaranteed students a reasonable opportunity to do well on a test that would be neither too easy nor too hard.

In addition to selecting items within specific *p*-values ranges, committee members were also asked to select items with item discriminations that indicate that getting the item correct is reasonably correlated with performance on the entire test (i.e., preferably item-total correlations greater than 0.3) and do not exhibit the potential for item bias (i.e., the items should not be flagged using various differential item functioning statistics).

Content considerations were addressed by the test blueprints. Careful adherence to the blueprints guaranteed the tests would validly measure the construct of science as represented in the Arizona Science Standard, maintain consistency, link to instruction, and allow for selection of items from different performance objectives within each concept. Substantial variance from the test blueprint could alter the test alignment and thus the validity of the scores being reported. Items were selected to represent the significant content categories specified in the test blueprint in the same proportion as the content categories represented in the test blueprint.

Prior to the Item Selection Committee meeting, ADE selected an anchor set of items upon which the operational forms would be constructed. The anchor set usually consisted of items that had been operational at least the previous year. Regardless of the grade, each anchor set was carefully selected to meet statistical criteria and to proportionally represent the blueprint. Anchor sets were finalized by ADE prior to the item selection workshop. However, Spring 2019 forms were intact forms from the previous years. Thus, they were treated as pre-equated form.

To facilitate the selection process and to guarantee that the proper number and proportion of items would be selected, participants were provided with item pool tables and item replacement tables. Figure 4.1 shows a sample of an item pool table and the available data considered by the Item Selection Committee in its selection of replacement items. An analysis of differential item functioning is performed for every administration. The latest values are included in the item pool tables for each grade/content area and provided to participants in the Item Selection Committee. Table 4.3 is a sample portion of the Item Replacement Table used by the participants to note their replacement requirements for grade 4 Science and to capture proposed items to be used on the spring 2017 assessment. A similar table was also used to construct the Spring 2015 and 2016 forms. This sample table shows the portion relevant to Strand 1 Concept 1 only. The entire table included all strands and concepts. This sample table shows the portion of columns relevant to spring 2016 and spring 2017. The information in the first column shows the blueprint requirements for Strand 1, Concept 1 – six of the 54 operational items that should be covered by items from Strand 1, Concept 1 in the grade 4 Science test.

The set of columns labeled Spring 2017 New Operational Items include all of the AZ items covering Strand 1 Concept 1 that were in the spring 2016 test. The set of columns labeled Spring 2017 New Operational Items show the items that were retained from the spring 2016 or prior administrations (highlighted in blue). These retained items were designated as anchor items. During item selection for spring 2017, the participants' tasks were to retain anchor items, if possible, and select items to fill in any gaps in blueprint coverage. As the participants considered each option based on content and difficulty, they could refer to the Item Pool Table to determine if the statistical considerations were being met and to the item bank to see the actual items.

As selections were made, they were recorded on item replacement tables. These tables were loaded onto computers and projected for group discussion. These tables provided a running record of the selections and further helped to guarantee blueprint coverage. Table 4.4 shows a sample of the *p*-value target distribution table and graph used by the committees. Note that this table and graph are displayed as if items were in the process of being selected. These tables were completed for all

selections and were subject to approval by both ADE and Pearson's content and psychometric departments.

Figure 4.1
Sample Grade 4 Science Item Pool Table

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Row	AZID	Subject	Grade	Status	Stimulus Title	Strand	Concept	Perf. Obj.	DOK	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Year 2014	Recent Year	Item No.
1	44144025	Science	4	New	Circuit Study	5	3	2	2									FT	2014	7
2	44144005	Science	4	New	Soil Erosion	6	2	3	2									FT	2014	59
3	44144047	Science	4	New		1	1	1	2									FT	2014	6
4	44144049	Science	4	New		1	1	2	2									FT	2014	6
5	44144051	Science	4	New		1	1	2	2									FT	2014	6
6	44144055	Science	4	New		1	1	2	2									FT	2014	7
7	44144041	Science	4	New		1	1	2	4											
8	44144054	Science	4	New		1	1	3	2											
9	44144043	Science	4	New		1	1	3	2									FT	2014	7
10	44144046	Science	4	New		1	1	3	2									FT	2014	7

Page 2

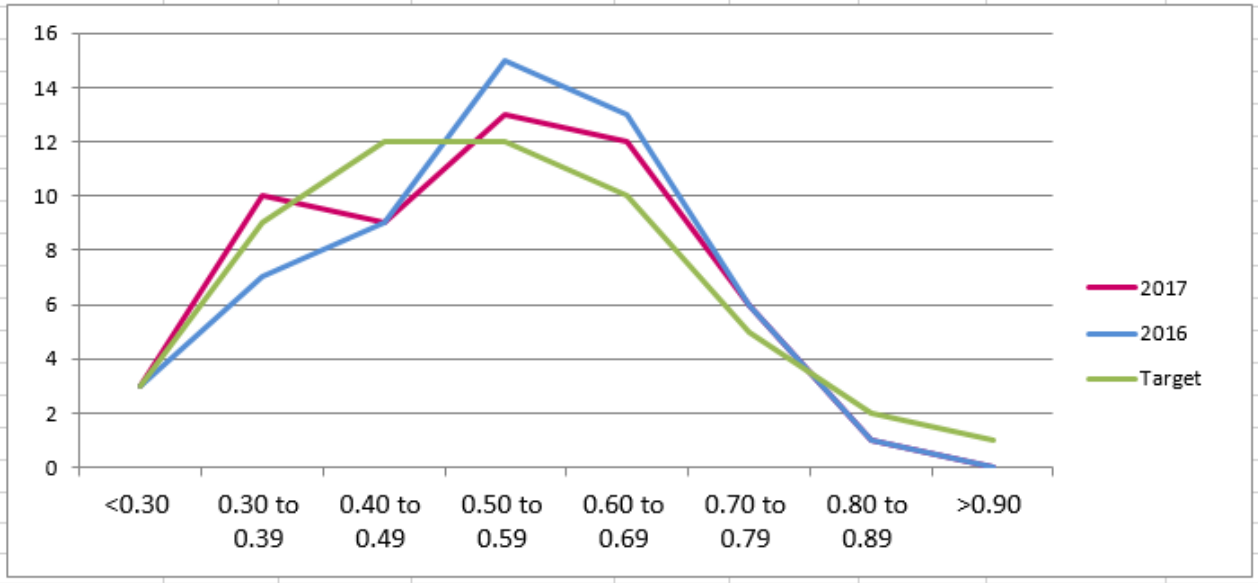
Row	N Count	Rasch	PVal	Flag PVal	PT Bis.	Flag PTBIS	Male vs Female Bias Flag	Non-Hispanic vs Hispanic Bias Flag	White vs Black Bias Flag	White vs Hispanic Bias Flag	White vs AmIn Bias Flag	White vs Asian Bias Flag	White vs Hawi/PaclsIr Bias Flag	White vs Multiracial Bias Flag	Dist A	Dist B	Dist C	Dist D	Omit
1	20638	1.116	0.46		0.24	*	A	A	A		A	A	A	A	38.3	45.8	9.5	6.4	0.0
2	20339	-0.411	0.76		0.50		A	A	A		A	A	A	A	76.1	7.5	7.4	8.8	0.1
3	20500	1.850	0.30	*	0.28	*	A	A	A		A	A	A	A	13.5	12.4	29.7	44.4	0.0
4	20340	1.759	0.33		0.21	*	A	A	A		A	A	A	A	15.6	34.2	16.9	33.3	0.0
5	20638	2.455	0.21	*	0.13	*	A	A	A		A	A	A	A	12.2	7.8	58.9	21.1	0.0
6	20339	1.205	0.45		0.26	*	A	A	A		A	A	A	A	15.2	14.7	25.1	44.9	0.1
7																			
8																			
9	20500	-0.283	0.72		0.44		A	A	A		A	A	A	A	4.9	5.4	72.4	17.3	0.0
10	20340	-0.268	0.74		0.52		A	A	A		A	A	A	A	74.0	14.8	4.5	6.6	0.0

Figure 4.2
Sample Grade 4 Science Item Replacement Table

AZ AIMS Grade 4 Spring 17 Operational Item Replacement Plan for Science																	
# of Items Required per Blueprint	Strand	Concept	Spring 16 - New Operational Items Selections								Spring 17 - New Operational Items Selections							
			Actual # of Items	PO	AZID	Passg ID	P-VALUE	Rasch	PtBis	DOK	Actual # of Items	PO	AZID	Passg ID	P-VALUE	Rasch	PtBis	DOK
6	1	1	6	1.1.1	3514444	0	0.399	1.3943	0.373	1	6	1.1.1	3514444	0	0.399	1.3943	0.373	1
	1	1		1.1.3	3514583	0	0.62	0.5167	0.402	3		1.1.3	3514583	0	0.62	0.5167	0.402	3
	1	1		1.1.1	3514504	0	0.519	0.816	0.354	1		1.1.1	3514504	0	0.519	0.816	0.354	1
	1	1		1.1.3	44114434	Electricity and Magnetism	0.674	0.1057	0.532	2		1.1.3	44114434	Electricity and Magnetism	0.674	0.1057	0.532	2
	1	1		1.1.2	44114447	Volcanoes	0.736	-0.2494	0.545	1		1.1.2	44114447	Volcanoes	0.736	-0.2494	0.545	1
	1	1		1.1.2	44114318	0	0.445	1.2724	0.335	2		1.1.1	44134442	0	0.585	0.4906	0.368	3

Figure 4.3
Sample *P*-Value Target Table and Graph

		<0.30	0.30 to 0.39	0.40 to 0.49	0.50 to 0.59	0.60 to 0.69	0.70 to 0.79	0.80 to 0.89	>0.90	**Total Number of Items**
Pct of items for target		6%	17%	22%	22%	19%	9%	4%	2%	
Target Totals		**3**	**9**	**12**	**12**	**10**	**5**	**2**	**1**	**54**
Actual - Anchors		0	1	3	6	7	1	0	0	**18**
Actual - new selections		3	9	6	7	5	5	1	0	**36**
NRT/Dual Purpose		0	0	0	0	0	0	0	0	**0**
TOTAL	2017	3	10	9	13	12	6	1	0	**54**
Actual	2016	3	7	9	15	13	6	1	0	**54**



2017

DOK Level	Target N	Actual N
1	4	9
2	36	34
3	14	11
4	0	0
Total	54	54

DOK	2016
1	10
2	36
3	8
4	0
Total	54

4.3 Customer Approvals

Approvals from ADE staff were obtained during several phases of development: during selection of the items, after forms were created, at the completion of the QA reviews, and when items were visible in the Pearson's item bank, Assessment Banking and Building solutions for Interoperable assessments (ABBI). Each is described below.

4.3.1 Item Selection Approval

ADE staff members reviewed the items in ABBI that were on each form. Edits were made if needed and approval was provided via email. The item selection tables were then reviewed by Pearson's research scientist. Psychometric evaluation of the test selection was the main focus of this review. Recommended changes were discussed with and approved by ADE.

4.3.2 Online Form Approval

Prior to form publishing, ADE reviewed items in ABBI. ADE was able to preview the forms in a Pearson's online test delivery platform (TestNav) previewer which mimics what the students will see. Items were approved in ABBI then published in an online form. ADE was granted access to the testing environment to review the forms by logging into the secure site. This review was to ensure the items appeared as expected, function correctly, and tools were present. By this point, all content issues were resolved. The focus of this approval was on format and presentation issues, rather than on content issues. Formal approval was given.

4.3.3 FTP Site

A secure FTP site had been established by ADE for transfer of electronic documents (annotated test books, test book reviews, etc.) that need to be reviewed by ADE staff. After careful review by ADE staff, corrections and edits were transmitted via this site to Pearson for inclusion/revision of the test documents.

4.3.4 Final Forms Review (Pearson)

Once ADE has approved the online forms, forms are processed through various groups to ensure the forms are able to be viewed on all platforms. Tools, scoring, and functionality are checked for all forms.

PART 5: TEST ADMINISTRATION

Part 5 of the technical report describes administration procedures, including accommodations, security, and written procedures available to test administrators and school personnel for the Spring 2019 AIMS Science testing. The following 1999 AERA/APA/NCME *Standards* (AERA, APA, NCME, 1999) are addressed: 1.13, 3.3, 3.19, 3.20, 3.21, 3.24, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.11, 6.15, 9.1, 10.1, and 10.2. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this part of the technical report are 1.10, 3.1, 3.9, 4.2, 4.5, 4.15, 4.16, 4.21, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7.0, 7.8.

5.1 Accommodations

Accommodations were made available for the Spring 2019 AIMS Science grades 4, 8, and high school tests. Accommodations are included if there is no evidence that the accommodation changes the construct that is being assessed. All statistics include students who have received accommodations.

Arizona statutes (A.R.S. §15-741 and §15-755), the Individuals with Disabilities Education Act (IDEA) (300.160), and the Elementary and Secondary Education Act (ESEA) (§1111) mandate that all students who are educated with public funds must participate in state assessment, including all students with disabilities and all students identified as English Language Learners.

For the purposes of assessment, a Special Education student is eligible to receive services under the Individuals with Disabilities Education Act and has an Individualized Education Program (IEP); and a 504 student is eligible under Section 504 of the Rehabilitation Act of 1973 and has a 504 Accommodation Plan.

Students with disabilities who have an IEP, or who have a 504 plan, may be considered for both universal test administration conditions and standard accommodations (described in section 5.1.1). Also, students identified as English Language Learner (EL) and students who have been identified as Fluent English Proficient (FEP) for no more than two years may be considered for universal test administration conditions and standard accommodations.

Students with significant cognitive disabilities and whose current Individualized Education Program (IEP) designates them as eligible for an alternate assessment are excluded from AIMS testing and encouraged to take the AIMS A Science assessment.

The Arizona English Language Learner Assessment (AZELLA), a language proficiency assessment, is given to determine a student's proficiency in English and respective instructional placement. An English Language learner (EL) is a student whose primary home language is other than English, who scores below the proficient level on the AZELLA. Fluent English Proficient (FEP) is a term that is used to refer to a former EL student who has scored at the proficient level of the AZELLA.

For detailed information on testing accommodations, please see *AIMS Testing Accommodations: Guidelines* on the Arizona Department of Education (ADE) website.

5.1.1 Overview of Accommodations

Accommodations are specific practices and procedures that provide students with equitable access during instruction and assessment. Accommodations are made in order to provide a student

equal access to learning and equal opportunity to demonstrate what is known. They are intended to reduce or even eliminate the effects of a student's disability.

Accommodations can be changes in the presentation, response, setting, and timing/scheduling of educational activities. There should be a direct connection between a student's disability, special education need, or language need and the accommodation(s) provided to the student during educational activities, including assessment.

Students should receive the same accommodations for classroom instruction, classroom assessments, district assessments, and state assessments. No accommodations should be provided during assessments that are not also provided during instruction. However, not all accommodations appropriate for instruction are appropriate for use during a standardized state assessment. The accommodations available to students while testing on AIMS Science are limited to those listed in section 5.1.3 of this document.

Accommodations may not provide verbal or other clues or suggestions that hint at or give away the correct response to the student. Therefore, it is not permissible to simplify, paraphrase, explain, or eliminate any test item, prompt, or multiple-choice option. Additionally, accommodations provided for one student may not impede or impact other students in the testing room. It is the responsibility of the testing administrator to see that each student, who qualifies for testing accommodations, receives appropriate accommodations while also ensuring that other students, who do not receive accommodations, are not affected.

5.1.2 Descriptions of Universal and Standard Accommodations

AIMS Science offers two levels of accommodations to students participating in state assessments: universal test administration conditions and standard accommodations. Accommodations are provisions made in how a student accesses the test and/or demonstrates learning that do not alter the validity of score interpretation, reliability, or security of the test.

Universal Test Administration Conditions are specific testing situations and conditions that may be offered to **any** student in order to provide him/her a comfortable and distraction-free testing environment. Universal test administration conditions may be included in a student's IEP or 504 plan as a required "accommodation"; however, for Arizona state testing purposes, these are not considered testing accommodations and are not limited to only students with IEPs or 504 plans.

Standard Accommodations are provisions made in how a student accesses and demonstrates learning that do not substantially change the instructional level, the content, or the performance criteria. For students with disabilities, standard accommodations are intended to reduce or even eliminate the effects of a student's disability. For ELs and FEP Year 1 and Year 2 students, standard accommodations are intended to allow students the opportunity to demonstrate their content knowledge even though the student may not be functioning at grade level in English.

During the assessment, all accommodations for assessment identified in a student's IEP or 504 plan must be made available. However, students may choose not to use the accommodation(s).

5.1.3 Determining if a Student Needs a Testing Accommodation

When students need accommodations in how they learn or demonstrate learning, they are likely to need accommodations in how they are assessed. Conversely, if students do not need accommodations in how they learn or demonstrate learning, they will not need accommodations in how they are assessed. Therefore, no accommodation can be put in place for an assessment that is not already used regularly in the classroom.

To determine if a student will need testing accommodations to participate in state assessments, the following questions were asked:

- Does the student use accommodations during daily instruction?
- If the student uses accommodations during daily instruction, does the student need accommodations in order to participate in the state assessment?
- If so, which testing accommodations are necessary and appropriate for the student?

It is important to annually re-consider the types of accommodations used for students, particularly as they gain more skills. The following is a list of the specific testing accommodations available to students while participating in a state assessment.

Universal Test Administration Conditions

- Testing in a small group, testing one-on-one, testing in a separate location or in a study carrel
- Being seated in a specific location within the testing room or being seated at special furniture
- Having the test administered by a familiar test administrator
- Using a special pencil or pencil grip
- Using a place holder
- Read-aloud (text-to-speech or human reader) content of the AIMS Science assessment
- Using devices that allow the student to see the test: glasses, contacts, magnification, and special lighting
- Using different color choices, reverse contrast (for computer-based testing or CBT), or color overlays
- Using devices that allow the student to hear the test directions: hearing aids and amplification
- Wearing noise buffers after the scripted directions have been read
- Signing the scripted directions
- Having the scripted directions repeated
- Having questions about the scripted directions or the directions that students read on their own answered
- Reading the test quietly to himself/herself as long as other students are not disrupted
- Individual students may take a stretch break (1 or 2 minutes) during test session (students cannot talk, use electronic devices, or leave the testing room)
- Students may use the restroom during test (only 1 student may leave room at a time) o Test Administrator must collect paper test booklet/answer document o CBT must be in "Pause" status
- Extended time (Testing session must be competed in the same school day it was started)
- The use of scratch paper (plain, lined, or graph; schools provide). Scratch paper must be securely shredded at the conclusion of testing.

Standard Accommodations

Injury

For students who were eligible to receive a standard accommodation due to an injury.

- Have answers transferred from a test book into an answer document
- Record or dictate multiple-choice responses to a scribe
- Assistive Technology
- Rest/Breaks
- Paper Accommodation

EL/FEP

For students who were eligible to receive a standard accommodation due to their classification as an EL student or as a FEP (Year 1 or Year 2) student.

- More breaks and/or several shorter sessions
- Simplified language for the scripted directions in English
- Read aloud in English the science test items, as needed upon student request
- Provide a word-for-word published, paper translation dictionary
- Exact oral translation of the scripted directions or the directions that students read on their own as needed upon student request

IEP/504

For students who were eligible to receive a standard accommodation due to their IEP or 504 plan.

- More breaks and/or several shorter sessions
- Test at a different time of day
- Simplify language for the scripted directions in English
- Read aloud or sign the directions that students read on their own
- Read aloud in English or sign the science test items
- Large print edition of test
- Have answers transferred from the test book and transcribed onto TestNav
- Record or dictate multiple-choice responses to a scribe
- Use of a Braille edition of the test
- Use of assistive technology

5.1.4 Reporting Results of Assessments Taken with Accommodations

The use of standard accommodations results in scores that are considered valid for comparison and accountability purposes. Students who received standard accommodations on AIMS Science assessments will count as having tested for accountability purposes. Their AIMS results will be included in aggregate results at the school, district, and state level on reports provided by the testing contractor.

Students who receive standard testing accommodations while participating in AIMS Science assessments must have their accommodations appropriately identified in the Student Registration section of PearsonAccess^{Next}, Pearson online assessment management system for online and paper testing, as directed in the corresponding *AIMS Science Test Administrations*. It is not necessary to identify students who received universal test administration conditions while participating in AIMS Science assessments.

5.2 Test Security

All AIMS tests were administered under secure testing conditions. Figure 5.2.1 includes the security agreement signed by the superintendent/charter representative and district test coordinator

involved with the testing administration. Figure 5.2.2 includes the security agreement signed by personnel involved with the testing administration.

District test coordinators are responsible for establishing and enforcing test security procedures that comply with the Test Security Agreement, the State Board of Education Rule regarding test security, and Test Security guidance provided in the Pre-Test Workshop package and included in the *AIMS Test Administration Directions.*

Figure 5.2.1
Spring 2019 AIMS Test security agreement for Superintendents/Charter Representatives and District Test Coordinators

School Year 2018-2019
Assessment Test Security Agreement
For Superintendents/Charter Representatives and District Test Coordinators

As Superintendent/Charter Representative or District Test Coordinator, I acknowledge that all state Assessment Tests (AIMS Science, AIMS A Science, AzMERIT 3-8, AzMERIT EOC, MSAA and AZELLA Placement and AZELLA ReassessmentTests) are secure tests and I agree to the following conditions concerning the security of the state Assessment Tests.

1. Superintendents and Charter Representatives are responsible for all testing activities within their district/charter. Superintendents and Charter Representatives are allowed to designate a District Test Coordinator to act on their behalf.
   a. An accurate Assessment Test Coordinator Information Sheet for School Year 2018-2019 must be on file with the Assessment Section of the Arizona Department of Education (ADE).
   b. The designated District Test Coordinator(s) must complete all pre-test trainings provided by ADE for each of the test administrations in which that the district will be participating.
2. All necessary security precautions shall be in place to safeguard test materials.
   a. Access to paper test books, answer documents, test booklets, paper based assessments, online tests, and all other secure ancillary documents is restricted.
   b. All persons having access to the secure test materials, other than students to whom the tests are administered, shall sign a School Year 2018-2019 State Assessment Test Security Agreement which will be kept on file for 6 years.
      i. Building administrators shall maintain the agreements signed by building staff.
      ii. Superintendents/charter representatives shall maintain the agreements signed by building administrators.
      iii. The Assessment Section of ADE shall maintain the agreements signed by superintendents and charter representatives.
   c. A list of students who responded to any portion of each test must be kept on file, with the names of who the test administrator(s) and test proctors(s) who were in the test room during the test administration.
   d. All secure test materials including secure ancillary test materials shall be kept under lock and key **except during actual test times when distributed to students.**
      i. Secure test materials shall be delivered to test administrators no sooner than the date of testing.
      ii. Students shall not be permitted to remove test materials including scratch paper from the testing room except under supervision of staff.
   e. All secure student documents shall not be examined, read, or reviewed by anyone other than the student unless in compliance with the appropriate Administration Directions.
      i. No secure test materials shall be used for instruction before or after test administration.
      ii. No content or items of the test shall be disclosed nor allowed to be discussed or disclosed.
      iii. No student response or notations (including stray marks) on a student test booklet, answer document, or computer responses can be changed (or erased) and will be submitted for scoring exactly as completed by student.
      iv. No reporting of any students' answer choices based on previous experience outside the test administration.
   f. Upon completion of testing, all test materials, including student data sheets and/or secure testing materials including the appropriate Manuals and Administration Directions shall be returned to the designated District Test Coordinator.
3. All Usernames and passwords used for state assessments are unique to individuals and shall not be shared.
4. The district superintendent or charter representative shall develop, distribute, and enforce disciplinary procedures for the violation of test security by staff.
5. *Test Preparation and Administration Practices,* the guidelines approved by the State Board of Education in January 2003 and updated December 2007, shall be followed.
6. All instructions in the Coordinator Manuals and Administration Directions for each state assessment, which include reading the directions to students exactly as scripted, shall be followed.

By signing my name to this document, I am assuring the Arizona Department of Education that I will abide by the above conditions and that anyone I supervise, who will have access to the State Assessment tests for School Year 2018-2019, will also sign an Assessment Test Security Agreement.

District/Charter Name: _____ **District Entity #:**_____

Superintendent/Charter Representative:

Printed Name:_____ Signature:_____ Date:_____

Achievement District Test Coordinator:

Printed Name:_____ Signature:_____ Date:_____

Alternative Assessment District Test Coordinator:

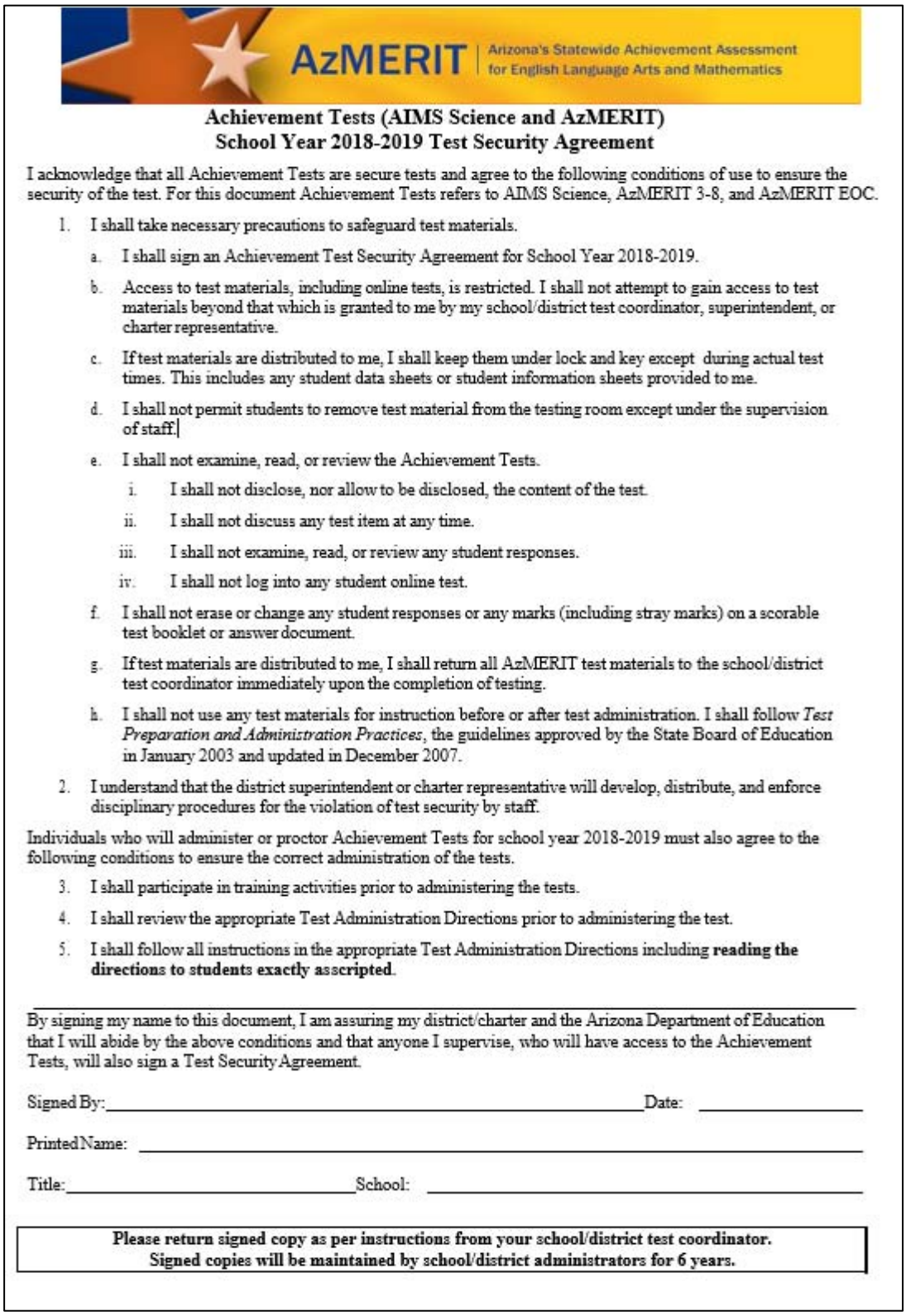
Printed Name:_____ Signature:_____ Date:_____

AZELLA District Test Coordinator:

Printed Name:_____ Signature:_____ Date:_____

Email: Testing@azed.gov

Figure 5.2.2
Spring 2019 AIMS Test security agreement for all school/district/charter personnel



AzMERIT | Arizona's Statewide Achievement Assessment for English Language Arts and Mathematics

Achievement Tests (AIMS Science and AzMERIT)
School Year 2018-2019 Test Security Agreement

I acknowledge that all Achievement Tests are secure tests and agree to the following conditions of use to ensure the security of the test. For this document Achievement Tests refers to AIMS Science, AzMERIT 3-8, and AzMERIT EOC.

1. I shall take necessary precautions to safeguard test materials.
   a. I shall sign an Achievement Test Security Agreement for School Year 2018-2019.
   b. Access to test materials, including online tests, is restricted. I shall not attempt to gain access to test materials beyond that which is granted to me by my school/district test coordinator, superintendent, or charter representative.
   c. If test materials are distributed to me, I shall keep them under lock and key except during actual test times. This includes any student data sheets or student information sheets provided to me.
   d. I shall not permit students to remove test material from the testing room except under the supervision of staff.
   e. I shall not examine, read, or review the Achievement Tests.
      i. I shall not disclose, nor allow to be disclosed, the content of the test.
      ii. I shall not discuss any test item at any time.
      iii. I shall not examine, read, or review any student responses.
      iv. I shall not log into any student online test.
   f. I shall not erase or change any student responses or any marks (including stray marks) on a scorable test booklet or answer document.
   g. If test materials are distributed to me, I shall return all AzMERIT test materials to the school/district test coordinator immediately upon the completion of testing.
   h. I shall not use any test materials for instruction before or after test administration. I shall follow *Test Preparation and Administration Practices*, the guidelines approved by the State Board of Education in January 2003 and updated in December 2007.
2. I understand that the district superintendent or charter representative will develop, distribute, and enforce disciplinary procedures for the violation of test security by staff.

Individuals who will administer or proctor Achievement Tests for school year 2018-2019 must also agree to the following conditions to ensure the correct administration of the tests.

3. I shall participate in training activities prior to administering the tests.
4. I shall review the appropriate Test Administration Directions prior to administering the test.
5. I shall follow all instructions in the appropriate Test Administration Directions including **reading the directions to students exactly asscripted**.

By signing my name to this document, I am assuring my district/charter and the Arizona Department of Education that I will abide by the above conditions and that anyone I supervise, who will have access to the Achievement Tests, will also sign a Test Security Agreement.

Signed By:_____ Date: _____

Printed Name: _____

Title:_____ School: _____

Please return signed copy as per instructions from your school/district test coordinator.
Signed copies will be maintained by school/district administrators for 6 years.

5.3 Test Administration

In order to ensure a standardized testing administration for all students, a *Test Coordinator's Manual* was made available to all test coordinators for the spring 2019 administration. The manual included the following topics:

- Responsibilities of the Achievement District Test Coordinator
  - Before Testing
  - During Testing
  - After Testing
- Procedures for Test Administration
  - Students to Be Tested
  - Test Administration Schedules
  - Administering AIMS Science Tests
  - Required Test Materials and Tools
  - Test Security
  - Student Confidentiality
  - Test Irregularities
- Testing Platforms
  - PearsonAccess^{next} System
  - Special Paper Version Test Accommodations
  - Additional Order for Special Paper Version Tests
  - Student Identification Information
  - Arrangements Prior to Test Administration
  - TestNav 8 System
  - During Testing
  - After Testing
- Contact Information

Test Administration Directions Online Testing were made available to all test administrators for the spring 2019 assessments. The *Test Administration Directions Online Testing* included the following topics:

- Overview for the Spring 2019 Administration of AIMS Science
  - Test Administrators and Proctors
  - Test Administrator Responsibilities
  - Students to Be Tested
  - Test Administration Schedule
- Before Testing
  - Training and Test Security
  - Use of Unacceptable Resources
  - Testing Conditions, Tools, and Accommodations

  - Test Settings and Accommodations
  - Before AIMS Science Administration
  - Prepare the Room for Testing
  - Prepare Student Devices for Testing
  - Prepare Students for Online Testing
  - Practice Tests
  - Start Test Session
  - Signing into TestNav8 to Begin Testing
  - Prepare for Online Testing
  - Testing Tickets
  - Seal Codes
- During AIMS Science Test Administration
  - Breaks During Test Session
  - Monitoring Testing
  - Monitoring Test Status
  - Disruptive Students
  - Students Who Leave the Room During Testing
  - Students Who Leave School During Testing
  - Troubleshoot Guidance During Online Testing
- After Testing
  - Students Who Need Additional Test Time
  - Ending Online Testing
  - Special Paper Version Test

For specific information related to test administration, refer to the *Test Coordinator's Manual and/or* the *Test Administration Directions Online Testing.*

Pre-Test Workshops were conducted online prior to the spring test administration. Every district test coordinator is required to view a 3-session online Pre-Test Workshop. The Pre-Test Workshop encompasses training related to test administration which includes test security, accommodations, test coordinator responsibility, and test schedule. Materials handling is included in these online workshops, covering ordering, receiving, preparing for retrieval, and the retrieval of test materials for the Special Paper Version accommodations.

5.4 Form Assignment

There were three online forms available for each grade in the Spring 2019 administration. The forms were randomly assigned to students, who were in the same test administration session created by a proctor, by an online administration system. This resulted in roughly the similar number of students taking each online form.

PART 6: CLASSICAL ITEM ANALYSIS

Part 6 presents classical test statistics and item analysis statistics for the AIMS Science grade 4, 8, and high school tests computed from the data used for calibration and scaling. Addressed in this part of the technical report are the following 1999 AERA/APA/NCME *Standards*: 1.5, 1.13, 2.4, 2.8, 3.18, 6.5, and 7.1. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this chapter are: 1.8, 1.10, 2.19, 3.6, 4.14, and 7.4.

Note that the statistics presented in this part are based on the online forms administered in Spring 2018 when they were post-equated. For Spring 2019 administration, the online forms were intact forms from Spring 2018. The online forms were pre-equated for the Spring 2019 administration. Thus, the statistics were not generated for this administration. For a special paper version form, which was an intact form from 2016, the statistics were not generated for this administration because it was a pre-equated form. Please refer to the 2016 technical report for the statistics.

6.1 Data

Arizona had one test window for operational testing in spring 2018. The AIMS Science tests for grade 4 and 8, and high school were administered between March 12 and April 20, 2018. The test window for Spring 2019 administration was between March 25 and April 19, 2019.

6.2 Descriptive Statistics by Test

Table 6.2.1 presents descriptive statistics by grade level which are computed with the calibration samples in Spring 2018 when the online forms were post-equated. The table shows the number of students (N), the maximum obtained raw score (Max RS), the raw score mean (RS M), the raw score standard deviation (RS SD), the average *p*-value (P-Value M), the average item-to-total correlation (rpb M) and the estimate of internal consistency by form. Cronbach's alpha is the measure of internal consistency used for the AIMS Science tests. Note that the formula for Cronbach's alpha is presented in Section 9.1.1. The item-to-total correlation is computed as a point biserial correlation. The point biserial correlation reported is the correlation of the item scores and the total test score.

Table 6.2.1
Spring 2018 AIMS Science Classical Test Analysis Statistics

Grade	Form	N	Max RS Obtained	RS M	RS SD	P-value M	rpb M	Internal Consistency
4	A	29383	54	29.89	9.77	0.55	0.34	0.89
4	B	29423	54	30.25	9.99	0.56	0.35	0.89
4	C	29443	54	29.58	9.78	0.55	0.34	0.89
8	A	28230	58	32.64	10.82	0.56	0.36	0.90
8	B	28154	58	32.85	10.93	0.57	0.36	0.91
8	C	28310	58	33.37	10.91	0.58	0.36	0.91
10	A	28453	65	31.88	12.01	0.49	0.35	0.91
10	B	27995	65	31.56	12.05	0.49	0.35	0.91
10	C	28302	65	30.94	12.33	0.48	0.36	0.91

6.3 Classical Item Analysis

Classical item analysis was conducted for each Science test. Tables 6.3.1-6.3.3 present item statistics for the spring science tests by form. The tables show the number of students (N), the item difficulty (P-Value), point biserial correlation (rpb) and biserial correlation (rbi), percentage of students who omitted the item (% Omit), and the percentage of students responding to and point biserial for each response option. The keyed response has a percent responding that matches the *p*-value and a positive point biserial correlation while the distractors usually have a negative point biserial correlation. The point biserial correlation (rpb) reported is the correlation between student performance on an item and the total score on a test. The biserial correlation (rbi) is an adjusted point-biserial correlation intended to estimate the value of the correlation between the item and total score as if the item scores were normally distributed rather than binary.

Table 6.3.1
Spring 2018 AIMS Classical Item Analysis
Science Grade 4

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	1	29383	0.76	0.25	0.35	0.05	75.66	0.25	4.06	-0.12	6.61	-0.18	13.62	-0.11
A	2	29383	0.67	0.32	0.41	0.11	66.61	0.32	13.68	-0.15	8.31	-0.25	11.29	-0.09
A	3	29383	0.83	0.30	0.45	0.03	82.64	0.30	5.32	-0.19	2.43	-0.15	9.57	-0.16
A	4	29383	0.55	0.47	0.59	0.06	55.40	0.47	32.71	-0.36	7.00	-0.14	4.83	-0.14
A	5	29383	0.64	0.37	0.47	0.06	64.48	0.37	10.81	-0.27	6.76	-0.15	17.89	-0.14
A	6	29383	0.52	0.27	0.34	0.04	52.30	0.27	19.42	-0.03	21.18	-0.13	7.07	-0.28
A	7	29383	0.61	0.33	0.42	0.03	60.81	0.33	13.20	-0.19	9.91	-0.04	16.04	-0.23
A	8	29383	0.62	0.37	0.47	0.03	61.53	0.37	7.31	-0.19	8.36	-0.20	22.77	-0.18
A	9	29383	0.48	0.22	0.27	0.03	47.76	0.22	25.22	-0.02	8.01	-0.18	18.98	-0.13
A	10	29383	0.73	0.43	0.58	0.03	73.20	0.43	7.85	-0.14	8.43	-0.30	10.50	-0.22
A	11	29383	0.55	0.35	0.44	0.04	54.96	0.35	8.58	-0.20	21.46	-0.15	14.96	-0.16
A	12	29383	0.32	0.23	0.30	0.03	31.86	0.23	10.46	-0.13	3.37	-0.12	54.29	-0.09
A	13	29383	0.40	0.29	0.36	0.07	40.14	0.29	21.81	-0.06	27.26	-0.12	10.72	-0.19
A	14	29383	0.46	0.23	0.29	0.05	46.48	0.23	11.66	-0.20	16.71	-0.10	25.10	-0.03
A	15	29383	0.48	0.23	0.29	0.05	47.72	0.23	14.24	-0.04	26.45	-0.08	11.54	-0.22
A	16	29383	0.60	0.44	0.56	0.08	59.66	0.44	18.61	-0.20	13.16	-0.24	8.49	-0.20
A	17	29383	0.68	0.35	0.45	0.09	67.90	0.35	10.16	-0.15	11.96	-0.15	9.89	-0.22
A	18	29383	0.63	0.31	0.40	0.07	62.70	0.31	7.69	-0.20	8.21	-0.26	21.33	-0.07
A	19	29383	0.31	0.25	0.33	0.08	31.12	0.25	32.05	-0.09	18.91	-0.08	17.84	-0.10
A	20	29383	0.51	0.42	0.53	0.06	51.37	0.42	20.63	-0.28	12.38	-0.22	15.56	-0.07
A	21	29383	0.75	0.41	0.56	0.07	74.63	0.41	11.24	-0.15	6.35	-0.28	7.70	-0.23
A	22	29383	0.66	0.41	0.54	0.06	66.36	0.41	13.48	-0.23	15.90	-0.21	4.20	-0.19
A	23	29383	0.56	0.34	0.43	0.07	55.77	0.34	10.44	-0.16	15.27	-0.12	18.45	-0.20
A	24	29383	0.42	0.27	0.34	0.04	41.60	0.27	17.37	-0.13	23.85	-0.08	17.13	-0.13
A	25	29383	0.75	0.51	0.70	0.08	74.89	0.51	9.67	-0.26	5.69	-0.27	9.68	-0.28
A	26	29383	0.55	0.39	0.49	0.07	54.87	0.39	13.62	-0.11	7.98	-0.25	23.45	-0.20
A	27	29383	0.34	0.28	0.36	0.07	34.18	0.28	26.16	-0.08	15.45	-0.15	24.13	-0.10
A	28	29383	0.60	0.27	0.35	0.01	60.19	0.27	1.69	-0.16	4.76	-0.21	33.34	-0.15
A	29	29383	0.74	0.48	0.65	0.08	74.05	0.48	6.80	-0.24	12.73	-0.26	6.34	-0.26
A	30	29383	0.49	0.28	0.35	0.05	48.91	0.28	6.11	-0.21	5.67	-0.22	39.26	-0.07
A	31	29383	0.34	0.16	0.21	0.04	34.24	0.16	24.12	-0.05	25.80	-0.03	15.80	-0.11
A	32	29383	0.36	0.36	0.47	0.06	36.44	0.36	18.96	-0.22	33.85	-0.11	10.69	-0.12
A	33	29383	0.43	0.43	0.54	0.05	42.96	0.43	8.53	-0.15	42.66	-0.24	5.79	-0.22
A	34	29383	0.64	0.47	0.60	0.05	63.52	0.47	11.34	-0.25	19.67	-0.24	5.42	-0.22
A	35	29383	0.61	0.44	0.56	0.04	60.54	0.44	8.80	-0.29	8.21	-0.25	22.41	-0.16
A	36	29383	0.59	0.22	0.28	0.06	59.10	0.22	16.58	-0.01	5.15	-0.17	19.11	-0.17
A	37	29383	0.34	0.20	0.26	0.05	33.93	0.20	39.94	-0.07	6.96	-0.20	19.11	-0.03
A	38	29383	0.62	0.33	0.42	0.07	62.10	0.33	4.43	-0.22	26.32	-0.13	7.07	-0.22
A	39	29383	0.40	0.35	0.44	0.05	40.11	0.35	19.21	-0.13	15.10	-0.16	25.52	-0.14
A	40	29383	0.74	0.28	0.37	0.05	73.99	0.28	8.33	-0.07	12.70	-0.20	4.92	-0.15

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.1 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 4 (continued)

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	41	29383	0.29	0.26	0.34	0.07	29.24	0.26	15.37	-0.18	24.62	-0.09	30.69	-0.02
A	42	29383	0.65	0.34	0.44	0.06	65.23	0.34	8.34	-0.21	10.06	-0.19	16.30	-0.12
A	43	29383	0.55	0.35	0.45	0.05	55.40	0.35	8.47	-0.24	5.97	-0.18	30.11	-0.14
A	44	29383	0.22	0.19	0.27	0.06	21.75	0.19	14.32	-0.05	13.31	-0.18	50.57	0.00
A	45	29383	0.42	0.28	0.35	0.09	41.60	0.28	26.49	-0.03	11.18	-0.27	20.64	-0.09
A	46	29383	0.82	0.44	0.64	0.07	82.20	0.44	6.67	-0.26	6.36	-0.25	4.68	-0.19
A	47	29383	0.54	0.34	0.42	0.07	53.74	0.34	19.08	-0.10	19.31	-0.17	7.80	-0.23
A	48	29383	0.57	0.39	0.50	0.09	56.53	0.39	9.34	-0.27	11.98	-0.20	22.07	-0.12
A	49	29383	0.71	0.53	0.71	0.09	70.60	0.53	9.37	-0.27	8.78	-0.30	11.16	-0.24
A	50	29383	0.55	0.38	0.48	0.11	54.92	0.38	14.49	-0.04	18.10	-0.28	12.37	-0.20
A	51	29383	0.53	0.40	0.50	0.09	52.54	0.40	19.39	-0.07	16.75	-0.23	11.24	-0.26
A	52	29383	0.57	0.40	0.51	0.09	57.31	0.40	19.49	-0.17	11.32	-0.24	11.79	-0.16
A	53	29383	0.56	0.19	0.24	0.10	55.66	0.19	8.29	-0.08	11.90	-0.12	24.04	-0.08
A	54	29383	0.66	0.47	0.61	0.09	65.52	0.47	12.55	-0.28	9.17	-0.25	12.67	-0.17
B	1	29423	0.75	0.24	0.32	0.04	75.50	0.24	4.10	-0.12	6.70	-0.18	13.66	-0.10
B	2	29423	0.67	0.31	0.41	0.06	66.87	0.31	13.73	-0.14	8.31	-0.25	11.03	-0.09
B	3	29423	0.83	0.30	0.45	0.03	82.89	0.30	5.22	-0.20	2.42	-0.15	9.42	-0.16
B	4	29423	0.56	0.48	0.60	0.08	56.34	0.48	31.92	-0.36	6.97	-0.15	4.69	-0.13
B	5	29423	0.65	0.36	0.46	0.04	65.04	0.36	10.42	-0.26	6.72	-0.14	17.78	-0.15
B	6	29423	0.53	0.28	0.35	0.03	52.53	0.28	19.46	-0.01	20.88	-0.15	7.09	-0.28
B	7	29423	0.61	0.33	0.42	0.03	61.02	0.33	13.27	-0.19	9.71	-0.03	15.97	-0.24
B	8	29423	0.62	0.39	0.49	0.04	61.70	0.39	7.38	-0.19	8.54	-0.20	22.34	-0.20
B	9	29423	0.49	0.21	0.26	0.05	48.61	0.21	25.04	0.00	7.81	-0.18	18.48	-0.14
B	10	29423	0.75	0.42	0.58	0.04	74.64	0.42	5.40	-0.25	3.52	-0.20	16.40	-0.24
B	11	29423	0.49	0.34	0.42	0.05	48.96	0.34	11.05	-0.14	16.47	-0.12	23.46	-0.19
B	12	29423	0.52	0.40	0.50	0.06	52.07	0.40	14.84	-0.12	14.56	-0.16	18.47	-0.26
B	13	29423	0.40	0.27	0.35	0.06	40.03	0.27	21.96	-0.06	27.97	-0.12	9.99	-0.18
B	14	29423	0.36	0.30	0.38	0.03	36.20	0.30	50.52	-0.09	8.01	-0.23	5.23	-0.17
B	15	29423	0.63	0.49	0.63	0.07	63.38	0.49	14.50	-0.22	8.34	-0.23	13.71	-0.27
B	16	29423	0.31	0.17	0.23	0.08	31.06	0.17	17.72	-0.19	43.88	0.12	7.25	-0.26
B	17	29423	0.33	0.24	0.32	0.05	32.71	0.24	31.52	-0.11	18.46	-0.06	17.26	-0.10
B	18	29423	0.63	0.30	0.38	0.07	63.04	0.30	7.54	-0.21	7.96	-0.24	21.39	-0.06
B	19	29423	0.52	0.43	0.54	0.05	51.93	0.43	20.19	-0.30	12.67	-0.20	15.15	-0.07
B	20	29423	0.76	0.39	0.54	0.07	75.81	0.39	11.10	-0.15	5.74	-0.26	7.28	-0.23
B	21	29423	0.70	0.44	0.58	0.05	69.72	0.44	12.14	-0.25	14.52	-0.24	3.57	-0.19
B	22	29423	0.56	0.34	0.43	0.06	56.38	0.34	9.76	-0.16	15.68	-0.13	18.12	-0.19
B	23	29423	0.76	0.50	0.69	0.04	76.31	0.50	8.70	-0.25	5.36	-0.26	9.58	-0.29
B	24	29423	0.43	0.26	0.33	0.04	42.90	0.26	16.76	-0.13	23.47	-0.07	16.83	-0.14
B	25	29423	0.35	0.17	0.22	0.05	35.19	0.17	16.02	-0.17	8.45	-0.14	40.29	0.04
B	26	29423	0.43	0.31	0.39	0.06	43.23	0.31	26.20	-0.04	10.39	-0.27	20.12	-0.13

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.1 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 4 (continued)

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
B	27	29423	0.69	0.43	0.56	0.06	68.55	0.43	6.98	-0.20	7.20	-0.25	17.21	-0.22
B	28	29423	0.60	0.29	0.36	0.04	60.18	0.29	1.80	-0.16	4.85	-0.20	33.13	-0.16
B	29	29423	0.74	0.49	0.66	0.07	73.52	0.49	6.61	-0.24	13.27	-0.27	6.52	-0.25
B	30	29423	0.49	0.29	0.36	0.04	49.35	0.29	6.14	-0.22	5.51	-0.23	38.96	-0.08
B	31	29423	0.34	0.15	0.20	0.05	33.95	0.15	24.45	-0.07	26.30	-0.02	15.24	-0.10
B	32	29423	0.36	0.37	0.48	0.05	36.09	0.37	18.85	-0.23	34.29	-0.12	10.73	-0.11
B	33	29423	0.43	0.43	0.54	0.06	43.24	0.43	8.60	-0.15	42.79	-0.25	5.31	-0.21
B	34	29423	0.64	0.47	0.60	0.04	63.97	0.47	11.49	-0.26	19.38	-0.24	5.11	-0.21
B	35	29423	0.61	0.45	0.57	0.06	60.69	0.45	8.60	-0.28	7.93	-0.24	22.72	-0.17
B	36	29423	0.60	0.20	0.26	0.07	59.81	0.20	17.03	0.00	4.90	-0.15	18.19	-0.17
B	37	29423	0.36	0.21	0.27	0.04	35.51	0.21	40.15	-0.08	5.78	-0.20	18.52	-0.04
B	38	29423	0.46	0.35	0.44	0.07	45.94	0.35	26.07	-0.24	12.10	-0.02	15.83	-0.17
B	39	29423	0.39	0.34	0.44	0.06	39.42	0.34	19.65	-0.13	15.69	-0.16	25.19	-0.14
B	40	29423	0.75	0.27	0.37	0.05	74.93	0.27	7.79	-0.07	12.54	-0.19	4.68	-0.16
B	41	29423	0.51	0.34	0.43	0.06	51.00	0.34	10.59	-0.21	21.15	-0.15	17.19	-0.11
B	42	29423	0.65	0.34	0.44	0.05	65.30	0.34	8.26	-0.22	9.70	-0.19	16.69	-0.12
B	43	29423	0.62	0.41	0.52	0.05	61.97	0.41	8.89	-0.26	5.62	-0.20	23.46	-0.18
B	44	29423	0.22	0.20	0.28	0.07	21.71	0.20	15.37	-0.02	13.38	-0.18	49.47	-0.03
B	45	29423	0.58	0.49	0.62	0.08	57.53	0.49	8.43	-0.23	7.49	-0.28	26.47	-0.24
B	46	29423	0.83	0.43	0.64	0.04	83.34	0.43	6.00	-0.26	6.18	-0.24	4.44	-0.19
B	47	29423	0.56	0.35	0.44	0.05	55.55	0.35	17.64	-0.11	19.23	-0.17	7.53	-0.24
B	48	29423	0.57	0.39	0.50	0.07	56.75	0.39	8.89	-0.27	11.88	-0.20	22.41	-0.12
B	49	29423	0.72	0.53	0.71	0.07	71.96	0.53	9.20	-0.28	8.03	-0.29	10.73	-0.24
B	50	29423	0.55	0.38	0.48	0.06	54.75	0.38	15.06	-0.03	17.78	-0.28	12.35	-0.22
B	51	29423	0.53	0.39	0.49	0.09	53.40	0.39	19.25	-0.08	16.20	-0.23	11.06	-0.25
B	52	29423	0.58	0.41	0.52	0.10	57.64	0.41	19.33	-0.18	11.24	-0.24	11.70	-0.16
B	53	29423	0.59	0.27	0.34	0.07	59.08	0.27	9.15	-0.08	10.51	-0.15	21.19	-0.16
B	54	29423	0.66	0.47	0.61	0.09	65.62	0.47	12.36	-0.29	9.11	-0.25	12.82	-0.17
C	1	29443	0.76	0.24	0.32	0.04	75.63	0.24	4.21	-0.12	6.68	-0.18	13.43	-0.09
C	2	29443	0.67	0.32	0.41	0.05	66.63	0.32	13.48	-0.15	8.58	-0.25	11.25	-0.08
C	3	29443	0.83	0.30	0.45	0.04	82.84	0.30	5.35	-0.19	2.48	-0.15	9.29	-0.16
C	4	29443	0.56	0.47	0.60	0.04	56.06	0.47	32.39	-0.37	6.77	-0.14	4.73	-0.13
C	5	29443	0.65	0.35	0.45	0.03	65.32	0.35	10.16	-0.26	6.52	-0.14	17.97	-0.15
C	6	29443	0.52	0.28	0.35	0.02	52.38	0.28	19.60	-0.03	20.73	-0.13	7.27	-0.29
C	7	29443	0.60	0.34	0.43	0.02	59.85	0.34	13.61	-0.19	10.20	-0.03	16.32	-0.24
C	8	29443	0.61	0.38	0.49	0.06	61.12	0.38	7.55	-0.19	8.78	-0.20	22.49	-0.19
C	9	29443	0.48	0.21	0.26	0.05	48.26	0.21	25.15	0.00	8.42	-0.18	18.13	-0.14
C	10	29443	0.40	0.33	0.42	0.02	39.66	0.33	17.22	-0.15	10.40	-0.09	32.70	-0.16
C	11	29443	0.59	0.40	0.51	0.03	59.42	0.40	13.05	-0.09	6.62	-0.25	20.87	-0.26
C	12	29443	0.37	0.32	0.41	0.04	37.29	0.32	10.95	-0.12	3.39	-0.10	48.32	-0.19

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.1 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 4 (continued)

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
C	13	29443	0.42	0.32	0.41	0.06	42.50	0.32	20.75	-0.08	25.98	-0.16	10.71	-0.18
C	14	29443	0.50	0.33	0.42	0.05	49.96	0.33	23.74	-0.12	19.26	-0.15	6.99	-0.22
C	15	29443	0.60	0.35	0.44	0.08	59.83	0.35	7.59	-0.26	10.61	-0.18	21.88	-0.11
C	16	29443	0.75	0.50	0.69	0.06	74.60	0.50	7.83	-0.27	6.86	-0.28	10.65	-0.24
C	17	29443	0.32	0.27	0.35	0.05	32.32	0.27	27.93	-0.14	20.62	-0.06	19.09	-0.10
C	18	29443	0.63	0.31	0.39	0.04	62.74	0.31	8.01	-0.22	8.22	-0.24	21.00	-0.05
C	19	29443	0.52	0.43	0.54	0.06	51.52	0.43	20.25	-0.31	12.43	-0.21	15.75	-0.06
C	20	29443	0.76	0.40	0.55	0.05	75.59	0.40	10.48	-0.16	6.20	-0.26	7.68	-0.22
C	21	29443	0.69	0.45	0.59	0.04	68.77	0.45	12.39	-0.25	14.57	-0.24	4.23	-0.20
C	22	29443	0.75	0.50	0.68	0.07	75.17	0.50	9.60	-0.26	5.18	-0.26	9.98	-0.28
C	23	29443	0.55	0.33	0.42	0.07	55.40	0.33	10.63	-0.15	16.14	-0.11	17.76	-0.20
C	24	29443	0.42	0.27	0.34	0.10	41.83	0.27	17.57	-0.14	23.55	-0.07	16.96	-0.14
C	25	29443	0.35	0.18	0.23	0.06	34.84	0.18	16.88	-0.18	8.88	-0.13	39.34	0.04
C	26	29443	0.56	0.31	0.39	0.06	55.58	0.31	14.06	-0.23	8.53	-0.18	21.77	-0.06
C	27	29443	0.34	0.14	0.19	0.07	34.30	0.14	24.48	-0.06	25.74	-0.02	15.41	-0.09
C	28	29443	0.60	0.29	0.37	0.02	59.71	0.29	1.99	-0.16	4.99	-0.20	33.30	-0.16
C	29	29443	0.74	0.48	0.65	0.08	74.14	0.48	6.79	-0.24	12.63	-0.27	6.36	-0.25
C	30	29443	0.50	0.29	0.36	0.04	50.05	0.29	6.21	-0.22	5.55	-0.22	38.16	-0.08
C	31	29443	0.45	0.32	0.40	0.05	45.45	0.32	26.76	-0.07	9.90	-0.26	17.83	-0.13
C	32	29443	0.35	0.37	0.47	0.05	35.49	0.37	19.23	-0.24	34.97	-0.10	10.26	-0.11
C	33	29443	0.43	0.43	0.54	0.04	43.35	0.43	9.13	-0.15	41.95	-0.24	5.52	-0.21
C	34	29443	0.64	0.47	0.60	0.06	64.09	0.47	11.62	-0.26	18.98	-0.24	5.26	-0.21
C	35	29443	0.61	0.45	0.57	0.03	60.58	0.45	8.68	-0.29	8.58	-0.25	22.13	-0.16
C	36	29443	0.60	0.20	0.26	0.07	59.78	0.20	16.71	0.00	5.00	-0.16	18.44	-0.17
C	37	29443	0.35	0.22	0.29	0.06	34.82	0.22	40.23	-0.10	6.08	-0.19	18.80	-0.03
C	38	29443	0.47	0.35	0.44	0.10	46.91	0.35	25.67	-0.23	11.84	-0.01	15.49	-0.19
C	39	29443	0.40	0.35	0.45	0.07	39.52	0.35	19.80	-0.13	15.20	-0.16	25.42	-0.14
C	40	29443	0.75	0.27	0.37	0.07	74.57	0.27	7.90	-0.07	12.93	-0.20	4.52	-0.15
C	41	29443	0.30	0.29	0.39	0.06	30.26	0.29	15.82	-0.18	24.27	-0.10	29.59	-0.05
C	42	29443	0.65	0.34	0.44	0.05	65.33	0.34	8.42	-0.22	9.58	-0.18	16.62	-0.13
C	43	29443	0.56	0.35	0.45	0.07	56.42	0.35	8.40	-0.24	5.89	-0.19	29.22	-0.14
C	44	29443	0.33	0.21	0.28	0.07	32.85	0.21	50.20	-0.03	10.74	-0.14	6.15	-0.16
C	45	29443	0.82	0.44	0.65	0.05	82.40	0.44	6.36	-0.25	6.56	-0.26	4.62	-0.20
C	46	29443	0.44	0.27	0.34	0.10	43.86	0.27	15.29	-0.19	17.25	-0.22	23.50	0.05
C	47	29443	0.23	0.21	0.29	0.07	23.11	0.21	14.14	-0.05	12.79	-0.17	49.89	-0.03
C	48	29443	0.62	0.27	0.34	0.07	61.53	0.27	7.16	-0.25	9.37	-0.24	21.87	0.01
C	49	29443	0.59	0.42	0.53	0.08	59.38	0.42	14.85	-0.09	14.22	-0.29	11.47	-0.22
C	50	29443	0.56	0.39	0.48	0.11	55.87	0.39	16.66	-0.08	16.43	-0.27	10.93	-0.19
C	51	29443	0.52	0.39	0.49	0.12	52.30	0.39	19.88	-0.07	16.42	-0.24	11.27	-0.25
C	52	29443	0.56	0.41	0.51	0.12	56.34	0.41	20.07	-0.18	11.93	-0.25	11.54	-0.15
C	53	29443	0.63	0.29	0.37	0.12	63.43	0.29	6.98	-0.11	9.82	-0.16	19.65	-0.15
C	54	29443	0.67	0.46	0.60	0.18	66.89	0.46	11.67	-0.27	8.94	-0.26	12.33	-0.17

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.2
Spring 2018 AIMS Classical Item Analysis
Science Grade 8

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	1	28230	0.83	0.23	0.35	0.04	82.91	0.23	10.37	-0.13	2.65	-0.16	4.03	-0.11
A	2	28230	0.69	0.31	0.41	0.01	69.11	0.31	8.15	-0.15	13.38	-0.22	9.34	-0.10
A	3	28230	0.63	0.24	0.31	0.01	62.52	0.24	10.09	-0.24	13.17	-0.01	14.20	-0.12
A	4	28230	0.63	0.48	0.62	0.02	63.45	0.48	18.42	-0.23	11.68	-0.30	6.43	-0.19
A	5	28230	0.76	0.40	0.55	0.03	75.91	0.40	3.20	-0.18	2.91	-0.20	17.96	-0.27
A	6	28230	0.61	0.19	0.25	0.02	61.18	0.19	8.24	-0.10	4.62	-0.22	25.94	-0.05
A	7	28230	0.78	0.42	0.58	0.03	77.64	0.42	5.64	-0.25	6.68	-0.22	10.00	-0.20
A	8	28230	0.88	0.36	0.58	0.01	88.25	0.36	2.32	-0.14	6.44	-0.26	2.98	-0.18
A	9	28230	0.61	0.27	0.35	0.04	60.73	0.27	15.59	-0.02	13.92	-0.26	9.73	-0.11
A	10	28230	0.64	0.32	0.42	0.04	64.01	0.32	15.09	-0.08	10.51	-0.21	10.35	-0.20
A	11	28230	0.66	0.27	0.35	0.02	65.77	0.27	8.29	-0.19	13.30	-0.08	12.62	-0.15
A	12	28230	0.68	0.41	0.53	0.04	67.55	0.41	15.52	-0.13	5.67	-0.24	11.22	-0.27
A	13	28230	0.76	0.33	0.45	0.03	76.15	0.33	12.19	-0.13	7.34	-0.24	4.29	-0.17
A	14	28230	0.42	0.22	0.28	0.03	41.86	0.22	6.79	-0.13	34.47	-0.10	16.85	-0.08
A	15	28230	0.47	0.37	0.47	0.03	47.46	0.37	25.06	-0.03	15.02	-0.20	12.43	-0.29
A	16	28230	0.60	0.37	0.47	0.04	59.67	0.37	11.91	-0.15	12.69	-0.22	15.70	-0.16
A	17	28230	0.60	0.41	0.52	0.04	60.00	0.41	16.83	-0.09	7.26	-0.26	15.87	-0.27
A	18	28230	0.27	0.17	0.22	0.03	27.23	0.17	18.62	-0.02	22.78	-0.12	31.34	-0.04
A	19	28230	0.69	0.41	0.54	0.04	69.14	0.41	9.86	-0.16	8.84	-0.28	12.12	-0.19
A	20	28230	0.32	0.42	0.54	0.03	32.23	0.42	15.98	-0.12	29.53	-0.25	22.23	-0.09
A	21	28230	0.43	0.30	0.37	0.02	42.58	0.30	22.07	-0.06	13.46	-0.25	21.87	-0.08
A	22	28230	0.51	0.32	0.40	0.02	51.34	0.32	5.64	-0.21	33.65	-0.08	9.34	-0.25
A	23	28230	0.52	0.43	0.54	0.04	52.07	0.43	18.07	-0.21	24.71	-0.21	5.12	-0.21
A	24	28230	0.34	0.46	0.59	0.01	33.63	0.46	4.92	-0.17	30.32	-0.08	31.12	-0.31
A	25	28230	0.58	0.31	0.39	0.03	57.95	0.31	24.26	-0.08	13.01	-0.25	4.75	-0.16
A	26	28230	0.43	0.34	0.42	0.03	43.24	0.34	27.91	-0.07	13.96	-0.21	14.85	-0.17
A	27	28230	0.40	0.45	0.56	0.02	39.80	0.45	24.33	-0.19	18.51	-0.26	17.35	-0.09
A	28	28230	0.48	0.34	0.42	0.04	47.57	0.34	19.38	-0.12	17.57	-0.22	15.44	-0.10
A	29	28230	0.46	0.42	0.52	0.03	46.00	0.42	13.34	-0.15	18.85	-0.24	21.78	-0.15
A	30	28230	0.65	0.49	0.63	0.02	64.75	0.49	11.66	-0.25	8.85	-0.29	14.73	-0.21
A	31	28230	0.48	0.34	0.43	0.04	47.96	0.34	20.05	-0.27	20.22	-0.07	11.73	-0.11
A	32	28230	0.81	0.45	0.64	0.03	80.91	0.45	4.23	-0.22	10.14	-0.31	4.69	-0.18
A	33	28230	0.49	0.17	0.21	0.04	48.93	0.17	7.40	-0.18	12.33	-0.16	31.30	0.03
A	34	28230	0.70	0.43	0.57	0.04	70.17	0.43	4.60	-0.18	11.32	-0.24	13.86	-0.24
A	35	28230	0.42	0.38	0.48	0.06	41.63	0.38	10.55	-0.19	11.18	-0.18	36.59	-0.15
A	36	28230	0.51	0.26	0.32	0.04	50.51	0.26	22.97	0.00	17.76	-0.21	8.72	-0.16
A	37	28230	0.21	0.21	0.30	0.05	20.69	0.21	13.91	-0.19	17.04	-0.10	48.31	0.04
A	38	28230	0.58	0.35	0.45	0.04	57.93	0.35	8.82	-0.23	8.63	-0.31	24.58	-0.05
A	39	28230	0.51	0.37	0.46	0.04	50.79	0.37	10.67	-0.24	20.92	-0.12	17.59	-0.16
A	40	28230	0.59	0.46	0.58	0.05	59.30	0.46	11.71	-0.18	25.46	-0.32	3.48	-0.16

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.2 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 8

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	41	28230	0.50	0.38	0.48	0.06	50.42	0.38	33.70	-0.14	7.83	-0.29	8.00	-0.18
A	42	28230	0.70	0.47	0.61	0.05	70.28	0.47	4.44	-0.24	14.25	-0.23	10.98	-0.27
A	43	28230	0.55	0.39	0.50	0.06	54.54	0.39	12.13	-0.23	11.66	-0.30	21.61	-0.06
A	44	28230	0.74	0.54	0.72	0.05	74.01	0.54	8.05	-0.28	10.02	-0.29	7.87	-0.27
A	45	28230	0.49	0.23	0.29	0.06	48.93	0.23	34.46	0.00	7.27	-0.24	9.28	-0.19
A	46	28230	0.49	0.36	0.46	0.05	48.94	0.36	7.10	-0.23	9.54	-0.28	34.37	-0.09
A	47	28230	0.77	0.50	0.70	0.05	77.08	0.50	8.87	-0.30	8.40	-0.27	5.60	-0.23
A	48	28230	0.62	0.49	0.62	0.07	62.00	0.49	15.82	-0.28	7.25	-0.19	14.87	-0.25
A	49	28230	0.57	0.33	0.41	0.07	56.91	0.33	21.69	-0.02	12.87	-0.30	8.46	-0.19
A	50	28230	0.48	0.54	0.67	0.08	48.00	0.54	25.06	-0.24	23.42	-0.33	3.44	-0.14
A	51	28230	0.55	0.32	0.40	0.07	55.37	0.32	8.28	-0.23	25.24	-0.09	11.04	-0.18
A	52	28230	0.56	0.39	0.49	0.09	56.05	0.39	8.53	-0.21	11.13	-0.32	24.21	-0.07
A	53	28230	0.83	0.38	0.57	0.06	82.84	0.38	3.84	-0.15	5.60	-0.22	7.65	-0.24
A	54	28230	0.59	0.48	0.60	0.07	59.08	0.48	8.23	-0.26	13.06	-0.29	19.56	-0.16
A	55	28230	0.31	0.30	0.39	0.07	31.35	0.30	42.45	-0.12	13.23	-0.08	12.90	-0.15
A	56	28230	0.30	0.29	0.38	0.06	29.85	0.29	26.53	0.05	20.03	-0.20	23.54	-0.18
A	57	28230	0.45	0.15	0.18	0.06	45.13	0.15	12.54	-0.15	33.04	0.06	9.23	-0.18
A	58	28230	0.53	0.36	0.45	0.09	52.73	0.36	11.77	-0.30	27.42	-0.04	7.98	-0.23
B	1	28154	0.83	0.23	0.34	0.04	82.76	0.23	10.75	-0.13	2.67	-0.16	3.79	-0.11
B	2	28154	0.69	0.32	0.42	0.03	68.99	0.32	8.34	-0.16	13.45	-0.23	9.20	-0.10
B	3	28154	0.55	0.17	0.21	0.01	55.22	0.17	16.21	-0.09	24.09	-0.07	4.46	-0.10
B	4	28154	0.71	0.38	0.50	0.04	70.79	0.38	5.59	-0.22	19.14	-0.21	4.44	-0.18
B	5	28154	0.48	0.54	0.68	0.02	48.36	0.54	26.76	-0.26	22.47	-0.33	2.38	-0.12
B	6	28154	0.59	0.25	0.31	0.04	58.69	0.25	24.47	-0.12	6.87	-0.18	9.94	-0.07
B	7	28154	0.79	0.39	0.55	0.03	78.88	0.39	4.73	-0.23	6.06	-0.19	10.30	-0.21
B	8	28154	0.88	0.36	0.59	0.02	88.36	0.36	2.19	-0.13	6.38	-0.26	3.04	-0.19
B	9	28154	0.63	0.25	0.32	0.03	62.74	0.25	14.42	0.00	13.74	-0.25	9.08	-0.12
B	10	28154	0.63	0.32	0.41	0.02	62.80	0.32	15.34	-0.08	10.57	-0.21	11.26	-0.19
B	11	28154	0.77	0.31	0.43	0.01	76.59	0.31	12.43	-0.13	6.73	-0.22	4.24	-0.16
B	12	28154	0.65	0.41	0.53	0.03	65.30	0.41	17.49	-0.13	5.83	-0.24	11.36	-0.29
B	13	28154	0.41	0.20	0.26	0.04	41.35	0.20	7.06	-0.14	35.33	-0.09	16.22	-0.05
B	14	28154	0.48	0.35	0.44	0.02	48.38	0.35	24.02	-0.04	15.34	-0.19	12.24	-0.28
B	15	28154	0.29	0.16	0.21	0.03	28.66	0.16	18.20	-0.01	22.62	-0.11	30.49	-0.05
B	16	28154	0.59	0.38	0.48	0.07	59.47	0.38	11.85	-0.16	12.52	-0.22	16.10	-0.16
B	17	28154	0.61	0.41	0.52	0.04	60.50	0.41	16.67	-0.09	7.25	-0.25	15.54	-0.27
B	18	28154	0.70	0.41	0.54	0.02	69.71	0.41	9.99	-0.17	8.76	-0.28	11.52	-0.18
B	19	28154	0.56	0.43	0.54	0.03	56.09	0.43	14.03	-0.21	7.22	-0.29	22.63	-0.16
B	20	28154	0.31	0.41	0.54	0.03	30.92	0.41	16.55	-0.12	30.12	-0.26	22.37	-0.07
B	21	28154	0.52	0.34	0.43	0.02	51.89	0.34	6.01	-0.25	10.96	-0.29	31.13	-0.05
B	22	28154	0.61	0.29	0.37	0.04	60.82	0.29	25.84	-0.09	9.23	-0.25	4.07	-0.16

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.2 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 8

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
B	23	28154	0.51	0.43	0.54	0.03	51.10	0.43	18.24	-0.20	25.80	-0.21	4.82	-0.21
B	24	28154	0.34	0.46	0.59	0.02	33.93	0.46	4.87	-0.15	30.00	-0.10	31.17	-0.30
B	25	28154	0.41	0.43	0.54	0.03	41.01	0.43	24.05	-0.18	17.36	-0.28	17.55	-0.08
B	26	28154	0.43	0.33	0.42	0.05	43.12	0.33	28.03	-0.08	13.65	-0.22	15.14	-0.16
B	27	28154	0.20	0.19	0.26	0.04	20.30	0.19	13.57	-0.19	18.71	-0.10	47.38	0.06
B	28	28154	0.48	0.33	0.42	0.03	47.75	0.33	20.78	-0.13	17.38	-0.21	14.07	-0.10
B	29	28154	0.47	0.41	0.51	0.05	47.19	0.41	13.66	-0.14	18.37	-0.24	20.74	-0.15
B	30	28154	0.65	0.49	0.63	0.01	64.73	0.49	11.73	-0.24	8.89	-0.29	14.63	-0.22
B	31	28154	0.48	0.35	0.44	0.02	48.34	0.35	20.23	-0.27	20.02	-0.08	11.38	-0.11
B	32	28154	0.82	0.44	0.65	0.01	82.47	0.44	4.33	-0.23	9.96	-0.30	3.22	-0.18
B	33	28154	0.70	0.43	0.57	0.04	70.09	0.43	4.43	-0.17	11.79	-0.24	13.65	-0.24
B	34	28154	0.42	0.38	0.48	0.03	42.03	0.38	10.28	-0.18	10.85	-0.20	36.81	-0.15
B	35	28154	0.52	0.27	0.34	0.03	51.62	0.27	22.21	-0.01	17.44	-0.21	8.71	-0.17
B	36	28154	0.49	0.35	0.43	0.02	49.50	0.35	10.31	-0.23	20.43	-0.07	19.75	-0.18
B	37	28154	0.64	0.42	0.53	0.04	64.02	0.42	6.41	-0.23	13.32	-0.29	16.20	-0.12
B	38	28154	0.58	0.35	0.44	0.02	58.08	0.35	8.05	-0.22	8.49	-0.30	25.36	-0.06
B	39	28154	0.45	0.31	0.39	0.04	45.46	0.31	40.03	-0.08	7.27	-0.29	7.21	-0.17
B	40	28154	0.60	0.46	0.59	0.04	60.36	0.46	11.36	-0.19	24.64	-0.31	3.59	-0.18
B	41	28154	0.71	0.46	0.62	0.07	71.32	0.46	3.94	-0.23	14.14	-0.24	10.53	-0.26
B	42	28154	0.78	0.47	0.66	0.07	78.37	0.47	5.43	-0.24	9.61	-0.28	6.51	-0.23
B	43	28154	0.55	0.39	0.50	0.04	55.28	0.39	12.24	-0.23	11.69	-0.31	20.75	-0.05
B	44	28154	0.74	0.54	0.73	0.06	74.22	0.54	8.35	-0.28	9.90	-0.30	7.48	-0.27
B	45	28154	0.49	0.23	0.29	0.05	49.42	0.23	34.36	0.00	7.11	-0.24	9.05	-0.18
B	46	28154	0.48	0.37	0.46	0.07	48.26	0.37	6.88	-0.22	9.78	-0.29	35.01	-0.09
B	47	28154	0.55	0.33	0.41	0.06	55.21	0.33	8.18	-0.24	25.78	-0.09	10.77	-0.19
B	48	28154	0.61	0.49	0.62	0.05	61.20	0.49	16.29	-0.28	7.06	-0.19	15.40	-0.24
B	49	28154	0.71	0.44	0.58	0.06	71.26	0.44	4.80	-0.22	6.13	-0.28	17.75	-0.22
B	50	28154	0.31	0.31	0.41	0.06	31.41	0.31	43.27	-0.14	13.64	-0.07	11.61	-0.16
B	51	28154	0.57	0.34	0.43	0.08	57.49	0.34	20.98	-0.04	12.74	-0.31	8.71	-0.18
B	52	28154	0.57	0.39	0.49	0.07	57.19	0.39	8.82	-0.22	10.20	-0.31	23.73	-0.09
B	53	28154	0.77	0.51	0.70	0.06	76.78	0.51	9.32	-0.31	7.71	-0.25	6.13	-0.24
B	54	28154	0.53	0.42	0.53	0.06	53.50	0.42	10.08	-0.26	13.66	-0.25	22.69	-0.11
B	55	28154	0.31	0.29	0.38	0.06	30.77	0.29	26.94	0.04	19.61	-0.19	22.62	-0.18
B	56	28154	0.68	0.41	0.53	0.05	67.60	0.41	5.60	-0.23	20.48	-0.19	6.26	-0.26
B	57	28154	0.45	0.15	0.18	0.08	44.76	0.15	12.53	-0.15	33.34	0.07	9.29	-0.18
B	58	28154	0.53	0.35	0.44	0.08	52.69	0.35	11.37	-0.30	27.99	-0.04	7.87	-0.24
C	1	28310	0.83	0.24	0.35	0.02	83.02	0.24	10.31	-0.13	2.72	-0.17	3.93	-0.11
C	2	28310	0.69	0.33	0.43	0.02	68.92	0.33	8.12	-0.15	13.56	-0.23	9.37	-0.11
C	3	28310	0.67	0.31	0.41	0.01	67.08	0.31	7.52	-0.23	12.43	-0.14	12.95	-0.12
C	4	28310	0.81	0.41	0.59	0.02	80.65	0.41	4.83	-0.18	5.31	-0.21	9.20	-0.26

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.2 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 8

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
C	5	28310	0.49	0.54	0.67	0.01	48.90	0.54	26.80	-0.26	21.83	-0.32	2.47	-0.13
C	6	28310	0.82	0.33	0.48	0.03	81.84	0.33	7.15	-0.18	2.75	-0.21	8.24	-0.17
C	7	28310	0.78	0.39	0.54	0.02	78.19	0.39	4.90	-0.23	6.02	-0.19	10.87	-0.21
C	8	28310	0.88	0.36	0.59	0.02	88.50	0.36	2.32	-0.13	6.29	-0.26	2.87	-0.19
C	9	28310	0.61	0.23	0.30	0.02	61.37	0.23	16.06	0.01	13.21	-0.25	9.34	-0.12
C	10	28310	0.63	0.33	0.42	0.04	62.82	0.33	15.14	-0.09	11.10	-0.20	10.91	-0.20
C	11	28310	0.77	0.31	0.43	0.04	77.27	0.31	11.85	-0.12	6.83	-0.23	4.01	-0.16
C	12	28310	0.65	0.40	0.51	0.04	65.21	0.40	17.45	-0.12	6.01	-0.24	11.29	-0.28
C	13	28310	0.41	0.20	0.25	0.05	41.40	0.20	7.30	-0.14	35.07	-0.09	16.18	-0.05
C	14	28310	0.48	0.36	0.45	0.05	47.65	0.36	24.57	-0.04	15.37	-0.19	12.36	-0.29
C	15	28310	0.29	0.15	0.20	0.08	28.92	0.15	18.43	-0.02	22.66	-0.11	29.91	-0.04
C	16	28310	0.59	0.37	0.47	0.06	59.23	0.37	11.85	-0.16	12.81	-0.22	16.04	-0.15
C	17	28310	0.61	0.41	0.52	0.06	60.58	0.41	16.20	-0.09	7.23	-0.25	15.93	-0.28
C	18	28310	0.69	0.44	0.58	0.04	68.77	0.44	9.20	-0.25	9.60	-0.23	12.39	-0.19
C	19	28310	0.69	0.41	0.54	0.05	69.45	0.41	10.02	-0.16	8.83	-0.28	11.65	-0.19
C	20	28310	0.32	0.43	0.56	0.05	31.56	0.43	15.76	-0.13	29.77	-0.26	22.86	-0.08
C	21	28310	0.59	0.20	0.25	0.05	59.09	0.20	10.41	-0.20	13.75	-0.12	16.71	0.02
C	22	28310	0.62	0.30	0.38	0.06	62.19	0.30	23.33	-0.10	9.23	-0.23	5.19	-0.16
C	23	28310	0.52	0.42	0.53	0.05	51.90	0.42	17.98	-0.20	25.42	-0.21	4.65	-0.21
C	24	28310	0.33	0.45	0.58	0.04	33.19	0.45	4.71	-0.15	30.25	-0.09	31.82	-0.29
C	25	28310	0.42	0.45	0.57	0.04	42.29	0.45	22.92	-0.19	17.18	-0.28	17.58	-0.10
C	26	28310	0.43	0.34	0.43	0.04	43.31	0.34	27.66	-0.08	13.39	-0.21	15.60	-0.16
C	27	28310	0.20	0.19	0.28	0.04	19.95	0.19	13.62	-0.17	18.34	-0.11	48.04	0.05
C	28	28310	0.48	0.34	0.43	0.02	48.04	0.34	20.37	-0.13	17.05	-0.20	14.51	-0.12
C	29	28310	0.47	0.41	0.52	0.04	47.45	0.41	13.38	-0.15	17.79	-0.24	21.35	-0.16
C	30	28310	0.65	0.50	0.64	0.00	64.51	0.50	11.49	-0.25	8.87	-0.30	15.13	-0.21
C	31	28310	0.48	0.35	0.43	0.02	48.32	0.35	19.76	-0.27	20.50	-0.08	11.40	-0.10
C	32	28310	0.83	0.44	0.66	0.04	82.52	0.44	4.08	-0.23	10.20	-0.30	3.16	-0.18
C	33	28310	0.71	0.42	0.56	0.05	70.64	0.42	4.45	-0.17	10.93	-0.23	13.94	-0.24
C	34	28310	0.41	0.38	0.48	0.04	41.36	0.38	10.06	-0.20	10.93	-0.18	37.61	-0.15
C	35	28310	0.49	0.34	0.42	0.02	49.45	0.34	10.38	-0.24	21.17	-0.07	18.98	-0.17
C	36	28310	0.63	0.42	0.54	0.04	63.26	0.42	2.82	-0.22	5.78	-0.26	28.10	-0.23
C	37	28310	0.51	0.28	0.35	0.06	50.58	0.28	23.12	-0.02	17.51	-0.21	8.73	-0.19
C	38	28310	0.59	0.35	0.44	0.05	58.57	0.35	8.55	-0.23	8.20	-0.30	24.63	-0.05
C	39	28310	0.46	0.32	0.40	0.05	45.78	0.32	39.58	-0.08	7.44	-0.29	7.15	-0.17
C	40	28310	0.61	0.46	0.58	0.05	60.97	0.46	11.58	-0.18	24.00	-0.30	3.41	-0.19
C	41	28310	0.71	0.45	0.60	0.05	71.20	0.45	3.85	-0.23	14.42	-0.22	10.48	-0.26
C	42	28310	0.78	0.47	0.65	0.05	78.10	0.47	5.65	-0.24	9.39	-0.27	6.81	-0.23
C	43	28310	0.56	0.40	0.51	0.03	55.77	0.40	11.99	-0.24	11.33	-0.31	20.88	-0.06
C	44	28310	0.75	0.54	0.73	0.03	74.69	0.54	7.97	-0.28	9.80	-0.29	7.51	-0.27

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.2 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 8

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
C	45	28310	0.50	0.25	0.31	0.06	49.61	0.25	34.19	-0.01	7.16	-0.24	8.97	-0.20
C	46	28310	0.48	0.35	0.45	0.05	47.77	0.35	6.79	-0.23	9.58	-0.28	35.80	-0.08
C	47	28310	0.68	0.38	0.50	0.06	68.45	0.38	5.91	-0.20	19.94	-0.17	5.66	-0.26
C	48	28310	0.62	0.48	0.61	0.03	61.95	0.48	15.55	-0.28	6.76	-0.18	15.72	-0.23
C	49	28310	0.59	0.34	0.43	0.05	59.03	0.34	19.94	-0.04	12.33	-0.30	8.65	-0.18
C	50	28310	0.55	0.43	0.55	0.05	55.01	0.43	9.95	-0.23	20.32	-0.23	14.68	-0.15
C	51	28310	0.32	0.32	0.42	0.04	31.88	0.32	42.91	-0.15	13.34	-0.06	11.83	-0.17
C	52	28310	0.56	0.37	0.46	0.05	56.00	0.37	8.25	-0.20	11.15	-0.33	24.56	-0.06
C	53	28310	0.55	0.34	0.42	0.07	55.39	0.34	8.45	-0.25	24.91	-0.09	11.17	-0.19
C	54	28310	0.55	0.44	0.56	0.07	55.28	0.44	8.71	-0.25	14.83	-0.27	21.11	-0.13
C	55	28310	0.31	0.29	0.39	0.06	30.70	0.29	26.94	0.02	19.22	-0.19	23.07	-0.17
C	56	28310	0.76	0.51	0.70	0.05	76.00	0.51	10.20	-0.32	7.97	-0.25	5.78	-0.22
C	57	28310	0.42	0.13	0.16	0.07	42.12	0.13	12.27	-0.14	36.14	0.09	9.41	-0.20
C	58	28310	0.53	0.36	0.45	0.11	53.26	0.36	11.01	-0.30	27.55	-0.04	8.07	-0.24

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

Table 6.3.3
Spring 2018 AIMS Classical Item Analysis
Science Grade 10

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	1	28453	0.51	0.35	0.44	0.02	50.83	0.35	29.34	-0.14	10.74	-0.22	9.07	-0.15
A	2	28453	0.55	0.50	0.62	0.02	54.87	0.50	5.03	-0.04	29.68	-0.41	10.39	-0.17
A	3	28453	0.42	0.35	0.44	0.04	42.41	0.35	35.22	-0.09	15.20	-0.26	7.14	-0.15
A	4	28453	0.38	0.28	0.36	0.04	37.65	0.28	14.88	-0.12	30.36	-0.08	17.07	-0.14
A	5	28453	0.40	0.23	0.29	0.04	40.34	0.23	14.76	-0.15	36.60	-0.03	8.26	-0.17
A	6	28453	0.43	0.26	0.33	0.03	43.37	0.26	6.01	-0.15	2.98	-0.13	47.60	-0.14
A	7	28453	0.31	0.25	0.33	0.04	31.17	0.25	39.61	-0.14	7.40	-0.16	21.79	-0.01
A	8	28453	0.57	0.33	0.41	0.04	57.36	0.33	8.43	-0.07	14.48	-0.18	19.69	-0.20
A	9	28453	0.65	0.33	0.43	0.07	65.33	0.33	16.38	-0.09	6.63	-0.22	11.59	-0.22
A	10	28453	0.55	0.41	0.52	0.09	55.08	0.41	21.48	-0.16	6.46	-0.20	16.88	-0.23
A	11	28453	0.53	0.34	0.43	0.07	53.43	0.34	14.56	-0.12	9.99	-0.25	21.94	-0.12
A	12	28453	0.30	0.26	0.35	0.08	29.80	0.26	12.74	-0.11	25.40	0.04	31.98	-0.21
A	13	28453	0.73	0.41	0.55	0.08	73.48	0.41	12.98	-0.21	4.30	-0.21	9.16	-0.23
A	14	28453	0.55	0.19	0.24	0.07	54.54	0.19	8.72	-0.20	30.00	0.04	6.67	-0.22
A	15	28453	0.71	0.33	0.44	0.10	71.31	0.33	16.03	-0.18	10.58	-0.21	1.99	-0.15
A	16	28453	0.62	0.34	0.44	0.07	62.34	0.34	5.31	-0.16	25.73	-0.17	6.54	-0.21
A	17	28453	0.50	0.38	0.48	0.07	50.42	0.38	6.66	-0.17	17.29	-0.29	25.56	-0.09
A	18	28453	0.50	0.50	0.63	0.08	49.91	0.50	13.50	-0.22	20.56	-0.28	15.95	-0.17
A	19	28453	0.45	0.37	0.47	0.09	45.05	0.37	16.67	-0.12	16.19	-0.19	21.99	-0.16
A	20	28453	0.34	0.26	0.33	0.09	34.11	0.26	25.49	-0.15	25.58	-0.07	14.73	-0.08
A	21	28453	0.84	0.37	0.55	0.11	83.54	0.37	4.62	-0.19	6.62	-0.20	5.11	-0.20
A	22	28453	0.54	0.29	0.36	0.13	54.28	0.29	16.15	-0.05	21.05	-0.22	8.40	-0.12
A	23	28453	0.68	0.47	0.61	0.11	67.85	0.47	13.45	-0.24	8.68	-0.29	9.91	-0.18
A	24	28453	0.73	0.41	0.55	0.11	73.11	0.41	10.03	-0.21	6.08	-0.22	10.68	-0.22
A	25	28453	0.54	0.38	0.48	0.12	54.36	0.38	11.30	-0.14	11.65	-0.25	22.57	-0.15
A	26	28453	0.38	0.37	0.47	0.14	38.35	0.37	35.42	-0.12	20.19	-0.21	5.90	-0.15
A	27	28453	0.29	0.29	0.39	0.17	29.42	0.29	18.29	-0.25	16.86	-0.29	35.26	0.16
A	28	28453	0.55	0.38	0.47	0.15	55.09	0.38	18.24	-0.16	10.91	-0.15	15.60	-0.22
A	29	28453	0.46	0.34	0.42	0.18	46.41	0.34	13.64	-0.16	28.31	-0.14	11.47	-0.15
A	30	28453	0.51	0.37	0.47	0.13	50.55	0.37	9.95	-0.21	25.49	-0.12	13.88	-0.20
A	31	28453	0.48	0.39	0.49	0.13	47.53	0.39	3.82	-0.13	33.34	-0.32	15.18	-0.04
A	32	28453	0.51	0.34	0.42	0.16	50.80	0.34	28.52	-0.12	14.95	-0.23	5.57	-0.14
A	33	28453	0.43	0.41	0.52	0.16	42.85	0.41	25.96	-0.19	20.15	-0.21	10.89	-0.11
A	34	28453	0.27	0.33	0.44	0.14	27.20	0.33	25.11	0.00	25.72	-0.15	21.83	-0.19
A	35	28453	0.59	0.50	0.64	0.15	58.60	0.50	7.01	-0.22	18.92	-0.30	15.32	-0.20
A	36	28453	0.72	0.46	0.62	0.16	72.33	0.46	15.98	-0.31	4.74	-0.20	6.79	-0.19
A	37	28453	0.38	0.25	0.32	0.15	37.58	0.25	34.23	-0.09	18.54	-0.16	9.50	-0.04
A	38	28453	0.29	0.21	0.27	0.18	29.30	0.21	31.33	0.01	27.63	-0.09	11.56	-0.18
A	39	28453	0.57	0.39	0.49	0.19	57.41	0.39	15.56	-0.17	14.47	-0.23	12.36	-0.14
A	40	28453	0.41	0.30	0.38	0.18	40.92	0.30	27.68	-0.01	14.39	-0.26	16.82	-0.14

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.3 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 10

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
A	41	28453	0.61	0.39	0.50	0.18	60.71	0.39	8.84	-0.14	14.85	-0.22	15.42	-0.19
A	42	28453	0.48	0.40	0.50	0.19	48.14	0.40	9.18	-0.20	13.52	-0.20	28.97	-0.15
A	43	28453	0.41	0.32	0.40	0.19	40.81	0.32	15.37	-0.15	19.10	-0.17	24.52	-0.07
A	44	28453	0.42	0.34	0.42	0.18	41.54	0.34	13.34	-0.09	32.38	-0.10	12.56	-0.26
A	45	28453	0.28	0.32	0.42	0.17	28.11	0.32	31.08	0.11	13.18	-0.24	27.46	-0.25
A	46	28453	0.55	0.38	0.47	0.17	55.42	0.38	19.77	-0.13	18.92	-0.22	5.72	-0.21
A	47	28453	0.49	0.43	0.54	0.19	49.14	0.43	9.63	-0.14	20.00	-0.24	21.03	-0.19
A	48	28453	0.28	0.20	0.26	0.18	28.27	0.20	13.26	-0.18	21.47	-0.16	36.81	0.09
A	49	28453	0.58	0.34	0.43	0.20	57.78	0.34	15.79	-0.14	16.73	-0.22	9.51	-0.11
A	50	28453	0.59	0.49	0.62	0.18	58.52	0.49	7.88	-0.23	22.97	-0.30	10.44	-0.15
A	51	28453	0.58	0.33	0.42	0.20	58.43	0.33	14.08	-0.11	15.09	-0.21	12.20	-0.14
A	52	28453	0.41	0.24	0.30	0.19	40.65	0.24	13.88	-0.06	19.91	-0.04	25.37	-0.17
A	53	28453	0.52	0.33	0.41	0.19	52.00	0.33	3.89	-0.18	30.76	-0.08	13.17	-0.26
A	54	28453	0.52	0.55	0.69	0.22	52.41	0.55	11.29	-0.27	29.84	-0.34	6.25	-0.13
A	55	28453	0.52	0.30	0.37	0.20	52.22	0.30	12.00	-0.17	9.32	-0.26	26.26	-0.03
A	56	28453	0.39	0.36	0.46	0.23	39.43	0.36	16.55	-0.23	15.75	-0.30	28.05	0.04
A	57	28453	0.48	0.33	0.42	0.24	48.10	0.33	23.65	-0.06	18.83	-0.18	9.18	-0.23
A	58	28453	0.35	0.42	0.54	0.22	34.89	0.42	11.84	-0.20	22.20	-0.16	30.85	-0.14
A	59	28453	0.28	0.23	0.31	0.19	28.01	0.23	45.67	-0.06	18.46	-0.14	7.67	-0.06
A	60	28453	0.40	0.09	0.11	0.21	40.28	0.09	8.46	-0.15	31.28	-0.06	19.76	0.08
A	61	28453	0.72	0.37	0.50	0.22	71.59	0.37	10.56	-0.20	13.73	-0.23	3.89	-0.13
A	62	28453	0.46	0.32	0.40	0.22	46.48	0.32	28.50	-0.15	9.86	-0.22	14.94	-0.06
A	63	28453	0.45	0.43	0.54	0.20	45.10	0.43	18.79	-0.20	25.05	-0.19	10.86	-0.16
A	64	28453	0.41	0.38	0.48	0.24	40.98	0.38	24.13	-0.19	22.03	-0.14	12.62	-0.15
A	65	28453	0.48	0.35	0.44	0.25	48.26	0.35	21.07	-0.10	19.73	-0.21	10.69	-0.17
B	1	27995	0.50	0.35	0.44	0.01	50.48	0.35	29.78	-0.15	11.00	-0.22	8.73	-0.14
B	2	27995	0.55	0.50	0.63	0.02	54.85	0.50	5.42	-0.05	29.11	-0.40	10.60	-0.17
B	3	27995	0.43	0.35	0.44	0.04	42.60	0.35	35.05	-0.09	15.20	-0.25	7.11	-0.15
B	4	27995	0.38	0.28	0.36	0.04	37.86	0.28	14.37	-0.13	30.44	-0.08	17.30	-0.14
B	5	27995	0.41	0.23	0.29	0.04	41.23	0.23	14.81	-0.16	36.11	-0.03	7.81	-0.16
B	6	27995	0.43	0.26	0.33	0.03	43.36	0.26	5.92	-0.16	2.85	-0.13	47.83	-0.14
B	7	27995	0.27	0.41	0.55	0.04	27.08	0.41	20.67	0.00	31.23	-0.24	20.98	-0.17
B	8	27995	0.57	0.35	0.44	0.03	56.69	0.35	9.08	-0.10	14.26	-0.18	19.95	-0.20
B	9	27995	0.66	0.33	0.42	0.03	65.54	0.33	16.71	-0.09	6.50	-0.21	11.22	-0.22
B	10	27995	0.55	0.41	0.52	0.05	55.40	0.41	21.39	-0.18	6.32	-0.20	16.85	-0.22
B	11	27995	0.53	0.34	0.43	0.04	52.90	0.34	14.90	-0.13	9.91	-0.25	22.25	-0.12
B	12	27995	0.30	0.26	0.35	0.04	29.80	0.26	12.68	-0.12	25.28	0.04	32.20	-0.21
B	13	27995	0.73	0.41	0.55	0.03	73.47	0.41	13.12	-0.21	4.26	-0.21	9.12	-0.22
B	14	27995	0.54	0.19	0.24	0.04	54.05	0.19	8.55	-0.20	30.91	0.03	6.45	-0.21
B	15	27995	0.71	0.32	0.43	0.07	71.26	0.32	16.04	-0.17	10.49	-0.20	2.13	-0.15

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.3 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 10

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
B	16	27995	0.63	0.34	0.44	0.05	63.41	0.34	5.53	-0.17	24.72	-0.18	6.29	-0.20
B	17	27995	0.51	0.38	0.47	0.08	50.57	0.38	6.69	-0.18	16.64	-0.29	26.02	-0.08
B	18	27995	0.50	0.49	0.62	0.06	50.22	0.49	13.35	-0.22	20.55	-0.28	15.81	-0.16
B	19	27995	0.35	0.28	0.36	0.07	35.45	0.28	23.63	-0.15	25.85	-0.08	14.99	-0.10
B	20	27995	0.84	0.37	0.55	0.08	84.18	0.37	4.34	-0.19	6.41	-0.21	5.00	-0.20
B	21	27995	0.70	0.37	0.49	0.08	69.97	0.37	9.99	-0.18	7.02	-0.20	12.95	-0.19
B	22	27995	0.50	0.28	0.35	0.07	50.25	0.28	17.11	-0.04	24.80	-0.19	7.76	-0.14
B	23	27995	0.68	0.44	0.58	0.09	67.79	0.44	13.23	-0.22	7.94	-0.28	10.94	-0.17
B	24	27995	0.55	0.38	0.48	0.09	55.46	0.38	11.12	-0.16	10.74	-0.24	22.58	-0.15
B	25	27995	0.45	0.39	0.49	0.09	45.02	0.39	17.51	-0.16	16.93	-0.20	20.46	-0.15
B	26	27995	0.30	0.29	0.39	0.09	30.43	0.29	17.37	-0.25	16.28	-0.29	35.82	0.14
B	27	27995	0.57	0.38	0.48	0.10	56.56	0.38	18.23	-0.18	10.17	-0.15	14.95	-0.21
B	28	27995	0.46	0.34	0.43	0.09	45.83	0.34	13.87	-0.16	28.68	-0.14	11.53	-0.16
B	29	27995	0.39	0.36	0.46	0.11	39.32	0.36	35.13	-0.12	19.61	-0.21	5.82	-0.15
B	30	27995	0.44	0.22	0.28	0.11	44.44	0.22	19.47	-0.11	29.05	-0.04	6.93	-0.17
B	31	27995	0.47	0.38	0.47	0.09	47.42	0.38	3.79	-0.12	34.67	-0.32	14.03	-0.04
B	32	27995	0.51	0.35	0.44	0.11	51.01	0.35	27.73	-0.12	15.48	-0.24	5.67	-0.14
B	33	27995	0.43	0.41	0.51	0.09	42.65	0.41	26.25	-0.18	19.99	-0.22	11.01	-0.11
B	34	27995	0.28	0.35	0.47	0.10	27.78	0.35	25.32	0.00	25.24	-0.17	21.56	-0.19
B	35	27995	0.59	0.50	0.63	0.10	58.69	0.50	7.10	-0.22	18.94	-0.30	15.16	-0.19
B	36	27995	0.72	0.45	0.60	0.11	72.39	0.45	15.57	-0.30	4.70	-0.20	7.23	-0.19
B	37	27995	0.62	0.37	0.48	0.12	61.97	0.37	8.90	-0.13	14.01	-0.22	15.00	-0.18
B	38	27995	0.48	0.40	0.50	0.13	48.48	0.40	9.26	-0.20	12.97	-0.19	29.17	-0.16
B	39	27995	0.40	0.33	0.42	0.12	40.14	0.33	15.77	-0.15	19.35	-0.17	24.63	-0.09
B	40	27995	0.56	0.40	0.50	0.13	56.44	0.40	15.18	-0.17	14.82	-0.24	13.43	-0.14
B	41	27995	0.31	0.20	0.26	0.13	31.37	0.20	31.30	0.00	24.95	-0.07	12.25	-0.19
B	42	27995	0.32	0.28	0.36	0.12	32.38	0.28	33.50	-0.05	23.66	-0.22	10.33	-0.04
B	43	27995	0.40	0.30	0.38	0.16	40.24	0.30	27.38	-0.02	14.58	-0.26	17.64	-0.12
B	44	27995	0.42	0.32	0.41	0.15	42.12	0.32	12.91	-0.11	32.61	-0.07	12.21	-0.27
B	45	27995	0.29	0.33	0.44	0.14	29.38	0.33	30.35	0.09	12.92	-0.23	27.20	-0.25
B	46	27995	0.48	0.45	0.56	0.16	47.72	0.45	9.59	-0.14	20.40	-0.25	22.13	-0.18
B	47	27995	0.55	0.38	0.47	0.14	55.35	0.38	19.44	-0.13	19.73	-0.23	5.33	-0.19
B	48	27995	0.27	0.20	0.26	0.15	26.87	0.20	14.05	-0.19	21.01	-0.16	37.92	0.09
B	49	27995	0.44	0.38	0.48	0.16	43.84	0.38	24.28	-0.20	21.20	-0.14	10.51	-0.14
B	50	27995	0.58	0.49	0.62	0.18	58.42	0.49	7.90	-0.23	22.67	-0.31	10.82	-0.16
B	51	27995	0.51	0.36	0.45	0.17	50.61	0.36	4.56	-0.21	32.48	-0.12	12.18	-0.24
B	52	27995	0.59	0.35	0.44	0.16	59.28	0.35	14.10	-0.14	14.68	-0.21	11.77	-0.14
B	53	27995	0.49	0.43	0.54	0.18	48.93	0.43	16.83	-0.21	23.64	-0.20	10.42	-0.17
B	54	27995	0.53	0.55	0.69	0.19	52.80	0.55	11.37	-0.28	29.02	-0.34	6.62	-0.13
B	55	27995	0.33	0.29	0.37	0.18	33.06	0.29	12.01	-0.23	8.63	-0.28	46.12	0.05

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.3 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 10

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
B	56	27995	0.41	0.25	0.32	0.20	41.26	0.25	14.43	-0.11	20.79	-0.06	23.33	-0.14
B	57	27995	0.45	0.39	0.49	0.22	45.10	0.39	25.61	-0.07	20.82	-0.23	8.26	-0.24
B	58	27995	0.35	0.41	0.53	0.24	35.31	0.41	11.84	-0.21	22.50	-0.16	30.12	-0.13
B	59	27995	0.42	0.34	0.43	0.21	41.81	0.34	15.55	-0.21	13.01	-0.27	29.42	0.00
B	60	27995	0.57	0.38	0.48	0.19	56.68	0.38	9.98	-0.22	9.62	-0.24	23.53	-0.12
B	61	27995	0.72	0.38	0.50	0.20	72.09	0.38	9.61	-0.19	13.63	-0.23	4.47	-0.15
B	62	27995	0.47	0.32	0.40	0.20	46.53	0.32	28.45	-0.15	9.76	-0.22	15.06	-0.07
B	63	27995	0.25	0.22	0.29	0.20	24.95	0.22	44.62	-0.04	20.25	-0.10	9.98	-0.10
B	64	27995	0.40	0.08	0.10	0.22	39.50	0.08	8.62	-0.15	31.94	-0.05	19.71	0.07
B	65	27995	0.48	0.37	0.46	0.26	48.03	0.37	21.31	-0.11	19.57	-0.21	10.84	-0.17
C	1	28302	0.50	0.35	0.44	0.02	49.80	0.35	30.03	-0.14	10.96	-0.22	9.19	-0.15
C	2	28302	0.55	0.50	0.62	0.01	54.81	0.50	5.36	-0.04	29.31	-0.41	10.52	-0.17
C	3	28302	0.40	0.38	0.48	0.03	39.95	0.38	33.58	-0.20	17.18	-0.12	9.25	-0.16
C	4	28302	0.38	0.28	0.35	0.04	37.90	0.28	14.37	-0.11	29.96	-0.08	17.74	-0.15
C	5	28302	0.37	0.24	0.31	0.04	37.20	0.24	20.32	-0.17	32.08	0.00	10.37	-0.16
C	6	28302	0.43	0.36	0.45	0.04	43.48	0.36	9.50	-0.08	15.35	-0.23	31.62	-0.15
C	7	28302	0.28	0.41	0.54	0.06	28.16	0.41	19.63	0.01	29.00	-0.22	23.15	-0.20
C	8	28302	0.55	0.34	0.42	0.06	55.47	0.34	9.05	-0.10	14.98	-0.17	20.45	-0.19
C	9	28302	0.65	0.33	0.43	0.04	64.85	0.33	17.01	-0.10	6.51	-0.21	11.59	-0.22
C	10	28302	0.55	0.41	0.52	0.05	55.29	0.41	21.31	-0.17	6.28	-0.19	17.08	-0.23
C	11	28302	0.53	0.33	0.42	0.05	52.98	0.33	15.22	-0.12	9.91	-0.24	21.84	-0.12
C	12	28302	0.30	0.27	0.36	0.08	29.61	0.27	12.10	-0.12	25.34	0.04	32.86	-0.21
C	13	28302	0.73	0.41	0.56	0.07	72.74	0.41	13.39	-0.22	4.28	-0.20	9.52	-0.23
C	14	28302	0.54	0.18	0.23	0.05	54.43	0.18	8.44	-0.19	30.68	0.03	6.40	-0.21
C	15	28302	0.71	0.34	0.44	0.07	70.93	0.34	16.15	-0.17	10.58	-0.21	2.27	-0.16
C	16	28302	0.62	0.34	0.44	0.06	62.50	0.34	5.79	-0.17	25.08	-0.17	6.57	-0.21
C	17	28302	0.34	0.25	0.32	0.07	34.20	0.25	28.31	-0.11	22.01	-0.07	15.41	-0.11
C	18	28302	0.47	0.36	0.45	0.07	47.46	0.36	5.97	-0.16	16.71	-0.29	29.79	-0.08
C	19	28302	0.38	0.35	0.45	0.09	37.75	0.35	12.09	-0.20	17.45	-0.22	32.62	-0.05
C	20	28302	0.45	0.50	0.63	0.07	45.36	0.50	16.02	-0.22	23.07	-0.26	15.48	-0.16
C	21	28302	0.69	0.36	0.48	0.10	69.00	0.36	10.35	-0.16	7.23	-0.19	13.32	-0.20
C	22	28302	0.50	0.28	0.35	0.08	50.16	0.28	17.26	-0.05	24.44	-0.19	8.06	-0.14
C	23	28302	0.66	0.45	0.58	0.11	66.26	0.45	13.64	-0.22	8.52	-0.28	11.47	-0.18
C	24	28302	0.55	0.39	0.49	0.11	54.87	0.39	11.32	-0.14	11.34	-0.24	22.37	-0.16
C	25	28302	0.45	0.38	0.48	0.11	44.75	0.38	17.38	-0.14	17.26	-0.20	20.50	-0.14
C	26	28302	0.38	0.37	0.47	0.10	38.00	0.37	35.60	-0.11	20.24	-0.22	6.06	-0.15
C	27	28302	0.49	0.39	0.48	0.10	48.54	0.39	3.93	-0.10	33.14	-0.31	14.30	-0.07
C	28	28302	0.25	0.35	0.48	0.10	25.23	0.35	28.16	0.02	25.11	-0.20	21.40	-0.19
C	29	28302	0.30	0.31	0.41	0.11	30.34	0.31	17.94	-0.26	17.37	-0.30	34.24	0.15
C	30	28302	0.54	0.38	0.48	0.11	54.48	0.38	16.55	-0.14	11.87	-0.15	16.98	-0.24

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

(table continues)

Table 6.3.3 (continued)
Spring 2018 AIMS Classical Item Analysis
Science Grade 10

Form	Item	N	P-Value	rpb	rbi	% Omit	Correct		Distractor 1		Distractor 2		Distractor 3	
							%	rpb	%	rpb	%	rpb	%	rpb
C	31	28302	0.46	0.34	0.43	0.11	45.98	0.34	13.93	-0.17	28.14	-0.14	11.84	-0.15
C	32	28302	0.51	0.34	0.43	0.10	51.01	0.34	27.40	-0.11	15.42	-0.24	6.06	-0.13
C	33	28302	0.43	0.40	0.51	0.11	42.81	0.40	26.22	-0.19	19.83	-0.21	11.02	-0.10
C	34	28302	0.42	0.30	0.38	0.11	42.10	0.30	33.12	-0.05	9.13	-0.20	15.54	-0.18
C	35	28302	0.32	0.19	0.25	0.10	31.80	0.19	30.61	0.01	25.03	-0.07	12.47	-0.19
C	36	28302	0.72	0.45	0.60	0.12	72.44	0.45	15.79	-0.30	4.82	-0.19	6.83	-0.19
C	37	28302	0.61	0.39	0.49	0.15	61.24	0.39	8.56	-0.14	15.29	-0.23	14.76	-0.19
C	38	28302	0.47	0.40	0.50	0.12	47.48	0.40	9.12	-0.20	13.89	-0.19	29.39	-0.17
C	39	28302	0.41	0.33	0.42	0.13	40.92	0.33	15.56	-0.15	19.09	-0.17	24.29	-0.09
C	40	28302	0.55	0.39	0.49	0.13	55.08	0.39	15.51	-0.16	15.45	-0.24	13.82	-0.13
C	41	28302	0.33	0.26	0.34	0.12	32.58	0.26	33.76	-0.06	23.03	-0.19	10.51	-0.04
C	42	28302	0.40	0.29	0.37	0.12	40.33	0.29	27.38	-0.01	14.48	-0.26	17.69	-0.12
C	43	28302	0.42	0.43	0.55	0.14	42.38	0.43	18.71	-0.12	23.14	-0.19	15.63	-0.23
C	44	28302	0.41	0.33	0.42	0.14	41.03	0.33	12.56	-0.10	33.00	-0.07	13.26	-0.28
C	45	28302	0.29	0.33	0.44	0.14	29.17	0.33	30.23	0.09	13.61	-0.24	26.86	-0.25
C	46	28302	0.55	0.39	0.48	0.13	54.98	0.39	19.76	-0.13	19.11	-0.22	6.02	-0.21
C	47	28302	0.50	0.43	0.54	0.14	49.72	0.43	9.24	-0.14	19.85	-0.25	21.05	-0.18
C	48	28302	0.42	0.26	0.33	0.17	42.13	0.26	13.45	-0.09	21.37	-0.07	22.89	-0.16
C	49	28302	0.29	0.21	0.28	0.15	29.22	0.21	12.93	-0.18	19.34	-0.14	38.36	0.04
C	50	28302	0.58	0.49	0.62	0.18	58.24	0.49	8.90	-0.24	22.38	-0.30	10.30	-0.14
C	51	28302	0.34	0.30	0.38	0.16	33.68	0.30	11.74	-0.25	8.15	-0.27	46.27	0.04
C	52	28302	0.56	0.38	0.47	0.16	56.24	0.38	10.06	-0.23	9.41	-0.23	24.14	-0.11
C	53	28302	0.27	0.23	0.31	0.17	26.88	0.23	42.59	-0.08	19.55	-0.11	10.81	-0.06
C	54	28302	0.43	0.40	0.51	0.16	42.58	0.40	24.63	-0.21	21.72	-0.15	10.92	-0.14
C	55	28302	0.53	0.55	0.69	0.19	52.55	0.55	10.91	-0.26	29.73	-0.35	6.62	-0.13
C	56	28302	0.63	0.42	0.54	0.18	62.97	0.42	8.77	-0.12	17.88	-0.26	10.19	-0.21
C	57	28302	0.48	0.38	0.48	0.18	47.51	0.38	25.21	-0.10	19.05	-0.22	8.06	-0.22
C	58	28302	0.36	0.42	0.54	0.19	35.67	0.42	11.90	-0.21	22.69	-0.16	29.56	-0.14
C	59	28302	0.42	0.35	0.44	0.18	42.01	0.35	15.97	-0.22	12.96	-0.26	28.88	0.00
C	60	28302	0.52	0.50	0.63	0.18	52.50	0.50	7.80	-0.21	23.45	-0.30	16.07	-0.18
C	61	28302	0.72	0.37	0.49	0.17	71.66	0.37	10.80	-0.20	13.43	-0.23	3.94	-0.12
C	62	28302	0.46	0.33	0.41	0.17	45.83	0.33	29.20	-0.15	9.56	-0.22	15.24	-0.08
C	63	28302	0.50	0.36	0.46	0.17	49.51	0.36	4.48	-0.18	29.47	-0.11	16.37	-0.25
C	64	28302	0.50	0.36	0.45	0.19	50.00	0.36	20.82	-0.12	19.00	-0.21	9.99	-0.16
C	65	28302	0.57	0.33	0.41	0.20	57.38	0.33	14.47	-0.13	14.75	-0.20	13.20	-0.13

Note. This test included multiple-choice items only. The statistics presented in this table are based on a calibration sample, which was near census for this administration.

PART 7: CALIBRATION, SCALING AND EQUATING

Part 7 of the technical report describes calibration and scaling procedures and results for the Spring 2018 AIMS Science assessments. The online forms were post-equated in Spring 2018. Spring 2019 online forms remain intact from Spring 2018, and they were pre-equated. Each grade level was calibrated and scaled with calibration samples that typically consisted close to the entire student population. Part 7 of this report addresses the following AERA/APA/NCME *Standards* from the 1999 edition: 1.13, 2.1, 2.2, 2.14, 4.1, 4.2, 4.3, 6.4, 6.5, and 13.6. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this chapter are: 1.10, 2.3, 2.13, 2.14, 5.1, 5.2, 5.3, 7.2, 7.4, and 12.9.

7.1 Ensuring Valid Records in Calibration Sample

In order to ensure valid calibration results, several data cleaning steps occurred upon receipt of raw data from the scanning and scoring processes. These steps allowed for calibration to be conducted on valid student responses at the targeted grade level.

The cleaning process removed the following records from the calibration datasets for each content area and grade level:

- records with invalid tests noted by a special invalidation code obtained from ADE and marked on the answer document;
- records with non-valid attempts noted by less than one response in any of the test sessions;
- records for Bureau of Indian Affairs schools, juvenile corrections centers, state hospital schools, private schools, and home-schooled students;
- records for students in cohorts other than 2020 or 2021 (high school tests only);
- records which indicated the student took a test other than their grade level test; and
- duplicate records (score sheets were double scanned or students indicated as taking the test more than one time).

7.2 Calibration Methods

Item Response Theory (IRT) models were used in the item calibration for all AIMS Science tests. Each grade-level test was calibrated separately. All calibration activities were replicated by ADE staff as an added quality control check.

7.2.1 Calibration Model

The AIMS Science assessments are composed of multiple-choice items. Historically, the AIMS Science tests have been developed and calibrated using the Rasch Model. The Rasch model (Rasch, 1960; Wright, 1977) can be conceptualized as a one-parameter IRT (1PL) model in which item difficulty and student ability are estimated on the same scale. The Rasch model defines a multiple-choice item in terms of one parameter: item difficulty. In the Rasch model, the probability that a student with an ability estimate (θ) responds correctly to item i is:

$$P_i(\theta) = \frac{\exp(\theta - b_i)}{1 + \exp(\theta - b_i)},$$

where b_i is the item difficulty.

7.2.2 Calibration Software

Parameter estimation for items on the science tests in grade 4, 8, and high school was implemented using WINSTEPS 3.90.0 (Linacre, 2015). WINSTEPS uses joint maximum likelihood estimation (JMLE) as described by Wright and Masters (1982).

7.3 Calibration Results

7.3.1 IRT Item Statistics

Item statistics resulting from calibration of the AIMS science tests for grades 4, 8, and high school in Spring 2018 are presented by form in Tables 7.3.1.1 through 7.3.1.3. These tables contain each item's Rasch difficulty, standard error of the difficulty (SE), weighted mean-square (MNSQ infit), and unweighted mean-square (MNSQ outfit). Note that the statistics presented in this part are based on the online forms. For a special paper version form, which was a re-used form from 2016, the statistics were not generated for this administration because it was a pre-equated form. Please refer to the 2016 technical report for the statistics.

All items for all AIMS tests converged during calibration using typical procedures for WINSTEPS software. Typically, in IRT, Rasch difficulty values range from -3.00 to +3.00 with positive values indicating that the item is relatively difficult and negative values indicating that it is relatively easy. Standard error of estimates for the Rasch difficulty measures indicated that the parameters were well estimated. Model-to-item data fit was monitored using MNSQ infit and MNSQ outfit statistics, which indicate the degree of accuracy and predictability with which the data fits the model (Linacre, 2002). The MNSQ infit is sensitive to unexpected responses at or near the item's calibrated level; whereas, MNSQ outfit is sensitive to unexpected responses away from the item's calibrated level. Typically for MNSQ infit, values less than 0.6 and greater than 1.4 indicate misfit, where values greater than 1.4 indicate misfit for MNSQ outfit (Wright & Linacre, 1994). No item was flagged as having misfit as indicated by either MNSQ infit or MNSQ outfit.

Table 7.3.1.1
Spring 2018 AIMS IRT Item Statistics
Science Grade 4
(Form A)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-0.52	0.01	1.07	1.12	28	0.42	0.01	1.06	1.07
2	0.12	0.01	1.00	1.02	29	-0.21	0.01	0.81	0.71
3	-0.88	0.02	0.96	0.91	30	1.16	0.01	1.09	1.11
4	0.51	0.01	0.91	0.87	31	1.67	0.01	1.16	1.26
5	0.10	0.01	0.99	0.98	32	1.51	0.01	0.96	0.99
6	0.89	0.01	1.08	1.09	33	1.28	0.01	0.93	0.93
7	0.52	0.01	1.00	1.00	34	0.38	0.01	0.86	0.81
8	0.27	0.01	0.99	0.97	35	0.34	0.01	0.92	0.89
9	1.21	0.01	1.15	1.20	36	0.25	0.01	1.16	1.21
10	-0.28	0.01	0.89	0.85	37	1.58	0.01	1.11	1.15
11	0.66	0.01	1.00	0.99	38	0.31	0.01	1.01	0.98
12	1.80	0.01	1.08	1.19	39	1.39	0.01	1.00	1.03
13	1.18	0.01	1.04	1.07	40	-0.36	0.01	1.03	1.08
14	1.06	0.01	1.12	1.15	41	1.94	0.01	1.04	1.17
15	1.00	0.01	1.11	1.15	42	0.15	0.01	0.99	0.99
16	0.43	0.01	0.92	0.88	43	0.67	0.01	0.99	0.98
17	0.01	0.01	0.97	1.01	44	2.40	0.02	1.09	1.28
18	0.42	0.01	1.00	1.03	45	1.30	0.01	1.07	1.10
19	1.84	0.01	1.07	1.15	46	-0.87	0.02	0.86	0.68
20	0.83	0.01	0.94	0.92	47	0.72	0.01	1.01	1.02
21	-0.37	0.01	0.91	0.85	48	0.58	0.01	0.96	0.95
22	0.09	0.01	0.93	0.90	49	-0.14	0.01	0.82	0.71
23	0.62	0.01	1.01	1.01	50	0.69	0.01	0.97	0.94
24	1.13	0.01	1.06	1.07	51	0.68	0.01	0.97	0.95
25	-0.38	0.01	0.83	0.69	52	0.69	0.01	0.94	0.92
26	0.66	0.01	0.97	0.96	53	0.48	0.01	1.16	1.21
27	1.67	0.01	1.05	1.11	54	0.13	0.01	0.88	0.83

Table 7.3.1.1
Spring 2018 AIMS IRT Item Statistics
Science Grade 4
(Form B)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-0.52	0.01	1.11	1.18	28	0.42	0.01	1.07	1.07
2	0.12	0.01	1.01	1.03	29	-0.21	0.01	0.82	0.72
3	-0.88	0.02	0.95	0.89	30	1.16	0.01	1.10	1.12
4	0.51	0.01	0.90	0.88	31	1.72	0.01	1.18	1.30
5	0.10	0.01	1.00	0.99	32	1.51	0.01	0.95	0.98
6	0.89	0.01	1.08	1.11	33	1.28	0.01	0.94	0.94
7	0.52	0.01	1.01	1.01	34	0.38	0.01	0.87	0.82
8	0.27	0.01	0.98	0.96	35	0.34	0.01	0.92	0.90
9	1.21	0.01	1.18	1.23	36	0.25	0.01	1.18	1.25
10	-0.36	0.01	0.90	0.83	37	1.58	0.01	1.13	1.18
11	0.97	0.01	1.02	1.02	38	1.11	0.01	1.01	1.04
12	0.82	0.01	0.97	0.96	39	1.39	0.01	1.00	1.03
13	1.18	0.01	1.07	1.10	40	-0.36	0.01	1.03	1.09
14	1.60	0.01	1.05	1.08	41	0.87	0.01	1.02	1.04
15	0.26	0.01	0.87	0.80	42	0.15	0.01	1.00	0.99
16	1.87	0.01	1.16	1.27	43	0.33	0.01	0.95	0.91
17	1.78	0.01	1.09	1.18	44	2.45	0.01	1.09	1.30
18	0.42	0.01	1.03	1.05	45	0.55	0.02	0.88	0.83
19	0.82	0.01	0.94	0.92	46	-0.95	0.01	0.87	0.69
20	-0.43	0.01	0.92	0.87	47	0.65	0.01	1.01	1.03
21	-0.07	0.01	0.90	0.86	48	0.59	0.01	0.97	0.97
22	0.61	0.01	1.02	1.02	49	-0.20	0.01	0.82	0.70
23	-0.46	0.01	0.84	0.69	50	0.69	0.01	0.98	0.96
24	1.13	0.01	1.08	1.10	51	0.68	0.01	0.98	0.96
25	1.65	0.01	1.16	1.26	52	0.69	0.01	0.95	0.92
26	1.24	0.01	1.06	1.08	53	0.48	0.01	1.08	1.08
27	-0.01	0.01	0.92	0.84	54	0.13	0.01	0.89	0.83

Table 7.3.1.1
Spring 2018 AIMS IRT Item Statistics
Science Grade 4
(Form C)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-0.52	0.01	1.10	1.18	28	0.42	0.01	1.05	1.05
2	0.12	0.01	1.01	1.03	29	-0.21	0.01	0.82	0.72
3	-0.88	0.02	0.96	0.90	30	1.16	0.01	1.09	1.10
4	0.51	0.01	0.90	0.87	31	1.24	0.01	1.04	1.06
5	0.10	0.01	1.00	0.99	32	1.51	0.01	0.95	0.97
6	0.89	0.01	1.07	1.09	33	1.28	0.01	0.93	0.93
7	0.52	0.01	1.00	1.00	34	0.38	0.01	0.86	0.81
8	0.27	0.01	0.99	0.97	35	0.34	0.01	0.92	0.90
9	1.21	0.01	1.16	1.20	36	0.25	0.01	1.17	1.23
10	1.32	0.01	1.00	1.01	37	1.58	0.01	1.09	1.13
11	0.44	0.01	0.95	0.94	38	1.07	0.01	1.00	1.02
12	1.48	0.01	1.00	1.03	39	1.39	0.01	0.98	1.01
13	1.18	0.01	1.02	1.04	40	-0.36	0.01	1.03	1.08
14	1.13	0.01	1.03	1.04	41	1.84	0.01	0.99	1.07
15	0.37	0.01	1.01	1.04	42	0.15	0.01	1.00	0.99
16	-0.34	0.01	0.83	0.71	43	0.67	0.01	0.99	0.98
17	1.80	0.01	1.06	1.11	44	1.81	0.01	1.11	1.21
18	0.42	0.01	1.01	1.03	45	-0.83	0.02	0.85	0.67
19	0.81	0.01	0.93	0.91	46	1.10	0.01	1.07	1.09
20	-0.27	0.01	0.87	0.80	47	2.32	0.01	1.07	1.22
21	0.03	0.01	0.88	0.83	48	0.40	0.01	1.06	1.09
22	-0.30	0.01	0.81	0.68	49	0.73	0.01	0.92	0.90
23	0.82	0.01	1.01	1.01	50	0.69	0.01	0.96	0.94
24	1.13	0.01	1.06	1.07	51	0.68	0.01	0.97	0.96
25	1.62	0.01	1.13	1.20	52	0.69	0.01	0.94	0.92
26	0.46	0.01	1.07	1.09	53	0.48	0.01	1.02	1.02
27	1.84	0.01	1.22	1.35	54	0.13	0.01	0.87	0.82

Table 7.3.1.2
Spring 2018 AIMS IRT Item Statistics
Science Grade 8
(Form A)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-1.13	0.02	1.08	1.20	30	-0.09	0.01	0.92	0.87
2	-0.37	0.01	1.10	1.21	31	0.91	0.01	1.04	1.05
3	0.19	0.01	1.10	1.26	32	-1.06	0.02	0.96	0.79
4	0.15	0.01	0.88	0.84	33	0.86	0.01	1.21	1.28
5	-0.55	0.01	0.93	0.84	34	-0.21	0.01	0.92	0.85
6	0.26	0.01	1.16	1.32	35	1.22	0.01	1.00	1.00
7	-0.78	0.02	0.95	0.88	36	0.79	0.01	1.12	1.18
8	-1.29	0.02	0.78	0.63	37	2.43	0.01	1.08	1.36
9	0.21	0.01	1.10	1.19	38	0.37	0.01	1.02	1.06
10	0.33	0.01	1.01	1.01	39	0.77	0.01	1.01	1.01
11	0.03	0.02	1.08	1.13	40	0.20	0.01	0.94	0.91
12	-0.18	0.01	0.98	0.95	41	0.79	0.01	0.99	0.99
13	-0.57	0.01	0.98	1.00	42	-0.22	0.02	0.88	0.82
14	1.21	0.01	1.15	1.21	43	0.67	0.01	0.98	0.97
15	0.93	0.01	1.01	1.00	44	-0.49	0.01	0.83	0.68
16	0.35	0.01	0.99	0.99	45	1.02	0.01	1.16	1.20
17	0.23	0.01	0.97	0.95	46	0.74	0.01	1.02	1.01
18	2.00	0.01	1.16	1.37	47	-0.63	0.01	0.83	0.68
19	-0.16	0.01	0.94	0.90	48	0.37	0.01	0.86	0.83
20	1.99	0.01	1.04	1.06	49	0.47	0.01	1.04	1.07
21	1.17	0.01	1.08	1.11	50	0.91	0.01	0.84	0.81
22	0.74	0.01	1.06	1.08	51	0.55	0.01	1.05	1.07
23	0.71	0.01	0.95	0.93	52	0.46	0.01	0.99	0.98
24	1.64	0.01	0.90	0.89	53	-1.03	0.02	0.91	0.79
25	0.42	0.01	1.06	1.08	54	0.56	0.01	0.89	0.85
26	1.13	0.01	1.03	1.06	55	1.76	0.01	1.04	1.15
27	1.31	0.02	0.92	0.93	56	1.85	0.01	1.06	1.13
28	1.17	0.01	1.07	1.11	57	1.01	0.01	1.23	1.28
29	0.98	0.01	0.96	0.95	58	0.74	0.01	1.02	1.02

Table 7.3.1.2
Spring 2018 AIMS IRT Item Statistics
Science Grade 8
(Form B)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-1.13	0.02	1.09	1.22	30	-0.09	0.01	0.92	0.87
2	-0.37	0.01	1.10	1.19	31	0.91	0.01	1.03	1.04
3	0.55	0.01	1.21	1.36	32	-1.06	0.02	0.89	0.70
4	-0.25	0.02	0.96	0.97	33	-0.22	0.01	0.92	0.85
5	0.89	0.01	0.84	0.80	34	1.20	0.01	1.00	1.01
6	0.38	0.02	1.12	1.21	35	0.73	0.01	1.12	1.18
7	-0.78	0.02	0.93	0.89	36	0.83	0.01	1.04	1.04
8	-1.29	0.02	0.76	0.63	37	0.11	0.01	0.95	0.92
9	0.21	0.01	1.10	1.20	38	0.37	0.01	1.03	1.08
10	0.33	0.01	1.03	1.04	39	1.03	0.01	1.07	1.09
11	-0.60	0.02	1.00	1.03	40	0.20	0.01	0.93	0.89
12	-0.18	0.01	1.02	1.00	41	-0.28	0.01	0.88	0.81
13	1.23	0.01	1.17	1.25	42	-0.72	0.02	0.85	0.70
14	0.89	0.01	1.03	1.03	43	0.67	0.01	0.98	0.98
15	1.92	0.01	1.19	1.38	44	-0.49	0.01	0.82	0.67
16	0.35	0.01	1.00	0.99	45	1.02	0.01	1.17	1.22
17	0.23	0.01	0.97	0.96	46	0.74	0.01	1.02	1.02
18	-0.19	0.01	0.94	0.90	47	0.55	0.01	1.05	1.08
19	0.51	0.01	0.95	0.92	48	0.37	0.01	0.88	0.84
20	1.99	0.01	1.02	1.03	49	-0.28	0.01	0.91	0.82
21	0.71	0.01	1.04	1.04	50	1.76	0.01	1.03	1.16
22	0.27	0.01	1.08	1.13	51	0.44	0.01	1.03	1.06
23	0.71	0.01	0.95	0.94	52	0.46	0.01	0.99	0.98
24	1.64	0.01	0.91	0.90	53	-0.61	0.01	0.83	0.68
25	1.25	0.01	0.94	0.96	54	0.56	0.01	0.96	0.94
26	1.13	0.01	1.04	1.07	55	1.80	0.01	1.07	1.14
27	2.47	0.02	1.11	1.46	56	-0.08	0.02	0.95	0.91
28	1.17	0.01	1.08	1.12	57	1.01	0.01	1.23	1.29
29	0.98	0.01	0.98	0.98	58	0.74	0.01	1.03	1.03

Table 7.3.1.2
Spring 2018 AIMS IRT Item Statistics
Science Grade 8
(Form C)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	-1.13	0.02	1.06	1.19	30	-0.09	0.01	0.92	0.87
2	-0.37	0.01	1.10	1.22	31	0.91	0.01	1.04	1.05
3	-0.26	0.01	1.11	1.22	32	-1.06	0.02	0.88	0.70
4	-0.87	0.02	0.89	0.77	33	-0.30	0.01	0.95	0.88
5	0.84	0.01	0.85	0.81	34	1.10	0.01	1.00	1.00
6	-0.98	0.02	0.97	0.91	35	0.92	0.01	1.06	1.07
7	-0.78	0.02	0.96	0.92	36	0.15	0.01	0.95	0.90
8	-1.29	0.02	0.76	0.60	37	0.94	0.01	1.12	1.18
9	0.21	0.01	1.14	1.28	38	0.37	0.01	1.03	1.09
10	0.33	0.01	1.02	1.04	39	0.90	0.01	1.07	1.08
11	-0.66	0.02	1.00	1.04	40	0.20	0.01	0.93	0.89
12	-0.18	0.01	1.03	1.02	41	-0.32	0.01	0.91	0.84
13	1.19	0.01	1.19	1.26	42	-0.70	0.02	0.86	0.72
14	1.05	0.01	1.04	1.05	43	0.67	0.01	0.98	0.97
15	1.93	0.01	1.20	1.43	44	-0.49	0.01	0.81	0.66
16	0.35	0.01	1.00	1.02	45	1.02	0.01	1.16	1.20
17	0.23	0.01	0.98	0.96	46	0.74	0.01	1.04	1.05
18	-0.06	0.01	0.90	0.86	47	0.03	0.01	0.94	0.92
19	-0.38	0.01	1.01	0.99	48	0.37	0.01	0.88	0.85
20	1.99	0.01	1.02	1.03	49	0.53	0.01	1.03	1.05
21	0.46	0.01	1.17	1.24	50	0.49	0.01	0.96	0.92
22	-0.06	0.01	1.14	1.24	51	1.86	0.01	1.07	1.22
23	0.71	0.01	0.96	0.96	52	0.46	0.01	1.02	1.03
24	1.64	0.01	0.91	0.90	53	0.69	0.01	1.05	1.06
25	1.18	0.01	0.92	0.93	54	0.56	0.01	0.94	0.91
26	1.13	0.01	1.04	1.08	55	1.66	0.01	1.04	1.09
27	2.48	0.02	1.09	1.47	56	-0.70	0.02	0.89	0.73
28	1.17	0.01	1.08	1.14	57	1.01	0.01	1.26	1.32
29	0.98	0.01	0.97	0.97	58	0.74	0.01	1.03	1.03

Table 7.3.1.3
Spring 2018 AIMS IRT Item Statistics
Science Grade HS
(Form A)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	0.20	0.01	1.01	1.06	34	1.60	0.01	1.00	1.07
2	0.20	0.01	0.87	0.84	35	0.03	0.01	0.85	0.82
3	0.80	0.01	1.01	1.01	36	-0.73	0.01	0.88	0.79
4	0.90	0.01	1.05	1.07	37	1.04	0.01	1.10	1.13
5	1.10	0.01	1.17	1.23	38	1.48	0.01	1.12	1.23
6	0.75	0.01	1.09	1.12	39	0.08	0.01	0.97	0.92
7	1.38	0.01	1.09	1.17	40	0.87	0.01	1.05	1.07
8	0.16	0.01	1.01	1.00	41	-0.07	0.01	0.96	0.91
9	-0.25	0.01	0.97	1.02	42	0.52	0.01	0.96	0.96
10	0.15	0.01	0.95	0.92	43	0.88	0.01	1.04	1.05
11	0.19	0.01	1.01	1.03	44	0.86	0.01	1.03	1.03
12	1.51	0.01	1.11	1.14	45	1.44	0.01	1.00	1.01
13	-0.74	0.01	0.89	0.85	46	0.18	0.01	0.98	0.96
14	0.21	0.01	1.14	1.20	47	0.48	0.01	0.93	0.91
15	-0.77	0.01	1.01	1.13	48	1.54	0.01	1.14	1.23
16	-0.12	0.01	0.98	0.99	49	0.07	0.01	0.99	1.03
17	0.42	0.01	0.97	0.97	50	-0.24	0.01	0.93	0.88
18	0.44	0.01	0.87	0.84	51	0.04	0.01	1.01	1.00
19	0.67	0.01	0.99	0.98	52	0.89	0.01	1.11	1.15
20	1.22	0.02	1.09	1.14	53	0.34	0.01	1.02	1.03
21	-1.41	0.01	0.90	0.74	54	0.32	0.01	0.82	0.78
22	0.45	0.01	1.06	1.10	55	0.33	0.01	1.05	1.08
23	-0.49	0.01	0.89	0.82	56	0.95	0.01	1.00	1.00
24	-0.72	0.01	0.90	0.85	57	0.78	0.01	1.06	1.08
25	0.23	0.01	0.97	0.96	58	1.09	0.01	0.92	0.93
26	1.00	0.01	0.99	1.00	59	1.56	0.01	1.09	1.19
27	1.47	0.01	1.05	1.10	60	0.90	0.01	1.26	1.34
28	0.20	0.01	0.97	1.00	61	-0.43	0.01	0.89	0.83
29	0.61	0.01	1.02	1.03	62	0.62	0.01	1.04	1.04
30	0.41	0.01	0.98	0.98	63	0.67	0.02	0.94	0.93
31	0.55	0.01	0.97	0.95	64	0.87	0.01	0.98	0.98
32	0.48	0.01	1.02	1.01	65	0.52	0.01	1.00	1.00
33	0.86	0.01	0.97	0.96					

Table 7.3.1.3
Spring 2018 AIMS IRT Item Statistics
Science Grade HS
(Form B)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	0.20	0.01	1.01	1.05	34	1.57	0.01	0.98	1.04
2	0.20	0.01	0.86	0.84	35	0.02	0.01	0.86	0.82
3	0.78	0.01	1.01	1.02	36	-0.73	0.01	0.89	0.81
4	0.90	0.01	1.05	1.07	37	-0.14	0.01	0.97	0.92
5	1.10	0.01	1.19	1.25	38	0.50	0.01	0.97	0.96
6	0.75	0.01	1.09	1.12	39	0.90	0.01	1.02	1.04
7	1.61	0.01	0.93	0.97	40	0.12	0.01	0.96	0.92
8	0.16	0.01	0.99	0.99	41	1.36	0.01	1.14	1.24
9	-0.25	0.01	0.97	1.03	42	1.31	0.01	1.07	1.11
10	0.15	0.01	0.95	0.92	43	0.90	0.01	1.05	1.08
11	0.19	0.01	1.02	1.03	44	0.86	0.01	1.05	1.06
12	1.51	0.01	1.12	1.16	45	1.44	0.01	1.02	1.03
13	-0.74	0.01	0.89	0.84	46	0.54	0.01	0.92	0.90
14	0.21	0.01	1.14	1.21	47	0.18	0.01	0.98	0.96
15	-0.77	0.01	1.02	1.16	48	1.62	0.01	1.14	1.24
16	-0.12	0.01	0.97	0.97	49	0.72	0.01	0.98	0.98
17	0.40	0.01	0.98	0.98	50	-0.24	0.01	0.92	0.87
18	0.42	0.01	0.88	0.85	51	0.40	0.01	1.00	1.00
19	1.14	0.01	1.07	1.11	52	-0.01	0.01	0.99	0.99
20	-1.47	0.01	0.90	0.72	53	0.48	0.01	0.93	0.91
21	-0.55	0.01	0.93	0.96	54	0.30	0.01	0.82	0.78
22	0.45	0.01	1.07	1.12	55	1.27	0.01	1.07	1.10
23	-0.49	0.01	0.90	0.85	56	0.85	0.01	1.10	1.13
24	0.17	0.01	0.97	0.96	57	0.78	0.01	1.00	0.99
25	0.67	0.01	0.97	0.96	58	1.09	0.01	0.94	0.96
26	1.41	0.01	1.05	1.10	59	0.82	0.01	1.02	1.04
27	0.12	0.01	0.96	0.99	60	0.11	0.01	0.97	0.95
28	0.63	0.01	1.02	1.03	61	-0.43	0.01	0.87	0.81
29	0.95	0.01	1.00	1.02	62	0.62	0.01	1.04	1.03
30	0.69	0.01	1.13	1.15	63	1.74	0.01	1.10	1.25
31	0.55	0.01	0.98	0.97	64	0.94	0.01	1.27	1.36
32	0.48	0.01	1.01	1.00	65	0.52	0.01	0.99	1.00
33	0.86	0.01	0.97	0.97					

Table 7.3.1.3
Spring 2018 AIMS IRT Item Statistics
Science Grade HS
(Form C)

Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit	Item	Rasch Difficulty	SE	MNSQ Infit	MNSQ Outfit
1	0.20	0.01	1.02	1.08	34	0.86	0.01	1.08	1.08
2	0.20	0.01	0.87	0.85	35	1.35	0.01	1.15	1.25
3	1.06	0.01	1.02	1.03	36	-0.73	0.01	0.89	0.80
4	0.90	0.01	1.07	1.09	37	-0.08	0.01	0.96	0.91
5	1.10	0.01	1.13	1.18	38	0.50	0.01	0.97	0.96
6	0.83	0.01	1.02	1.03	39	0.80	0.01	1.03	1.04
7	1.62	0.01	0.96	1.01	40	0.18	0.01	0.98	0.95
8	0.16	0.01	1.02	1.03	41	1.30	0.01	1.09	1.14
9	-0.25	0.01	0.98	1.04	42	1.04	0.01	1.10	1.14
10	0.15	0.01	0.95	0.93	43	0.74	0.01	0.93	0.92
11	0.19	0.01	1.03	1.04	44	0.86	0.01	1.04	1.05
12	1.51	0.01	1.11	1.14	45	1.44	0.01	1.02	1.03
13	-0.74	0.01	0.91	0.86	46	0.31	0.01	0.97	0.95
14	0.21	0.01	1.16	1.23	47	0.61	0.01	0.95	0.93
15	-0.77	0.01	1.02	1.16	48	0.88	0.01	1.11	1.14
16	-0.12	0.01	0.98	1.00	49	1.54	0.01	1.15	1.25
17	1.37	0.01	1.15	1.24	50	-0.24	0.01	0.94	0.88
18	0.50	0.01	1.00	1.00	51	1.21	0.01	1.06	1.09
19	0.99	0.01	1.01	1.02	52	0.27	0.01	0.97	0.96
20	0.52	0.01	0.87	0.84	53	1.64	0.01	1.11	1.23
21	-0.51	0.01	0.95	0.96	54	0.80	0.01	0.97	0.96
22	0.45	0.01	1.08	1.15	55	0.30	0.01	0.82	0.78
23	-0.49	0.01	0.93	0.87	56	-0.18	0.01	0.92	0.89
24	0.23	0.01	0.97	0.96	57	0.78	0.01	1.02	1.02
25	0.79	0.01	1.00	1.00	58	1.09	0.01	0.94	0.96
26	1.00	0.01	1.00	1.01	59	0.76	0.01	1.02	1.03
27	0.58	0.01	0.99	0.98	60	0.24	0.01	0.87	0.85
28	1.68	0.01	0.96	1.01	61	-0.43	0.01	0.89	0.83
29	1.36	0.01	1.02	1.05	62	0.62	0.01	1.04	1.04
30	0.32	0.01	0.97	0.99	63	0.48	0.01	1.00	1.01
31	0.69	0.01	1.03	1.04	64	0.46	0.01	1.01	1.01
32	0.48	0.01	1.03	1.02	65	0.24	0.01	1.02	1.01
33	0.86	0.01	0.98	0.98					

7.4 Scaling Methods

7.4.1 Science

A scale of measurement was determined for science using spring 2008 operational test results and cut scores were determined during standard setting meetings. A detailed description concerning the development of the scale of measurement can be found in Appendix B of the *2008 AIMS Technical Report* which can be obtained from the Arizona Department of Education. A report detailing the procedures used to set performance standards on the science tests is available at http://www.azed.gov/assessment/files/2014/05/aims2008sciencerevisedstandardsettingtechnicalreport.pdf. The AIMS science scales for grades 4, 8, and high school ranged from 200 to 800. The science scales are not on a vertical scale. Each grade has its own unique scale so that the scale scores for different grades can NOT be compared.

7.5 Equating

7.5.1 Science

As mentioned above, the AIMS Science forms were converted to an online format from a paper-and-pencil format in Spring 2018 that a mode comparability needed to be conducted. Since it was the expectation that items administered in the paper-and-pencil format in the past would behave similarly in an online format, a mode comparability study was performed via Arizona's standard linking method, in Spring 2018. There were a couple of reasons this method was chosen. First, a comparability study for AIMS Science has been conducted once in 2007 (Arizona Department of Education, 2007). This study, which was based on a stand-alone field-test, it did not find significant mode effects. Second, AIMS Science items are all multiple-choice items so that they are not expected to be presented differently between a paper-and-pencil form and an online form. Third, the vast majority of students were expected to take the online assessment in Spring 2018. The few students who may take a paper-and-pencil form (Braille, Large Print, or Paper) may not be a representative of population as these students would have the need for this specific accommodation spelled out in their Individual Education Plan (IEP) or 504 Plan. The mode comparability method by linking was presented and approved by Arizona's Technical Advisory Council on November 2, 2017.

The first step was to conduct a mode comparability study through a linking method under a non-equivalent group anchor item (NEAT) design. The study was conducted on an intact form from Spring 2017, which was administered in a paper-and-pencil format in Spring 2017 and delivered online in Spring 2018. Because the form was the intact form Spring 2017 except for a change in administration mode, rather than a subset of items used as anchors, all operational items on the form were used and examined for displacement within Winsteps (Linacre, 2015). The 2017 AIMS Science tests were equated and placed on the operational AIMS scale using a common-item, non-equivalent groups design. A set of anchor items was selected from the 2015 and previous operational assessments before the item selection workshop. The anchor items were selected with two principles in mind. First, the subset of anchor items should represent the content covered by the full AIMS assessment. Second, the subset of anchor items should be representative of the distribution of item difficulties for the full assessment. Any item with a value of displacement greater than 0.3 in magnitude was flagged. Those that do not meet this threshold, are released from the anchor set and freely estimated in an iterative process releasing the item with the largest flagged displacement and re-equating the test until no more anchors are flagged for displacement. This process resulted in

flagging only 2 out of 54 items for Grade 4, 2 out of 58 items for Grade 8, and none of 65 items for High School.

Once the intact form from Spring 2017 was linked to the existing AIMS Science scale, the next step was to equate other two forms, separately, to the intact form to put them also on the original AIMS Science scale. In other words, two separate equating analyses were run, rather than equating them simultaneously. This separate calibration, again using the NEAT method, was necessary because some of common items across forms were placed at very different positions. These "displaced" items were not treated as the 'same' items as their item parameter estimates were expected to be affected by their major shift in placement (Miller & Fitzpatrick, 2009). All common items that were at the same location across forms were used as anchor. This step resulted in flagging only 1 item on one form for Grade 4. Table 7.5.1.1 presents the number of operational and anchor items for two separate equating analyses for each grade. Table 7.5.1.2 shows the content representation for the 2018 anchor items compared to the 2018 operational form. Table 7.5.1.3 presents descriptive statistics (IRT and classical) for the 2018 anchor item difficulties and the 2018 operational form. Note that the number of anchor items for Tables 7.5.1.1 through 7.5.1.3 is based on the final anchor set after displaced anchor items were removed.

After completing the steps described above, an impact analysis was conducted on both test characteristics and student performance for the 2018 online forms by comparing the results against a historical trend as a reasonableness check. In terms of test characteristics, the average *p*-value and Rasch difficulty values for the 2018 online forms were comparable to the previous years. Consequently, raw score cuts for the 2018 online forms were very close to the previous years. Similarly, student performance on the 2018 forms were comparable to the previous years for all grades with respect to the average scale score and Performance Level distribution.

A full report for the mode comparability study is available on the ADE's website: https://cms.azed.gov/home/GetDocumentFile?id=5b58e4f21dcb2513e81ceef2.

Table 7.5.1.1
Spring 2018 AIMS Science Anchor Items

Grade	Form	Operational	Anchor
4	A	54	30
	B	54	29
	C	54	52
8	A	58	29
	B	58	29
	C	58	56
HS	A	65	25
	B	65	25
	C	65	65

Table 7.5.1.2
Representation of Content by 2018 Science Anchor Sets
Grade 4

		Strand																		
		1				2		3		4					5			6		
		Concept				Concept		Concept		Concept					Concept			Concept		Total
		1	2	3	4	1	2	1	2	1	2	3	4	5	1	2	3	2	3	
Form A																				
All	N	6	6	6		3	3	3	3	3	0	1	2		0	0	6	6	6	54
	Pct	11.11	11.11	11.11		5.56	5.56	5.56	5.56	5.56	0	1.85	3.7		0	0	11.11	11.11	11.11	100
Anchor	N	3	3	3		1	2	2	1	2	0	0	2		0	0	4	2	5	30
	Pct	10	10	10		3.33	6.67	6.67	3.33	6.67	0	0	6.67		0	0	13.33	6.67	16.67	100
Form B																				
All	N	6	6	5	1	3	3	5	1	3	0	0	3		0	0	6	6	6	54
	Pct	11.11	11.11	9.26	1.85	5.56	5.56	9.26	1.85	5.56	0	0	5.56		0	0	11.11	11.11	11.11	100
Anchor	N	3	3	3		1	2	2	1	2	0	0	2		0	0	3	2	5	29
	Pct	10.34	10.34	10.34		3.45	6.9	6.9	3.45	6.9	0	0	6.9		0	0	10.34	6.9	17.24	100
Form C																				
All	N	6	6	5	1	3	3	4	2	4	0	0	2		0	0	6	6	6	54
	Pct	11.11	11.11	9.26	1.85	5.56	5.56	7.41	3.7	7.41	0	0	3.7		0	0	11.11	11.11	11.11	100
Anchor	N	6	5	5	1	3	3	4	2	4	0	0	1		0	0	6	6	6	52
	Pct	11.54	9.62	9.62	1.92	5.77	5.77	7.69	3.85	7.69	0	0	1.92		0	0	11.54	11.54	11.54	100

Table 7.5.1.2
Representation of Content by 2018 Science Anchor Sets
Grade 8

		Strand																		
		1				2		3		4					5			6		
		Concept				Concept		Concept		Concept					Concept			Concept		Total
		1	2	3	4	1	2	1	2	1	2	3	4	5	1	2	3	2	3	
Form A																				
All	N	6	4	6	4	4	2	2	4	0	3	0	5		10	8				58
	Pct	10.34	6.9	10.34	6.9	6.9	3.45	3.45	6.9	0	5.17	0	8.62		17.24	13.79				100
Anchor	N	3	3	3	1	2	2	1	3	0	0	0	2		4	5				29
	Pct	10.34	10.34	10.34	3.45	6.9	6.9	3.45	10.34	0	0	0	6.9		13.79	17.24				100
Form B																				
All	N	6	4	6	4	4	2	2	4	0	3	0	5		10	8				58
	Pct	10.34	6.9	10.34	6.9	6.9	3.45	3.45	6.9	0	5.17	0	8.62		17.24	13.79				100
Anchor	N	3	3	3	1	2	2	1	3	0	0	0	2		4	5				29
	Pct	10.34	10.34	10.34	3.45	6.9	6.9	3.45	10.34	0	0	0	6.9		13.79	17.24				100
Form C																				
All	N	6	4	6	4	4	2	1	5	0	2	0	6		10	8				58
	Pct	10.34	6.9	10.34	6.9	6.9	3.45	1.72	8.62	0	3.45	0	10.34		17.24	13.79				100
Anchor	N	6	3	5	4	4	2	1	5	0	2	0	6		10	8				56
	Pct	10.71	5.36	8.93	7.14	7.14	3.57	1.79	8.93	0	3.57	0	10.71		17.86	14.29				100

Table 7.5.1.2
Representation of Content by 2018 Science Anchor Sets
Grade HS

		Strand																		
		1				2		3		4					5			6		
		Concept				Concept		Concept		Concept					Concept			Concept		Total
		1	2	3	4	1	2	1	2	1	2	3	4	5	1	2	3	2	3	
Form A																				
All	N	6	6	6	4	4	2	7		6	6	6	6	6						65
	Pct	9.23	9.23	9.23	6.15	6.15	3.08	10.77		9.23	9.23	9.23	9.23	9.23						100
Anchor	N	2	2	1	1	1	2	4		2	2	1	5	2						25
	Pct	8	8	4	4	4	8	16		8	8	4	20	8						100
Form B																				
All	N	6	6	6	4	4	2	7		6	6	6	6	6						65
	Pct	9.23	9.23	9.23	6.15	6.15	3.08	10.77		9.23	9.23	9.23	9.23	9.23						100
Anchor	N	2	2	1	1	1	2	4		2	2	1	5	2						25
	Pct	8	8	4	4	4	8	16		8	8	4	20	8						100
Form C																				
All	N	6	6	6	4	4	2	7		6	6	6	6	6						65
	Pct	9.23	9.23	9.23	6.15	6.15	3.08	10.77		9.23	9.23	9.23	9.23	9.23						100
Anchor	N	6	6	6	4	4	2	7		6	6	6	6	6						65
	Pct	9.23	9.23	9.23	6.15	6.15	3.08	10.77		9.23	9.23	9.23	9.23	9.23						100

Table 7.5.1.3
Representation of Difficulty by 2018 Science Anchor Sets

Grade	Form	Statistic	IRT Difficulty Entire 2018 Test	IRT Difficulty All Anchors Items	P-Value Entire 2018 Test	P-Value All Anchors Items
4	A	N	54	30	54	30
		Mean	0.6200	0.5400	0.5500	0.5700
		Std Dev	0.7300	0.6000	0.1400	0.1200
		Min	-0.8800	-0.8800	0.2200	0.3400
		Max	2.4000	1.5800	0.8300	0.8300
	B	N	54	29	54	29
		Mean	0.6100	0.5400	0.5600	0.5800
		Std Dev	0.7300	0.6100	0.1400	0.1200
		Min	-0.9500	-0.8800	0.2200	0.3600
		Max	2.4500	1.5800	0.8300	0.8300
	C	N	54	52	54	52
		Mean	0.6900	0.7300	0.5500	0.5400
		Std Dev	0.7200	0.7000	0.1400	0.1400
		Min	-0.8800	-0.8300	0.2300	0.2300
		Max	2.3200	2.3200	0.8300	0.8200
8	A	N	58	29	58	29
		Mean	0.4800	0.3600	0.5600	0.5900
		Std Dev	0.8200	0.7900	0.1500	0.1400
		Min	-1.2900	-1.2900	0.2100	0.3200
		Max	2.4300	1.9900	0.8800	0.8800
	B	N	58	29	58	29
		Mean	0.4600	0.3600	0.5700	0.5800
		Std Dev	0.8100	0.7900	0.1500	0.1400
		Min	-1.2900	-1.2900	0.2000	0.3100
		Max	2.4700	1.9900	0.8800	0.8800
	C	N	58	56	58	56
		Mean	0.4000	0.4200	0.5800	0.5700
		Std Dev	0.8500	0.8600	0.1500	0.1500
		Min	-1.2900	-1.2900	0.2000	0.2000
		Max	2.4800	2.4800	0.8800	0.8800
HS	A	N	65	25	65	25
		Mean	0.4900	0.3000	0.4900	0.5300
		Std Dev	0.6500	0.6700	0.1300	0.1300
		Min	-1.4100	-0.7700	0.2700	0.2800
		Max	1.6000	1.5100	0.8400	0.7300
	B	N	65	25	65	25
		Mean	0.5000	0.3000	0.4900	0.5300
		Std Dev	0.6600	0.6700	0.1300	0.1300
		Min	-1.4700	-0.7700	0.2500	0.2900
		Max	1.7400	1.5100	0.8400	0.7300
	C	N	65	65	65	65
		Mean	0.5700	0.5700	0.4800	0.4800
		Std Dev	0.6100	0.6100	0.1200	0.1200
		Min	-0.7700	-0.7700	0.2500	0.2500
		Max	1.6800	1.6800	0.7300	0.7300

7.5.2 Scoring and Standard Error of Measurement

Item response theory makes available two types of scoring: number-correct and item-pattern. With number-correct scoring, the value of theta corresponding to each number-correct score (or raw score) is converted to a scale score. Item-pattern scoring produces a scale score, taking into account not only how many items were answered correctly but also which items and the characteristics of those items. For groups of 25 or more students, the two methods produce tau-equivalent results (Yen, 1984.) Tau-equivalent means that examinees are expected to receive the same score on average between the two methods. Number-correct scoring was used to derive scales scores for the AIMS tests.

Typically, a test score is obtained from a single observation of performance and represents an estimate of the trait being measured. As an estimate, an observed test score contains some measurement error and does not perfectly reflect an individual's true score. The degree of measurement error in a test score can be estimated using a statistic called the standard error of measurement (SEM). SEM is calculated as follows

$$SEM = \sigma_x (1 - r)^{1/2},$$

where σ_x is a standard deviation of total score X, and r is a reliability coefficient such as Cronbach's alpha (Crocker & Algina, 1986). SEM and Cronbach's alpha for the total group as well as subgroups are presented in Table 9.1.1.1.

A student's exact true score cannot be known. The true score is defined as the average test score that would result if the test could be administered repeatedly without the effects of practice or fatigue. The standard error of measurement is an estimate of the standard deviation of an individual's observed scores from these repeated administrations. For practical purposes, this statistic can be used to obtain a range within which a student's true score is likely to fall. Using item response theory, the standard error of measurement can be calculated for every possible scale score.

Tables 7.5.2.1 through 7.5.2.3 present raw score to scale score conversion tables and IRT conditional standard errors of measurement for Science grades 4, 8, and high school assessments. The values in bold represent the scale score with the smallest value greater than or equal to the established cut score for each grade level and content area. The "greater than" rule is evoked when the actual scale score is not observed in any given table. Note that a special paper version was a re-used and pre-equated form from Spring 2016. Please refer to the 2016 technical report for the raw score to scale score conversion table.

Table 7.5.2.1
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 4
(Form A)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	70	**28**	**503**	**14**
1	293	50	29	507	14
2	328	36	30	511	14
3	349	30	31	515	14
4	365	26	32	519	14
5	377	23	33	523	14
6	388	22	34	528	15
7	397	20	35	532	15
8	405	19	36	537	15
9	412	18	37	541	15
10	419	18	38	546	15
11	425	17	**39**	**551**	**16**
12	431	17	40	556	16
13	436	16	41	561	16
14	442	16	42	567	17
15	447	16	43	573	17
16	452	15	44	579	18
17	456	15	45	586	19
18	461	15	46	593	19
19	**465**	**15**	47	601	20
20	470	15	48	610	22
21	474	14	49	621	24
22	478	14	50	633	26
23	482	14	51	649	30
24	486	14	52	670	36
25	490	14	53	706	50
26	495	14	54	800	70
27	499	14			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.1
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 4
(Form B)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	70	**28**	**502**	**14**
1	291	50	29	506	14
2	327	36	30	510	14
3	348	30	31	514	14
4	364	26	32	519	14
5	376	24	33	523	14
6	387	22	34	527	15
7	396	20	35	531	15
8	404	19	36	536	15
9	411	19	37	541	15
10	418	18	38	545	15
11	424	17	**39**	**550**	**16**
12	430	17	40	555	16
13	436	16	41	561	16
14	441	16	42	566	17
15	446	16	43	572	17
16	451	15	44	578	18
17	455	15	45	585	19
18	460	15	46	593	19
19	**465**	**15**	47	601	20
20	469	15	48	610	22
21	473	14	49	620	24
22	477	14	50	633	26
23	482	14	51	648	30
24	486	14	52	670	36
25	490	14	53	705	50
26	494	14	54	800	70
27	498	14			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.1
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 4
(Form C)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	70	28	506	14
1	295	50	29	510	14
2	331	36	30	514	14
3	352	30	31	518	14
4	368	26	32	522	14
5	380	24	33	527	14
6	391	22	34	531	15
7	400	20	35	535	15
8	408	19	36	540	15
9	415	19	37	544	15
10	422	18	**38**	**549**	**15**
11	428	17	39	554	16
12	434	17	40	559	16
13	439	16	41	564	16
14	445	16	42	570	17
15	450	16	43	576	17
16	455	15	44	582	18
17	459	15	45	589	19
18	**464**	**15**	46	596	19
19	468	15	47	604	20
20	473	15	48	613	22
21	477	14	49	624	24
22	481	14	50	636	26
23	486	14	51	651	30
24	490	14	52	673	36
25	494	14	53	708	50
26	498	14	54	800	70
27	**502**	**14**			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.2
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 8
(Form A)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	69	30	499	14
1	286	49	**31**	**503**	**14**
2	320	35	32	507	14
3	341	29	33	511	14
4	357	26	34	515	14
5	369	23	35	518	14
6	379	21	36	522	14
7	388	20	37	526	14
8	396	19	38	531	14
9	403	18	**39**	**535**	**14**
10	410	18	40	539	14
11	416	17	41	544	15
12	422	16	42	548	15
13	427	16	43	553	15
14	433	16	44	558	16
15	438	15	45	563	16
16	442	15	46	568	16
17	447	15	47	574	17
18	451	15	48	580	17
19	456	14	49	587	18
20	460	14	50	594	19
21	464	14	51	602	20
22	468	14	52	611	21
23	472	14	53	621	23
24	**476**	**14**	54	633	25
25	480	14	55	649	29
26	484	14	56	670	35
27	488	14	57	704	49
28	492	14	58	800	69
29	495	14			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.2
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 8
(Form B)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	68	30	498	13
1	285	49	**31**	**502**	**14**
2	320	35	32	506	14
3	341	29	33	509	14
4	356	25	34	513	14
5	369	23	35	517	14
6	379	21	36	521	14
7	388	20	37	525	14
8	396	19	38	529	14
9	403	18	**39**	**534**	**14**
10	410	17	40	538	14
11	416	17	41	542	15
12	421	16	42	547	15
13	427	16	43	552	15
14	432	16	44	556	16
15	437	15	45	562	16
16	442	15	46	567	16
17	446	15	47	573	17
18	451	14	48	579	17
19	455	14	49	586	18
20	459	14	50	593	19
21	463	14	51	601	20
22	467	14	52	610	21
23	471	14	53	620	23
24	**475**	**14**	54	632	26
25	479	14	55	647	29
26	483	14	56	668	35
27	487	14	57	703	49
28	490	13	58	800	69
29	494	13			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.2
Spring 2019 AIMS Raw Score to Scale Score Table
Science Grade 8
(Form C)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	68	30	495	14
1	282	49	31	499	14
2	316	35	**32**	**503**	**14**
3	337	29	33	507	14
4	353	25	34	511	14
5	365	23	35	515	14
6	375	21	36	519	14
7	384	20	37	523	14
8	392	19	38	527	14
9	399	18	39	531	14
10	406	18	**40**	**536**	**15**
11	412	17	41	540	15
12	418	16	42	545	15
13	423	16	43	550	15
14	428	16	44	555	16
15	433	15	45	560	16
16	438	15	46	565	16
17	443	15	47	571	17
18	447	15	48	577	18
19	452	14	49	584	18
20	456	14	50	591	19
21	460	14	51	599	20
22	464	14	52	608	21
23	468	14	53	619	23
24	472	14	54	631	26
25	**476**	**14**	55	646	29
26	480	14	56	667	35
27	484	14	57	702	49
28	488	14	58	800	69
29	492	14			

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.3
Spring 2019 AIMS Raw Score to Scale Score Table
Science High School
(Form A)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	74	33	491	13
1	262	53	34	495	14
2	299	38	35	498	14
3	321	31	**36**	**502**	**14**
4	338	27	37	505	14
5	351	25	38	509	14
6	361	23	39	513	14
7	371	21	40	516	14
8	379	20	41	520	14
9	386	19	42	524	14
10	393	18	43	528	14
11	400	18	44	531	14
12	405	17	45	535	15
13	411	17	**46**	**540**	**15**
14	416	16	47	544	15
15	421	16	48	548	15
16	426	16	49	553	15
17	431	15	50	557	16
18	435	15	51	562	16
19	439	15	52	567	17
20	443	15	53	573	17
21	447	14	54	579	18
22	451	14	55	585	18
23	455	14	56	591	19
24	459	14	57	599	20
25	463	14	58	607	21
26	466	14	59	616	23
27	470	14	60	627	25
28	474	14	61	640	27
29	**477**	**14**	62	656	31
30	481	14	63	678	38
31	484	14	64	715	53
32	488	14	65	800	74

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.3
Spring 2019 AIMS Raw Score to Scale Score Table
Science High School
(Form B)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	74	33	492	14
1	262	53	34	496	14
2	299	38	35	499	14
3	322	31	**36**	**503**	**14**
4	338	27	37	506	14
5	351	25	38	510	14
6	362	23	39	514	14
7	371	21	40	517	14
8	380	20	41	521	14
9	387	19	42	525	14
10	394	18	43	529	14
11	400	18	44	532	14
12	406	17	**45**	**537**	**15**
13	412	17	46	541	15
14	417	16	47	545	15
15	422	16	48	549	15
16	427	16	49	554	15
17	431	15	50	558	16
18	436	15	51	563	16
19	440	15	52	569	17
20	444	15	53	574	17
21	448	14	54	580	18
22	452	14	55	586	18
23	456	14	56	593	19
24	460	14	57	600	20
25	464	14	58	608	21
26	467	14	59	617	23
27	471	14	60	628	25
28	**475**	**14**	61	641	27
29	478	14	62	657	31
30	482	14	63	679	38
31	485	14	64	717	53
32	489	14	65	800	74

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

Table 7.5.2.3
Spring 2019 AIMS Raw Score to Scale Score Table
Science High School
(Form C)

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	200	74	33	495	13
1	267	53	34	499	13
2	305	38	**35**	**502**	**13**
3	327	31	36	506	14
4	343	27	37	509	14
5	356	25	38	513	14
6	367	23	39	516	14
7	376	21	40	520	14
8	384	20	41	524	14
9	391	19	42	527	14
10	398	18	43	531	14
11	404	18	44	535	14
12	410	17	**45**	**539**	**14**
13	416	17	46	543	15
14	421	16	47	547	15
15	426	16	48	552	15
16	430	16	49	556	15
17	435	15	50	561	16
18	439	15	51	566	16
19	444	15	52	571	17
20	448	15	53	576	17
21	452	14	54	582	18
22	456	14	55	588	18
23	459	14	56	595	19
24	463	14	57	602	20
25	467	14	58	611	21
26	471	14	59	620	23
27	474	14	60	630	25
28	**478**	**14**	61	643	27
29	481	14	62	659	31
30	485	14	63	681	38
31	488	13	64	719	53
32	492	13	65	800	74

Note. SEM is the standard error of measurement for the scale score.
Note. Cut scores for Approaches the Standard, Meets the Standard, and Exceeds the Standard are in boldface. The complete list of AIMS Science score cuts and ranges is presented in Table 10.1.1.

PART 8: TEST RESULTS

8.1 Data

Part 8 of this technical report contains information about the results of Spring 2019 AIMS Science in grades 4, 8, and high school. The 1999 AERA/APA/NCME *Standards* addressed in Part 8 include: 1.5, 4.3, 4.5, 4.6, 4.7, 6.5, 7.1, 7.10, 13.15, and 13.19. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this chapter are: 1.10, 5.1, 5.2, 5.3, 5.8, 5.9, 7.2, 7.4, and 12.9.

Results presented below are based on population data contained within the final electronic data files and gone through the same clean-up process as calibration data in Part 7. The results presented in this part of the technical report may differ slightly from final testing results presented on the Arizona Department of Education website due to slight differences in the application of exclusion rules. Official final results typically use more detailed school-level information than is used to conduct research analyses. The results in the following tables are presented as evidence of reliability and validity of the AIMS assessments and should not be used for state accountability purposes.

8.1.1 AIMS State Test Results

The AIMS test results for Science for grades 4, 8, and high school are not on a vertical scale and therefore the scale scores across grades cannot be compared. For each grade, the lowest obtainable scale score (LOSS) on the science tests is 200, and the highest obtainable scale score (HOSS) is 800.

Test results are presented in Tables 8.1.1.2 and 8.1.1.3. For each grade, scale score means and standard deviations as well as the percentages of students in each performance level are reported for the state as a whole and disaggregated into various demographic groups.

In addition to the descriptive statistics presented in Tables 8.1.1.2 and 8.1.1.3, scale score frequency distributions are displayed in Tables 8.1.1.4 through 8.1.1.7. The information for each grade is contained within a separate table. These tables show the scale score, frequency (Freq), cumulative frequency (Cum Freq), percentage (%), and cumulative percentage (Cum %) by form.

Results for AIMS assessments for high school are reported by graduating cohort for Science. Cohort 22 is defined as the group of students that expect to graduate in 2022 and typically includes grade 9 students. Cohort 21 is defined as the group of students that expect to graduate in 2021 and typically includes 10th grade students.

Table 8.1.1.2
Spring 2019 AIMS State Test Results
Science Grades 4 and 8

		Scale Score		% at Performance Level			
	N	M	SD	FFBS	AS	MS	ES
Grade 4							
Total	86160	514.36	46.23	14	27	36	24
Hispanic	39864	500.80	41.42	19	34	34	13
Non-Hispanic	46296	526.05	46.96	9	21	37	33
Race							
White	66659	516.47	46.16	13	26	37	25
Black or African American	5579	498.25	41.32	21	33	34	12
Asian	2729	541.13	47.02	6	14	34	46
American Indian or Alaskan Native	5192	489.46	37.30	25	39	29	7
Native Hawaiian or Other Pacific Islander	422	509.60	43.69	14	31	35	20
Multiple Indication	4478	519.38	45.34	11	24	39	26
Special Program Membership							
English Learner Program	7217	469.02	29.50	45	41	13	1
Special Education	11125	485.51	42.94	34	34	22	9
Low SES	43416	500.18	41.13	19	34	34	13
Migrant	215	474.68	34.30	42	37	17	5
Mode							
Online	86011	514.36	46.23	14	27	36	24
Paper	149	514.05	49.21	18	26	28	28
Grade 8							
Total	86452	511.28	49.30	25	20	23	32
Hispanic	39222	495.90	42.78	33	24	23	19
Non-Hispanic	47230	524.05	50.68	18	16	23	43
Race							
White	67948	513.14	48.84	23	19	24	34
Black or African American	5170	494.67	42.62	35	24	22	19
Asian	2610	552.93	56.79	9	8	18	65
American Indian or Alaskan Native	5493	484.45	37.59	43	27	18	11
Native Hawaiian or Other Pacific Islander	400	509.18	47.55	26	17	27	31
Multiple Indication	4090	514.00	48.31	22	20	24	34
Special Program Membership							
English Learner Program	4768	458.21	27.74	75	17	6	2
Special Education	9332	471.93	38.43	60	20	12	8
Low SES	40983	495.50	42.75	34	24	23	19
Migrant	380	479.56	34.58	46	28	19	7
Mode							
Online	86247	511.28	49.31	25	20	23	32
Paper	205	508.92	42.17	21	20	25	34

Note. FFBS= Falls Far Below the Standard; AS= Approaches the Standard; MS= Meets the Standard; ES= Exceeds the Standard. Students with no valid attempt, invalidation, or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections centers, and students attending state hospital schools are not included in this summary. These results are not final results and are presented here for purposes of addressing reliability and validity. These results should not be used for accountability purposes. Science results are not on a vertical scale.

Table 8.1.1.3
Spring 2019 AIMS State Test Results
Science High School

		Scale Score		% at Performance Level			
	N	M	SD	FFBS	AS	MS	ES
Cohort 21							
Total	36144	481.00	47.70	52	18	17	14
Hispanic	17347	470.62	42.17	61	17	14	8
Non-Hispanic	18797	490.58	50.43	44	18	20	19
Race							
White	28205	483.23	48.06	50	18	18	15
Black or African American	2488	469.32	41.77	63	17	13	7
Asian	854	512.62	59.83	30	14	21	35
American Indian or Alaskan Native	2671	460.82	35.15	71	16	9	3
Native Hawaiian or Other Pacific Islander	155	473.34	43.47	59	20	14	7
Multiple Indication	1337	482.76	45.95	50	19	19	12
Special Program Membership							
English Learner Program	2331	439.60	24.04	93	5	1	0
Special Education	3760	449.44	33.49	83	9	5	3
Low SES	12841	464.87	38.39	66	17	12	5
Migrant	45	444.89	24.65	89	9	2	0
Mode							
Online	36045	481.01	47.72	52	18	17	14
Paper	99	477.71	37.91	53	23	17	7
Cohort 22							
Total	34125	496.53	48.73	37	21	23	20
Hispanic	13254	481.60	42.84	49	22	19	11
Non-Hispanic	20871	506.01	49.86	29	20	25	26
Race							
White	27743	497.54	48.26	35	21	23	21
Black or African American	1842	476.73	41.94	53	23	16	9
Asian	1334	528.05	52.63	16	14	26	43
American Indian or Alaskan Native	1187	470.05	39.02	61	18	15	7
Native Hawaiian or Other Pacific Islander	213	494.85	48.02	37	24	22	16
Multiple Indication	1483	498.41	48.07	34	20	26	19
Special Program Membership							
English Learner Program	901	446.63	28.57	86	10	3	1
Special Education	1891	460.25	39.79	73	13	9	5
Low SES	9665	478.39	40.93	51	22	18	9
Migrant	6	*	*	*	*	*	*
Mode							
Online	34111	496.54	48.72	37	21	23	20
Paper	14	453.43	43.41	79	14	0	7

Note. FFBS= Falls Far Below the Standard; AS= Approaches the Standard; MS= Meets the Standard; ES= Exceeds the Standard. Students with no valid attempt, invalidation, or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections centers, and students attending state hospital schools are not included in this summary. These results are not final results and are presented here for purposes of addressing reliability and validity. These results should not be used for accountability purposes. Science results are not on a vertical scale.

Table 8.1.1.4
Spring 2019 AIMS Frequency Distribution
Science Grade 4
(Form A)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	**28**	**503**	**925**	**3.22**	**12685**	**44.19**
1	293	0	0.00	0	0.00	29	507	955	3.33	13640	47.52
2	328	0	0.00	0	0.00	30	511	923	3.22	14563	50.73
3	349	0	0.00	0	0.00	31	515	1014	3.53	15577	54.27
4	365	2	0.01	2	0.01	32	519	924	3.22	16501	57.48
5	377	4	0.01	6	0.02	33	523	1048	3.65	17549	61.14
6	388	6	0.02	12	0.04	34	528	1012	3.53	18561	64.66
7	397	20	0.07	32	0.11	35	532	874	3.04	19435	67.71
8	405	35	0.12	67	0.23	36	537	1000	3.48	20435	71.19
9	412	62	0.22	129	0.45	37	541	892	3.11	21327	74.30
10	419	121	0.42	250	0.87	38	546	884	3.08	22211	77.38
11	425	169	0.59	419	1.46	**39**	**551**	**881**	**3.07**	**23092**	**80.45**
12	431	276	0.96	695	2.42	40	556	860	3.00	23952	83.44
13	436	357	1.24	1052	3.66	41	561	780	2.72	24732	86.16
14	442	470	1.64	1522	5.30	42	567	674	2.35	25406	88.51
15	447	550	1.92	2072	7.22	43	573	641	2.23	26047	90.74
16	452	609	2.12	2681	9.34	44	579	578	2.01	26625	92.75
17	456	702	2.45	3383	11.79	45	586	528	1.84	27153	94.59
18	461	712	2.48	4095	14.27	46	593	431	1.50	27584	96.09
19	**465**	**790**	**2.75**	**4885**	**17.02**	47	601	339	1.18	27923	97.28
20	470	804	2.80	5689	19.82	48	610	284	0.99	28207	98.27
21	474	774	2.70	6463	22.52	49	621	208	0.72	28415	98.99
22	478	809	2.82	7272	25.33	50	633	140	0.49	28555	99.48
23	482	923	3.22	8195	28.55	51	649	78	0.27	28633	99.75
24	486	864	3.01	9059	31.56	52	670	51	0.18	28684	99.93
25	490	888	3.09	9947	34.65	53	706	18	0.06	28702	99.99
26	495	932	3.25	10879	37.90	54	800	3	0.01	28705	100.00
27	499	881	3.07	11760	40.97						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.4
Spring 2019 AIMS Frequency Distribution
Science Grade 4
(Form B)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	**28**	**502**	**906**	**3.17**	**12457**	**43.56**
1	291	0	0.00	0	0.00	29	506	859	3.00	13316	46.56
2	327	0	0.00	0	0.00	30	510	930	3.25	14246	49.81
3	348	0	0.00	0	0.00	31	514	887	3.10	15133	52.91
4	364	0	0.00	0	0.00	32	519	917	3.21	16050	56.12
5	376	2	0.01	2	0.01	33	523	942	3.29	16992	59.41
6	387	7	0.02	9	0.03	34	527	956	3.34	17948	62.76
7	396	17	0.06	26	0.09	35	531	912	3.19	18860	65.95
8	404	32	0.11	58	0.20	36	536	895	3.13	19755	69.08
9	411	64	0.22	122	0.43	37	541	945	3.30	20700	72.38
10	418	126	0.44	248	0.87	38	545	891	3.12	21591	75.50
11	424	194	0.68	442	1.55	**39**	**550**	**877**	**3.07**	**22468**	**78.56**
12	430	289	1.01	731	2.56	40	555	796	2.78	23264	81.35
13	436	368	1.29	1099	3.84	41	561	830	2.90	24094	84.25
14	441	449	1.57	1548	5.41	42	566	805	2.81	24899	87.06
15	446	574	2.01	2122	7.42	43	572	717	2.51	25616	89.57
16	451	667	2.33	2789	9.75	44	578	652	2.28	26268	91.85
17	455	629	2.20	3418	11.95	45	585	528	1.85	26796	93.70
18	460	722	2.52	4140	14.48	46	593	473	1.65	27269	95.35
19	**465**	**798**	**2.79**	**4938**	**17.27**	47	601	422	1.48	27691	96.83
20	469	804	2.81	5742	20.08	48	610	323	1.13	28014	97.95
21	473	783	2.74	6525	22.82	49	620	249	0.87	28263	98.83
22	477	801	2.80	7326	25.62	50	633	170	0.59	28433	99.42
23	482	828	2.90	8154	28.51	51	648	96	0.34	28529	99.76
24	486	836	2.92	8990	31.43	52	670	41	0.14	28570	99.90
25	490	882	3.08	9872	34.52	53	705	25	0.09	28595	99.99
26	494	802	2.80	10674	37.32	54	800	4	0.01	28599	100.00
27	498	877	3.07	11551	40.39						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.4
Spring 2019 AIMS Frequency Distribution
Science Grade 4
(Form C)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	28	506	974	3.39	13237	46.11
1	295	1	0.00	1	0.00	29	510	964	3.36	14201	49.47
2	331	0	0.00	1	0.00	30	514	975	3.40	15176	52.87
3	352	0	0.00	1	0.00	31	518	944	3.29	16120	56.15
4	368	0	0.00	1	0.00	32	522	995	3.47	17115	59.62
5	380	3	0.01	4	0.01	33	527	987	3.44	18102	63.06
6	391	6	0.02	10	0.03	34	531	937	3.26	19039	66.32
7	400	10	0.03	20	0.07	35	535	893	3.11	19932	69.43
8	408	26	0.09	46	0.16	36	540	911	3.17	20843	72.61
9	415	68	0.24	114	0.40	37	544	932	3.25	21775	75.85
10	422	81	0.28	195	0.68	**38**	**549**	**849**	**2.96**	**22624**	**78.81**
11	428	212	0.74	407	1.42	39	554	780	2.72	23404	81.53
12	434	298	1.04	705	2.46	40	559	796	2.77	24200	84.30
13	439	361	1.26	1066	3.71	41	564	708	2.47	24908	86.77
14	445	466	1.62	1532	5.34	42	570	639	2.23	25547	88.99
15	450	592	2.06	2124	7.40	43	576	628	2.19	26175	91.18
16	455	634	2.21	2758	9.61	44	582	542	1.89	26717	93.07
17	459	736	2.56	3494	12.17	45	589	497	1.73	27214	94.80
18	**464**	**740**	**2.58**	**4234**	**14.75**	46	596	434	1.51	27648	96.31
19	468	844	2.94	5078	17.69	47	604	326	1.14	27974	97.45
20	473	819	2.85	5897	20.54	48	613	284	0.99	28258	98.44
21	477	892	3.11	6789	23.65	49	624	186	0.65	28444	99.08
22	481	829	2.89	7618	26.54	50	636	131	0.46	28575	99.54
23	486	896	3.12	8514	29.66	51	651	76	0.26	28651	99.80
24	490	934	3.25	9448	32.91	52	673	39	0.14	28690	99.94
25	494	966	3.37	10414	36.28	53	708	16	0.06	28706	100.00
26	498	910	3.17	11324	39.45	54	800	1	0.00	28707	100.00
27	**502**	**939**	**3.27**	**12263**	**42.72**						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.4
Spring 2019 AIMS Frequency Distribution
Science Grade 4
(Form D)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	**28**	**502**	**4**	**2.68**	**70**	**46.98**
1	293	0	0.00	0	0.00	29	506	6	4.03	76	51.01
2	328	0	0.00	0	0.00	30	511	6	4.03	82	55.03
3	350	0	0.00	0	0.00	31	515	1	0.67	83	55.70
4	365	0	0.00	0	0.00	32	519	3	2.01	86	57.72
5	377	0	0.00	0	0.00	33	523	3	2.01	89	59.73
6	388	0	0.00	0	0.00	34	527	4	2.68	93	62.42
7	397	0	0.00	0	0.00	35	532	4	2.68	97	65.10
8	405	0	0.00	0	0.00	36	536	4	2.68	101	67.79
9	412	0	0.00	0	0.00	37	541	3	2.01	104	69.80
10	419	0	0.00	0	0.00	38	545	4	2.68	108	72.48
11	425	2	1.34	2	1.34	**39**	**550**	**4**	**2.68**	**112**	**75.17**
12	431	0	0.00	2	1.34	40	555	4	2.68	116	77.85
13	436	1	0.67	3	2.01	41	561	5	3.36	121	81.21
14	442	3	2.01	6	4.03	42	566	3	2.01	124	83.22
15	447	0	0.00	6	4.03	43	572	8	5.37	132	88.59
16	451	5	3.36	11	7.38	44	578	2	1.34	134	89.93
17	456	8	5.37	19	12.75	45	585	3	2.01	137	91.95
18	461	8	5.37	27	18.12	46	592	4	2.68	141	94.63
19	**465**	**3**	**2.01**	**30**	**20.13**	47	600	3	2.01	144	96.64
20	469	9	6.04	39	26.17	48	609	0	0.00	144	96.64
21	474	5	3.36	44	29.53	49	620	2	1.34	146	97.99
22	478	5	3.36	49	32.89	50	632	3	2.01	149	100.00
23	482	1	0.67	50	33.56	51	648	0	0.00	149	100.00
24	486	2	1.34	52	34.90	52	669	0	0.00	149	100.00
25	490	5	3.36	57	38.26	53	705	0	0.00	149	100.00
26	494	5	3.36	62	41.61	54	800	0	0.00	149	100.00
27	498	4	2.68	66	44.30						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.5
Spring 2019 AIMS Frequency Distribution
Science Grade 8
(Form A)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	30	499	829	2.88	12697	44.12
1	286	0	0.00	0	0.00	**31**	**503**	**838**	**2.91**	**13535**	**47.03**
2	320	0	0.00	0	0.00	32	507	881	3.06	14416	50.09
3	341	0	0.00	0	0.00	33	511	857	2.98	15273	53.07
4	357	0	0.00	0	0.00	34	515	805	2.80	16078	55.87
5	369	1	0.00	1	0.00	35	518	851	2.96	16929	58.82
6	379	1	0.00	2	0.01	36	522	837	2.91	17766	61.73
7	388	8	0.03	10	0.03	37	526	810	2.81	18576	64.55
8	396	12	0.04	22	0.08	38	531	858	2.98	19434	67.53
9	403	33	0.11	55	0.19	**39**	**535**	**830**	**2.88**	**20264**	**70.41**
10	410	68	0.24	123	0.43	40	539	776	2.70	21040	73.11
11	416	127	0.44	250	0.87	41	544	799	2.78	21839	75.89
12	422	161	0.56	411	1.43	42	548	793	2.76	22632	78.64
13	427	267	0.93	678	2.36	43	553	746	2.59	23378	81.23
14	433	328	1.14	1006	3.50	44	558	722	2.51	24100	83.74
15	438	434	1.51	1440	5.00	45	563	744	2.59	24844	86.33
16	442	521	1.81	1961	6.81	46	568	650	2.26	25494	88.59
17	447	555	1.93	2516	8.74	47	574	580	2.02	26074	90.60
18	451	661	2.30	3177	11.04	48	580	526	1.83	26600	92.43
19	456	708	2.46	3885	13.50	49	587	481	1.67	27081	94.10
20	460	747	2.60	4632	16.10	50	594	410	1.42	27491	95.52
21	464	759	2.64	5391	18.73	51	602	361	1.25	27852	96.78
22	468	762	2.65	6153	21.38	52	611	268	0.93	28120	97.71
23	472	776	2.70	6929	24.08	53	621	232	0.81	28352	98.52
24	**476**	**873**	**3.03**	**7802**	**27.11**	54	633	201	0.70	28553	99.21
25	480	869	3.02	8671	30.13	55	649	128	0.44	28681	99.66
26	484	825	2.87	9496	33.00	56	670	63	0.22	28744	99.88
27	488	776	2.70	10272	35.69	57	704	30	0.10	28774	99.98
28	492	806	2.80	11078	38.49	58	800	5	0.02	28779	100.00
29	495	790	2.75	11868	41.24						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.6
Spring 2019 AIMS Frequency Distribution
Science Grade 8
(Form B)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	30	498	757	2.64	12542	43.80
1	285	0	0.00	0	0.00	**31**	**502**	**756**	**2.64**	**13298**	**46.44**
2	320	0	0.00	0	0.00	32	506	832	2.91	14130	49.35
3	341	0	0.00	0	0.00	33	509	858	3.00	14988	52.34
4	356	0	0.00	0	0.00	34	513	866	3.02	15854	55.37
5	369	2	0.01	2	0.01	35	517	868	3.03	16722	58.40
6	379	2	0.01	4	0.01	36	521	816	2.85	17538	61.25
7	388	14	0.05	18	0.06	37	525	822	2.87	18360	64.12
8	396	15	0.05	33	0.12	38	529	799	2.79	19159	66.91
9	403	28	0.10	61	0.21	**39**	**534**	**804**	**2.81**	**19963**	**69.72**
10	410	66	0.23	127	0.44	40	538	848	2.96	20811	72.68
11	416	134	0.47	261	0.91	41	542	827	2.89	21638	75.57
12	421	196	0.68	457	1.60	42	547	752	2.63	22390	78.19
13	427	242	0.85	699	2.44	43	552	712	2.49	23102	80.68
14	432	359	1.25	1058	3.69	44	556	760	2.65	23862	83.33
15	437	443	1.55	1501	5.24	45	562	676	2.36	24538	85.70
16	442	563	1.97	2064	7.21	46	567	603	2.11	25141	87.80
17	446	616	2.15	2680	9.36	47	573	595	2.08	25736	89.88
18	451	645	2.25	3325	11.61	48	579	561	1.96	26297	91.84
19	455	701	2.45	4026	14.06	49	586	503	1.76	26800	93.60
20	459	768	2.68	4794	16.74	50	593	413	1.44	27213	95.04
21	463	723	2.52	5517	19.27	51	601	404	1.41	27617	96.45
22	467	746	2.61	6263	21.87	52	610	295	1.03	27912	97.48
23	471	782	2.73	7045	24.60	53	620	246	0.86	28158	98.34
24	**475**	**797**	**2.78**	**7842**	**27.39**	54	632	198	0.69	28356	99.03
25	479	795	2.78	8637	30.16	55	647	150	0.52	28506	99.55
26	483	798	2.79	9435	32.95	56	668	77	0.27	28583	99.82
27	487	768	2.68	10203	35.63	57	703	44	0.15	28627	99.98
28	490	765	2.67	10968	38.30	58	800	7	0.02	28634	100.00
29	494	817	2.85	11785	41.16						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.7
Spring 2019 AIMS Frequency Distribution
Science Grade 8
(Form C)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	30	495	837	2.90	12322	42.73
1	282	0	0.00	0	0.00	31	499	770	2.67	13092	45.40
2	316	0	0.00	0	0.00	**32**	**503**	**856**	**2.97**	**13948**	**48.37**
3	337	0	0.00	0	0.00	33	507	856	2.97	14804	51.34
4	353	1	0.00	1	0.00	34	511	863	2.99	15667	54.34
5	365	1	0.00	2	0.01	35	515	842	2.92	16509	57.26
6	375	2	0.01	4	0.01	36	519	827	2.87	17336	60.12
7	384	2	0.01	6	0.02	37	523	817	2.83	18153	62.96
8	392	27	0.09	33	0.11	38	527	816	2.83	18969	65.79
9	399	36	0.12	69	0.24	39	531	844	2.93	19813	68.71
10	406	50	0.17	119	0.41	**40**	**536**	**812**	**2.82**	**20625**	**71.53**
11	412	111	0.38	230	0.80	41	540	795	2.76	21420	74.29
12	418	151	0.52	381	1.32	42	545	715	2.48	22135	76.77
13	423	203	0.70	584	2.03	43	550	760	2.64	22895	79.40
14	428	297	1.03	881	3.06	44	555	748	2.59	23643	82.00
15	433	391	1.36	1272	4.41	45	560	753	2.61	24396	84.61
16	438	447	1.55	1719	5.96	46	565	670	2.32	25066	86.93
17	443	549	1.90	2268	7.87	47	571	602	2.09	25668	89.02
18	447	610	2.12	2878	9.98	48	577	592	2.05	26260	91.07
19	452	670	2.32	3548	12.30	49	584	520	1.80	26780	92.88
20	456	723	2.51	4271	14.81	50	591	482	1.67	27262	94.55
21	460	740	2.57	5011	17.38	51	599	393	1.36	27655	95.91
22	464	793	2.75	5804	20.13	52	608	347	1.20	28002	97.11
23	468	777	2.69	6581	22.82	53	619	261	0.91	28263	98.02
24	472	789	2.74	7370	25.56	54	631	238	0.83	28501	98.85
25	**476**	**879**	**3.05**	**8249**	**28.61**	55	646	169	0.59	28670	99.43
26	480	818	2.84	9067	31.45	56	667	104	0.36	28774	99.79
27	484	839	2.91	9906	34.36	57	702	44	0.15	28818	99.94
28	488	794	2.75	10700	37.11	58	800	16	0.06	28834	100.00
29	492	785	2.72	11485	39.83						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.8
Spring 2019 AIMS Frequency Distribution
Science Grade 8
(Form D)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	30	497	7	3.41	85	41.46
1	283	0	0.00	0	0.00	**31**	**500**	**9**	**4.39**	**94**	**45.85**
2	318	0	0.00	0	0.00	32	504	6	2.93	100	48.78
3	339	0	0.00	0	0.00	33	508	5	2.44	105	51.22
4	354	0	0.00	0	0.00	34	512	8	3.90	113	55.12
5	367	0	0.00	0	0.00	35	516	6	2.93	119	58.05
6	377	0	0.00	0	0.00	36	520	7	3.41	126	61.46
7	386	0	0.00	0	0.00	37	524	5	2.44	131	63.90
8	394	0	0.00	0	0.00	38	528	5	2.44	136	66.34
9	401	0	0.00	0	0.00	**39**	**532**	**12**	**5.85**	**148**	**72.20**
10	408	1	0.49	1	0.49	40	537	6	2.93	154	75.12
11	414	0	0.00	1	0.49	41	541	5	2.44	159	77.56
12	419	1	0.49	2	0.98	42	546	10	4.88	169	82.44
13	425	1	0.49	3	1.46	43	551	7	3.41	176	85.85
14	430	2	0.98	5	2.44	44	556	3	1.46	179	87.32
15	435	6	2.93	11	5.37	45	561	5	2.44	184	89.76
16	440	0	0.00	11	5.37	46	566	5	2.44	189	92.20
17	444	1	0.49	12	5.85	47	572	4	1.95	193	94.15
18	449	3	1.46	15	7.32	48	578	2	0.98	195	95.12
19	453	6	2.93	21	10.24	49	585	3	1.46	198	96.59
20	457	6	2.93	27	13.17	50	592	3	1.46	201	98.05
21	462	4	1.95	31	15.12	51	600	1	0.49	202	98.54
22	466	5	2.44	36	17.56	52	609	2	0.98	204	99.51
23	470	8	3.90	44	21.46	53	619	1	0.49	205	100.00
24	**474**	**2**	**0.98**	**46**	**22.44**	54	631	0	0.00	205	100.00
25	477	7	3.41	53	25.85	55	647	0	0.00	205	100.00
26	481	11	5.37	64	31.22	56	668	0	0.00	205	100.00
27	485	4	1.95	68	33.17	57	702	0	0.00	205	100.00
28	489	2	0.98	70	34.15	58	800	0	0.00	205	100.00
29	493	8	3.90	78	38.05						

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.9
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 21
(Form A)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	33	491	273	2.26	7803	64.72
1	262	2	0.02	2	0.02	34	495	246	2.04	8049	66.76
2	299	2	0.02	4	0.03	35	498	262	2.17	8311	68.93
3	321	2	0.02	6	0.05	**36**	**502**	**280**	**2.32**	**8591**	**71.25**
4	338	0	0.00	6	0.05	37	505	243	2.02	8834	73.27
5	351	1	0.01	7	0.06	38	509	248	2.06	9082	75.33
6	361	1	0.01	8	0.07	39	513	212	1.76	9294	77.08
7	371	6	0.05	14	0.12	40	516	248	2.06	9542	79.14
8	379	12	0.10	26	0.22	41	520	201	1.67	9743	80.81
9	386	12	0.10	38	0.32	42	524	208	1.73	9951	82.53
10	393	30	0.25	68	0.56	43	528	208	1.73	10159	84.26
11	400	55	0.46	123	1.02	44	531	168	1.39	10327	85.65
12	405	108	0.90	231	1.92	45	535	182	1.51	10509	87.16
13	411	153	1.27	384	3.18	**46**	**540**	**184**	**1.53**	**10693**	**88.69**
14	416	201	1.67	585	4.85	47	544	146	1.21	10839	89.90
15	421	290	2.41	875	7.26	48	548	152	1.26	10991	91.16
16	426	376	3.12	1251	10.38	49	553	139	1.15	11130	92.31
17	431	442	3.67	1693	14.04	50	557	133	1.10	11263	93.41
18	435	463	3.84	2156	17.88	51	562	121	1.00	11384	94.42
19	439	487	4.04	2643	21.92	52	567	107	0.89	11491	95.31
20	443	437	3.62	3080	25.55	53	573	119	0.99	11610	96.29
21	447	489	4.06	3569	29.60	54	579	79	0.66	11689	96.95
22	451	429	3.56	3998	33.16	55	585	66	0.55	11755	97.50
23	455	415	3.44	4413	36.60	56	591	59	0.49	11814	97.98
24	459	428	3.55	4841	40.15	57	599	70	0.58	11884	98.57
25	463	360	2.99	5201	43.14	58	607	48	0.40	11932	98.96
26	466	382	3.17	5583	46.31	59	616	52	0.43	11984	99.39
27	470	369	3.06	5952	49.37	60	627	36	0.30	12020	99.69
28	474	327	2.71	6279	52.08	61	640	16	0.13	12036	99.83
29	**477**	**331**	**2.75**	**6610**	**54.82**	62	656	13	0.11	12049	99.93
30	481	325	2.70	6935	57.52	63	678	4	0.03	12053	99.97
31	484	305	2.53	7240	60.05	64	715	4	0.03	12057	100.00
32	488	290	2.41	7530	62.45	65	800	0	0.00	12057	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.10
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 21
(Form B)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	33	492	299	2.47	8066	66.57
1	262	0	0.00	0	0.00	34	496	245	2.02	8311	68.60
2	299	1	0.01	1	0.01	35	499	216	1.78	8527	70.38
3	322	0	0.00	1	0.01	**36**	**503**	**234**	**1.93**	**8761**	**72.31**
4	338	3	0.02	4	0.03	37	506	255	2.10	9016	74.41
5	351	1	0.01	5	0.04	38	510	217	1.79	9233	76.21
6	362	3	0.02	8	0.07	39	514	219	1.81	9452	78.01
7	371	4	0.03	12	0.10	40	517	219	1.81	9671	79.82
8	380	8	0.07	20	0.17	41	521	223	1.84	9894	81.66
9	387	21	0.17	41	0.34	42	525	180	1.49	10074	83.15
10	394	47	0.39	88	0.73	43	529	196	1.62	10270	84.76
11	400	58	0.48	146	1.21	44	532	164	1.35	10434	86.12
12	406	88	0.73	234	1.93	**45**	**537**	**183**	**1.51**	**10617**	**87.63**
13	412	181	1.49	415	3.43	46	541	157	1.30	10774	88.92
14	417	225	1.86	640	5.28	47	545	143	1.18	10917	90.10
15	422	297	2.45	937	7.73	48	549	126	1.04	11043	91.14
16	427	371	3.06	1308	10.80	49	554	126	1.04	11169	92.18
17	431	403	3.33	1711	14.12	50	558	121	1.00	11290	93.18
18	436	456	3.76	2167	17.89	51	563	124	1.02	11414	94.21
19	440	445	3.67	2612	21.56	52	569	104	0.86	11518	95.06
20	444	492	4.06	3104	25.62	53	574	98	0.81	11616	95.87
21	448	521	4.30	3625	29.92	54	580	111	0.92	11727	96.79
22	452	460	3.80	4085	33.72	55	586	84	0.69	11811	97.48
23	456	477	3.94	4562	37.65	56	593	88	0.73	11899	98.21
24	460	422	3.48	4984	41.14	57	600	71	0.59	11970	98.79
25	464	388	3.20	5372	44.34	58	608	41	0.34	12011	99.13
26	467	396	3.27	5768	47.61	59	617	34	0.28	12045	99.41
27	471	366	3.02	6134	50.63	60	628	28	0.23	12073	99.65
28	**475**	**371**	**3.06**	**6505**	**53.69**	61	641	18	0.15	12091	99.79
29	478	351	2.90	6856	56.59	62	657	12	0.10	12103	99.89
30	482	301	2.48	7157	59.07	63	679	6	0.05	12109	99.94
31	485	304	2.51	7461	61.58	64	717	7	0.06	12116	100.00
32	489	306	2.53	7767	64.11	65	800	0	0.00	12116	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.11
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 21
(Form C)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	1	0.01	1	0.01	33	495	245	2.06	7977	67.19
1	267	1	0.01	2	0.02	34	499	232	1.95	8209	69.15
2	305	0	0.00	2	0.02	**35**	**502**	**248**	**2.09**	**8457**	**71.23**
3	327	1	0.01	3	0.03	36	506	250	2.11	8707	73.34
4	343	0	0.00	3	0.03	37	509	217	1.83	8924	75.17
5	356	1	0.01	4	0.03	38	513	211	1.78	9135	76.95
6	367	1	0.01	5	0.04	39	516	193	1.63	9328	78.57
7	376	5	0.04	10	0.08	40	520	214	1.80	9542	80.37
8	384	11	0.09	21	0.18	41	524	188	1.58	9730	81.96
9	391	31	0.26	52	0.44	42	527	157	1.32	9887	83.28
10	398	37	0.31	89	0.75	43	531	175	1.47	10062	84.75
11	404	93	0.78	182	1.53	44	535	165	1.39	10227	86.14
12	410	146	1.23	328	2.76	**45**	**539**	**143**	**1.20**	**10370**	**87.35**
13	416	214	1.80	542	4.57	46	543	166	1.40	10536	88.75
14	421	285	2.40	827	6.97	47	547	142	1.20	10678	89.94
15	426	325	2.74	1152	9.70	48	552	136	1.15	10814	91.09
16	430	398	3.35	1550	13.06	49	556	138	1.16	10952	92.25
17	435	427	3.60	1977	16.65	50	561	92	0.77	11044	93.03
18	439	503	4.24	2480	20.89	51	566	117	0.99	11161	94.01
19	444	505	4.25	2985	25.14	52	571	99	0.83	11260	94.85
20	448	498	4.19	3483	29.34	53	576	87	0.73	11347	95.58
21	452	478	4.03	3961	33.36	54	582	95	0.80	11442	96.38
22	456	431	3.63	4392	36.99	55	588	83	0.70	11525	97.08
23	459	433	3.65	4825	40.64	56	595	74	0.62	11599	97.70
24	463	421	3.55	5246	44.19	57	602	64	0.54	11663	98.24
25	467	379	3.19	5625	47.38	58	611	69	0.58	11732	98.82
26	471	344	2.90	5969	50.28	59	620	42	0.35	11774	99.17
27	474	323	2.72	6292	53.00	60	630	34	0.29	11808	99.46
28	**478**	**309**	**2.60**	**6601**	**55.60**	61	643	28	0.24	11836	99.70
29	481	313	2.64	6914	58.24	62	659	16	0.13	11852	99.83
30	485	277	2.33	7191	60.57	63	681	15	0.13	11867	99.96
31	488	259	2.18	7450	62.75	64	719	4	0.03	11871	99.99
32	492	282	2.38	7732	65.13	65	800	1	0.01	11872	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.12
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 21
(Form D)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	33	493	4	4.04	73	73.74
1	263	0	0.00	0	0.00	34	497	2	2.02	75	75.76
2	300	0	0.00	0	0.00	**35**	**500**	**2**	**2.02**	**77**	**77.78**
3	323	0	0.00	0	0.00	36	504	3	3.03	80	80.81
4	339	0	0.00	0	0.00	37	508	4	4.04	84	84.85
5	352	0	0.00	0	0.00	38	511	2	2.02	86	86.87
6	363	0	0.00	0	0.00	39	515	1	1.01	87	87.88
7	372	0	0.00	0	0.00	40	518	1	1.01	88	88.89
8	381	0	0.00	0	0.00	41	522	1	1.01	89	89.90
9	388	0	0.00	0	0.00	42	526	0	0.00	89	89.90
10	395	1	1.01	1	1.01	43	530	1	1.01	90	90.91
11	401	1	1.01	2	2.02	44	534	2	2.02	92	92.93
12	407	0	0.00	2	2.02	**45**	**538**	**1**	**1.01**	**93**	**93.94**
13	413	0	0.00	2	2.02	46	542	1	1.01	94	94.95
14	418	0	0.00	2	2.02	47	546	0	0.00	94	94.95
15	423	0	0.00	2	2.02	48	550	1	1.01	95	95.96
16	428	2	2.02	4	4.04	49	555	0	0.00	95	95.96
17	432	3	3.03	7	7.07	50	560	0	0.00	95	95.96
18	437	4	4.04	11	11.11	51	565	2	2.02	97	97.98
19	441	3	3.03	14	14.14	52	570	0	0.00	97	97.98
20	445	7	7.07	21	21.21	53	575	0	0.00	97	97.98
21	449	2	2.02	23	23.23	54	581	0	0.00	97	97.98
22	453	6	6.06	29	29.29	55	587	0	0.00	97	97.98
23	457	4	4.04	33	33.33	56	594	0	0.00	97	97.98
24	461	3	3.03	36	36.36	57	601	1	1.01	98	98.99
25	465	7	7.07	43	43.43	58	609	0	0.00	98	98.99
26	468	7	7.07	50	50.51	59	619	1	1.01	99	100.00
27	472	2	2.02	52	52.53	60	629	0	0.00	99	100.00
28	**476**	**8**	**8.08**	**60**	**60.61**	61	642	0	0.00	99	100.00
29	479	1	1.01	61	61.62	62	658	0	0.00	99	100.00
30	483	1	1.01	62	62.63	63	680	0	0.00	99	100.00
31	486	2	2.02	64	64.65	64	718	0	0.00	99	100.00
32	490	5	5.05	69	69.70	65	800	0	0.00	99	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.13
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 22
(Form A)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	33	491	287	2.52	5735	50.29
1	262	0	0.00	0	0.00	34	495	342	3.00	6077	53.29
2	299	1	0.01	1	0.01	35	498	306	2.68	6383	55.97
3	321	1	0.01	2	0.02	**36**	**502**	**320**	**2.81**	**6703**	**58.78**
4	338	0	0.00	2	0.02	37	505	292	2.56	6995	61.34
5	351	3	0.03	5	0.04	38	509	289	2.53	7284	63.87
6	361	3	0.03	8	0.07	39	513	297	2.60	7581	66.48
7	371	2	0.02	10	0.09	40	516	293	2.57	7874	69.05
8	379	3	0.03	13	0.11	41	520	284	2.49	8158	71.54
9	386	3	0.03	16	0.14	42	524	280	2.46	8438	73.99
10	393	17	0.15	33	0.29	43	528	256	2.24	8694	76.24
11	400	23	0.20	56	0.49	44	531	227	1.99	8921	78.23
12	405	46	0.40	102	0.89	45	535	261	2.29	9182	80.52
13	411	77	0.68	179	1.57	**46**	**540**	**207**	**1.82**	**9389**	**82.33**
14	416	105	0.92	284	2.49	47	544	208	1.82	9597	84.15
15	421	107	0.94	391	3.43	48	548	218	1.91	9815	86.07
16	426	164	1.44	555	4.87	49	553	188	1.65	10003	87.71
17	431	221	1.94	776	6.80	50	557	188	1.65	10191	89.36
18	435	253	2.22	1029	9.02	51	562	183	1.60	10374	90.97
19	439	255	2.24	1284	11.26	52	567	167	1.46	10541	92.43
20	443	265	2.32	1549	13.58	53	573	155	1.36	10696	93.79
21	447	330	2.89	1879	16.48	54	579	120	1.05	10816	94.84
22	451	363	3.18	2242	19.66	55	585	116	1.02	10932	95.86
23	455	310	2.72	2552	22.38	56	591	115	1.01	11047	96.87
24	459	312	2.74	2864	25.11	57	599	96	0.84	11143	97.71
25	463	303	2.66	3167	27.77	58	607	75	0.66	11218	98.37
26	466	344	3.02	3511	30.79	59	616	56	0.49	11274	98.86
27	470	307	2.69	3818	33.48	60	627	41	0.36	11315	99.22
28	474	299	2.62	4117	36.10	61	640	47	0.41	11362	99.63
29	**477**	**328**	**2.88**	**4445**	**38.98**	62	656	21	0.18	11383	99.82
30	481	335	2.94	4780	41.92	63	678	15	0.13	11398	99.95
31	484	333	2.92	5113	44.84	64	715	6	0.05	11404	100.00
32	488	335	2.94	5448	47.77	65	800	0	0.00	11404	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.14
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 22
(Form B)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	2	0.02	2	0.02	33	492	336	2.97	5994	52.99
1	262	1	0.01	3	0.03	34	496	331	2.93	6325	55.92
2	299	1	0.01	4	0.04	35	499	295	2.61	6620	58.53
3	322	0	0.00	4	0.04	**36**	**503**	**306**	**2.71**	**6926**	**61.23**
4	338	0	0.00	4	0.04	37	506	293	2.59	7219	63.82
5	351	0	0.00	4	0.04	38	510	311	2.75	7530	66.57
6	362	1	0.01	5	0.04	39	514	258	2.28	7788	68.85
7	371	4	0.04	9	0.08	40	517	259	2.29	8047	71.14
8	380	3	0.03	12	0.11	41	521	248	2.19	8295	73.34
9	387	8	0.07	20	0.18	42	525	244	2.16	8539	75.49
10	394	20	0.18	40	0.35	43	529	222	1.96	8761	77.46
11	400	31	0.27	71	0.63	44	532	210	1.86	8971	79.31
12	406	54	0.48	125	1.11	**45**	**537**	**231**	**2.04**	**9202**	**81.35**
13	412	80	0.71	205	1.81	46	541	208	1.84	9410	83.19
14	417	115	1.02	320	2.83	47	545	198	1.75	9608	84.94
15	422	136	1.20	456	4.03	48	549	197	1.74	9805	86.69
16	427	174	1.54	630	5.57	49	554	187	1.65	9992	88.34
17	431	244	2.16	874	7.73	50	558	189	1.67	10181	90.01
18	436	254	2.25	1128	9.97	51	563	147	1.30	10328	91.31
19	440	290	2.56	1418	12.54	52	569	149	1.32	10477	92.63
20	444	273	2.41	1691	14.95	53	574	146	1.29	10623	93.92
21	448	328	2.90	2019	17.85	54	580	133	1.18	10756	95.09
22	452	297	2.63	2316	20.48	55	586	116	1.03	10872	96.12
23	456	345	3.05	2661	23.53	56	593	98	0.87	10970	96.99
24	460	367	3.24	3028	26.77	57	600	80	0.71	11050	97.69
25	464	333	2.94	3361	29.71	58	608	76	0.67	11126	98.36
26	467	359	3.17	3720	32.89	59	617	64	0.57	11190	98.93
27	471	329	2.91	4049	35.80	60	628	35	0.31	11225	99.24
28	**475**	**313**	**2.77**	**4362**	**38.56**	61	641	37	0.33	11262	99.57
29	478	343	3.03	4705	41.60	62	657	27	0.24	11289	99.81
30	482	333	2.94	5038	44.54	63	679	19	0.17	11308	99.97
31	485	313	2.77	5351	47.31	64	717	2	0.02	11310	99.99
32	489	307	2.71	5658	50.02	65	800	1	0.01	11311	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.15
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 22
(Form C)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	1	0.01	1	0.01	33	495	275	2.41	6210	54.49
1	267	0	0.00	1	0.01	34	499	276	2.42	6486	56.91
2	305	0	0.00	1	0.01	**35**	**502**	**309**	**2.71**	**6795**	**59.63**
3	327	1	0.01	2	0.02	36	506	255	2.24	7050	61.86
4	343	0	0.00	2	0.02	37	509	260	2.28	7310	64.15
5	356	2	0.02	4	0.04	38	513	241	2.11	7551	66.26
6	367	2	0.02	6	0.05	39	516	276	2.42	7827	68.68
7	376	4	0.04	10	0.09	40	520	267	2.34	8094	71.02
8	384	5	0.04	15	0.13	41	524	263	2.31	8357	73.33
9	391	8	0.07	23	0.20	42	527	221	1.94	8578	75.27
10	398	25	0.22	48	0.42	43	531	250	2.19	8828	77.47
11	404	48	0.42	96	0.84	44	535	233	2.04	9061	79.51
12	410	67	0.59	163	1.43	**45**	**539**	**215**	**1.89**	**9276**	**81.40**
13	416	101	0.89	264	2.32	46	543	222	1.95	9498	83.35
14	421	117	1.03	381	3.34	47	547	194	1.70	9692	85.05
15	426	160	1.40	541	4.75	48	552	197	1.73	9889	86.78
16	430	211	1.85	752	6.60	49	556	150	1.32	10039	88.09
17	435	261	2.29	1013	8.89	50	561	174	1.53	10213	89.62
18	439	287	2.52	1300	11.41	51	566	176	1.54	10389	91.16
19	444	329	2.89	1629	14.29	52	571	155	1.36	10544	92.52
20	448	330	2.90	1959	17.19	53	576	142	1.25	10686	93.77
21	452	332	2.91	2291	20.10	54	582	141	1.24	10827	95.01
22	456	353	3.10	2644	23.20	55	588	121	1.06	10948	96.07
23	459	349	3.06	2993	26.26	56	595	103	0.90	11051	96.97
24	463	347	3.04	3340	29.31	57	602	83	0.73	11134	97.70
25	467	341	2.99	3681	32.30	58	611	66	0.58	11200	98.28
26	471	307	2.69	3988	34.99	59	620	56	0.49	11256	98.77
27	474	326	2.86	4314	37.86	60	630	43	0.38	11299	99.15
28	**478**	**334**	**2.93**	**4648**	**40.79**	61	643	32	0.28	11331	99.43
29	481	320	2.81	4968	43.59	62	659	29	0.25	11360	99.68
30	485	299	2.62	5267	46.22	63	681	27	0.24	11387	99.92
31	488	352	3.09	5619	49.31	64	719	5	0.04	11392	99.96
32	492	316	2.77	5935	52.08	65	800	4	0.04	11396	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

Table 8.1.1.16
Spring 2019 AIMS Frequency Distribution
Science High School Cohort 22
(Form D)

Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %	Raw Score	Scale Score	Freq	%	Cum. Freq.	Cum. %
0	200	0	0.00	0	0.00	33	493	0	0.00	13	92.86
1	263	0	0.00	0	0.00	34	497	0	0.00	13	92.86
2	300	0	0.00	0	0.00	**35**	**500**	**0**	**0.00**	**13**	**92.86**
3	323	0	0.00	0	0.00	36	504	0	0.00	13	92.86
4	339	0	0.00	0	0.00	37	508	0	0.00	13	92.86
5	352	0	0.00	0	0.00	38	511	0	0.00	13	92.86
6	363	0	0.00	0	0.00	39	515	0	0.00	13	92.86
7	372	0	0.00	0	0.00	40	518	0	0.00	13	92.86
8	381	0	0.00	0	0.00	41	522	0	0.00	13	92.86
9	388	0	0.00	0	0.00	42	526	0	0.00	13	92.86
10	395	1	7.14	1	7.14	43	530	0	0.00	13	92.86
11	401	0	0.00	1	7.14	44	534	0	0.00	13	92.86
12	407	0	0.00	1	7.14	**45**	**538**	**0**	**0.00**	**13**	**92.86**
13	413	0	0.00	1	7.14	46	542	0	0.00	13	92.86
14	418	1	7.14	2	14.29	47	546	0	0.00	13	92.86
15	423	2	14.29	4	28.57	48	550	0	0.00	13	92.86
16	428	1	7.14	5	35.71	49	555	0	0.00	13	92.86
17	432	1	7.14	6	42.86	50	560	0	0.00	13	92.86
18	437	0	0.00	6	42.86	51	565	0	0.00	13	92.86
19	441	0	0.00	6	42.86	52	570	0	0.00	13	92.86
20	445	1	7.14	7	50.00	53	575	1	7.14	14	100.00
21	449	1	7.14	8	57.14	54	581	0	0.00	14	100.00
22	453	0	0.00	8	57.14	55	587	0	0.00	14	100.00
23	457	0	0.00	8	57.14	56	594	0	0.00	14	100.00
24	461	1	7.14	9	64.29	57	601	0	0.00	14	100.00
25	465	0	0.00	9	64.29	58	609	0	0.00	14	100.00
26	468	1	7.14	10	71.43	59	619	0	0.00	14	100.00
27	472	1	7.14	11	78.57	60	629	0	0.00	14	100.00
28	**476**	**1**	**7.14**	**12**	**85.71**	61	642	0	0.00	14	100.00
29	479	0	0.00	12	85.71	62	658	0	0.00	14	100.00
30	483	1	7.14	13	92.86	63	680	0	0.00	14	100.00
31	486	0	0.00	13	92.86	64	718	0	0.00	14	100.00
32	490	0	0.00	13	92.86	65	800	0	0.00	14	100.00

Note: Freq. = Frequency, Cum = Cumulative. Students with no valid attempt, invalidation or off-grade are not included in this summary. In addition, home-schooled students, students attending Bureau of Indian Affairs schools, students attending juvenile corrections facilities, and students attending hospital schools are not included in this summary.

8.2 Longitudinal Data

The Spring 2008 administration represents the baseline year for the AIMS Science assessment as a standard setting meeting was held after the administration. In this section, the Spring 2019 results are presented along with results back to 2008 to provide longitudinal information. Tables 8.2.1 and 8.2.2 include scale score descriptive statistics, mean scale score (M) and standard deviation (SD), as well as the scale score values at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentile ranking (P10 – P90) and the percentage of students scoring within each performance level for the AIMS Science administration from each year. Caution should be taken when interpreting year-to-year or grade-to-grade comparisons, as slight differences in exclusion rules, changes in the manner in which accommodations were identified, and changes in the manner in which high school results were separated may result in different student population characteristics reported in these tables.

Table 8.2.1
Longitudinal Comparison of Scale Scores in Science

			Scale Score		Percentiles				
Grade	Year	N	M	SD	P10	P25	P50	P75	P90
4	2008	80296	501.8	50.2	436	466	503	536	567
	2009	81724	508.2	50.5	443	475	508	540	567
	2010	80982	513.8	52.7	446	478	515	547	583
	2011	81934	534.8	61.7	455	492	536	575	615
	2012	81892	518.9	57.6	448	478	514	554	589
	2013	83028	513.4	51.9	445	477	511	549	581
	2014	83408	513.5	46.6	457	480	510	546	574
	2015	84113	513.8	46.5	452	479	512	547	573
	2016	85917	514.4	47.6	451	478	515	550	578
	2017	87350	515.0	46.8	455	481	514	549	576
	2018	88586	513.8	46.2	455	478	510	545	576
	2019	86160	514.4	46.2	455	481	511	545	576
8	2008	79482	500.6	50.0	435	463	498	534	568
	2009	78703	506.4	50.0	439	471	506	539	571
	2010	79293	510.4	51.5	446	473	508	545	578
	2011	79409	517.7	47.6	454	484	521	551	578
	2012	80019	519.3	47.9	456	487	521	553	581
	2013	81485	516.7	43.1	459	486	518	544	571
	2014	82470	516.7	45.7	459	483	516	546	573
	2015	82248	513.0	48.1	454	479	509	547	573
	2016	82475	512.6	48.8	449	477	512	546	578
	2017	83398	514.0	50.9	451	475	510	549	577
	2018	84940	512.2	49.4	451	476	509	545	577
	2019	86452	511.3	49.3	451	475	507	544	577
HS	2008 (Cohort 10)	45286	477.3	50.1	414	440	475	510	543
	2009 (Cohort 11)	51195	475.8	49.7	410	439	477	508	541
	2010(Cohort 12)	53671	479.1	51.8	414	442	474	512	545
	2011(Cohort 13)	54610	484.6	58.3	407	443	484	524	559
	2011(Cohort 14)	19392	523.7	58.8	446	488	524	559	596
	2012(Cohort 14)	53344	487.0	62.6	403	441	487	528	569
	2012(Cohort 15)	21142	526.3	65.4	441	487	528	569	603
	2013(Cohort 15)	52650	485.7	56.0	414	442	482	521	562
	2013(Cohort 16)	24094	517.3	59.0	438	475	517	556	591
	2014(Cohort 16)	50096	487.2	52.9	421	448	484	522	555
	2014(Cohort 17)	26254	514.5	53.0	445	477	514	550	582
	2015(Cohort 17)	50975	484.2	44.7	432	453	479	514	546
	2015(Cohort 18)	29063	504.2	49.3	441	468	500	537	569
	2016(Cohort 18)	46427	482.2	44.2	432	449	476	508	542
	2016(Cohort 19)	33922	499.4	48.4	441	465	493	530	565
	2017(Cohort 19)	44191	483.3	47.0	430	448	474	509	547
	2017(Cohort 20)	36104	498.9	49.7	439	459	495	531	566
	2018(Cohort 20)	46096	479.1	46.5	427	444	471	506	543
	2018(Cohort 21)	38694	499.1	49.5	439	463	495	531	566
	2019(Cohort 21)	36144	481.0	47.7	427	444	471	510	548
	2019(Cohort 22)	34125	496.5	48.7	439	460	492	528	562

Note: Students without a valid attempt, invalidation, off-grade, a non-standard accommodation (not in 2008), home-schooled students, attending Bureau of Indian Affairs schools, attending juvenile corrections centers (not in 2005), and attending state hospital schools (not in 2005) are not included in this summary. These results are not final results and are presented here for purposes of addressing reliability and validity. Caution should be used when interpreting results

across years, as exclusion rules differ slightly and high school identification of grade versus cohort may result in different student population characteristics.

Table 8.2.2
Longitudinal Comparison of Performance Level Distribution in Science

			% at Performance Level			
Grade	Year	N	FFBS	AS	MS	ES
4	2008	80296	22	25	35	18
	2009	81724	17	26	36	21
	2010	80982	17	22	33	28
	2011	81934	12	17	29	43
	2012	81892	16	21	31	32
	2013	83028	17	25	32	26
	2014	83408	12	29	36	22
	2015	84113	13	29	32	26
	2016	85917	15	25	34	25
	2017	87350	13	27	35	25
	2018	88586	14	27	35	24
	2019	86160	14	27	36	24
8	2008	79482	31	20	22	28
	2009	78703	26	19	23	32
	2010	79293	23	18	25	34
	2011	79409	17	17	27	39
	2012	80019	18	15	28	40
	2013	81485	16	18	29	37
	2014	82470	18	20	24	38
	2015	82248	22	20	24	34
	2016	82475	22	19	25	35
	2017	83398	23	19	24	34
	2018	84940	24	20	23	33
	2019	86452	25	20	23	32
HS	2008 (Cohort 10)	45286	49	19	20	12
	2009 (Cohort 11)	51195	50	18	22	11
	2010 (Cohort 12)	53671	50	16	21	14
	2011 (Cohort 13)	54610	43	15	23	18
	2011 (Cohort 14)	19392	19	12	27	41
	2012(Cohort 14)	53344	41	17	21	21
	2012(Cohort 15)	21142	20	14	23	43
	2013(Cohort 15)	52650	44	17	21	18
	2013(Cohort 16)	24094	23	15	25	36
	2014(Cohort 16)	50096	44	17	21	18
	2014(Cohort 17)	26254	24	16	27	33
	2015(Cohort 17)	50975	45	20	21	14
	2015(Cohort 18)	29063	29	19	26	26
	2016(Cohort 18)	46427	48	20	19	12
	2016(Cohort 19)	33922	33	20	25	22
	2017(Cohort 19)	44191	50	18	18	13
	2017(Cohort 20)	36104	36	19	23	22
	2018(Cohort 20)	46096	53	18	17	12
	2018(Cohort 21)	38694	35	20	23	22
	2019(Cohort 21)	36144	52	18	17	14
	2019(Cohort 22)	34125	37	21	23	20

Note: Students without a valid attempt, invalidation, off-grade, a non-standard accommodation (not in 2008), home-schooled students, attending Bureau of Indian Affairs schools, attending juvenile corrections centers (not in 2005), and attending state hospital schools (not in 2005) are not included in this summary. These results are not final results and are presented here for purposes of addressing reliability and validity. Caution should be used when interpreting results

across years, as exclusion rules differ slightly and high school identification of grade versus cohort may result in different student population characteristics.

PART 9: VALIDITY EVIDENCE

Part 9 of the technical report provides evidence supporting the reliability and validity of the 2018 AIMS Science assessments in grades 4, 8, and high school. All data presented in this section were computed using population test data available in the final electronic data files gone through the same clean-up process as the calibration data in Part 7. The following AERA/APA/NCME *Standards* from the 1999 edition are addressed: 1.5, 1.7, 2.1, 2.4, 2.10, 2.11, 2.13, 3.16, 4.15, 6.5, 7.1, 7.3, and 7.10. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this chapter are: 1.8, 1.9, 2.3, 2.7, 2.8, 2.19, 3.3, 3.6, 4.4, 5.19 and 7.4.

9.1 Reliability

AERA/APA/NCME *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999, p. 25) refer to reliability as the "consistency of [a measure] when the testing procedure is repeated on a population of individuals or groups". The 2014 edition of AERA/APA/NCME *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014, p. 33) indicates that "The term *reliability* has been used in two ways in the measurement literature. First, the term has been used to refer to the reliability coefficients of classical test theory, defined as the correlation between scores on two equivalent forms of the test, presuming that taking one form has no effect on performance on the second form. Second, the term has been used in a more general sense, to refer to the consistency of scores across replications of a testing procedure, regardless of how this consistency is estimated or reported (e.g., in terms of standard errors, reliability coefficients per se, generalizability coefficient, error/tolerance ratios, item response theory (IRT) information functions, or various indices of classification consistency)".

A reliable test produces stable scores; that is, very similar score distributions would result if the test were administered repeatedly under similar conditions to the same students without memory or fatigue affecting the scores. Reliability of the Spring 2018 AIMS Science assessments is an estimate of its internal consistency and presented in this chapter as Spring 2019 online forms are intact and pre-equated from Spring 2018. Note that for a special paper version, which is an intact and pre-equated form from Spring 2016, please refer to the 2016 technical report for the statistics.

9.1.1 Measures of Internal Consistency

For tests consisting of only constructed response or multiple-choice items, such as AIMS Science tests, Cronbach's alpha is a frequently used measure of internal consistency. Cronbach's alpha is computed as (Crocker & Algina, 1986)

$$\hat{\alpha} = \frac{k}{k-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_X^2}\right),$$

where k = number of items, σ_X^2 = the total score variance, and σ_i^2 = the variance of item i.

Reliability estimates (Alpha) for the Spring 2018 AIMS Science assessments, for all students as well as for the various subgroups, are presented by form in Table 9.1.1.1. Note that a high degree of internal consistency is evident for all three tests.

Table 9.1.1.1 Grade 4
Spring 2018 AIMS Science Internal Consistency

Subgroup	N	Alpha	SEM
Form A			
All Students	29383	0.89	3.24
Hispanic	13952	0.86	3.33
Non-Hispanic	15431	0.89	3.24
White	23079	0.89	3.23
Black/African American	1909	0.87	3.28
Asian	921	0.90	3.05
American Indian	1864	0.83	3.36
Hawaii/Pacific Islander	133	0.86	3.31
Multiple Indicators	1405	0.88	3.28
Female	14522	0.88	3.31
Male	14861	0.89	3.31
EL	2750	0.74	3.39
SPED	3635	0.87	3.34
Low SES	16678	0.86	3.35
Migrant	77	0.73	3.39
Form B			
All Students	29423	0.89	3.31
Hispanic	13731	0.87	3.31
Non-Hispanic	15692	0.90	3.14
White	23192	0.89	3.30
Black/African American	1845	0.87	3.35
Asian	912	0.91	3.02
American Indian	1893	0.84	3.36
Hawaii/Pacific Islander	139	0.86	3.25
Multiple Indicators	1388	0.89	3.18
Female	14463	0.89	3.23
Male	14960	0.90	3.24
EL	2665	0.74	3.38
SPED	3526	0.88	3.28
Low SES	16420	0.87	3.30
Migrant	66	0.81	3.35
Form C			
All Students	29443	0.89	3.24
Hispanic	13870	0.86	3.35
Non-Hispanic	15573	0.89	3.25
White	23209	0.89	3.24
Black/African American	1866	0.86	3.33
Asian	902	0.90	3.09
American Indian	1853	0.83	3.33
Hawaii/Pacific Islander	162	0.87	3.26
Multiple Indicators	1393	0.88	3.26
Female	14456	0.88	3.32
Male	14987	0.89	3.31
EL	2734	0.73	3.36
SPED	3622	0.87	3.30
Low SES	16540	0.86	3.35
Migrant	83	0.86	3.32

Table 9.1.1.1 Grade 8
Spring 2018 AIMS Science Internal Consistency

Subgroup	N	Alpha	SEM
Form A			
All Students	28230	0.90	3.42
Hispanic	12665	0.88	3.41
Non-Hispanic	15565	0.91	3.23
White	22456	0.90	3.40
Black/African American	1722	0.87	3.49
Asian	867	0.91	3.17
American Indian	1935	0.85	3.46
Hawaii/Pacific Islander	130	0.88	3.40
Multiple Indicators	1023	0.91	3.24
Female	13644	0.90	3.32
Male	14586	0.91	3.33
EL	1385	0.74	3.46
SPED	2936	0.84	3.46
Low SES	14744	0.88	3.40
Migrant	83	0.88	3.44
Form B			
All Students	28154	0.91	3.28
Hispanic	12767	0.88	3.44
Non-Hispanic	15387	0.91	3.28
White	22320	0.91	3.26
Black/African American	1718	0.88	3.48
Asian	925	0.93	3.00
American Indian	1930	0.85	3.48
Hawaii/Pacific Islander	116	0.90	3.42
Multiple Indicators	1031	0.90	3.39
Female	13762	0.90	3.34
Male	14392	0.91	3.38
EL	1353	0.72	3.45
SPED	2864	0.85	3.46
Low SES	14521	0.88	3.44
Migrant	103	0.83	3.44
Form C			
All Students	28310	0.91	3.27
Hispanic	12788	0.88	3.45
Non-Hispanic	15522	0.91	3.26
White	22573	0.91	3.25
Black/African American	1709	0.88	3.47
Asian	894	0.92	2.98
American Indian	1885	0.86	3.42
Hawaii/Pacific Islander	143	0.89	3.45
Multiple Indicators	997	0.91	3.24
Female	13796	0.90	3.32
Male	14514	0.91	3.39
EL	1451	0.75	3.49
SPED	2939	0.86	3.44
Low SES	14878	0.88	3.47
Migrant	103	0.86	3.44

Table 9.1.1.1 Grade HS
Spring 2018 AIMS Science Internal Consistency

Subgroup	N	Alpha	SEM
Form A			
All Students	28453	0.91	3.60
Hispanic	12496	0.88	3.67
Non-Hispanic	15957	0.91	3.69
White	23084	0.91	3.59
Black/African American	1714	0.88	3.74
Asian	921	0.93	3.40
American Indian	1537	0.86	3.67
Hawaii/Pacific Islander	114	0.91	3.67
Multiple Indicators	967	0.90	3.57
Female	14165	0.90	3.68
Male	14288	0.91	3.72
EL	908	0.69	3.60
SPED	2242	0.84	3.61
Low SES	11194	0.87	3.68
Migrant	159	0.72	3.62
Form B			
All Students	27995	0.91	3.62
Hispanic	12186	0.88	3.65
Non-Hispanic	15809	0.92	3.51
White	22769	0.91	3.61
Black/African American	1654	0.87	3.74
Asian	892	0.93	3.48
American Indian	1470	0.84	3.66
Hawaii/Pacific Islander	148	0.89	3.74
Multiple Indicators	936	0.90	3.64
Female	13870	0.90	3.70
Male	14125	0.91	3.72
EL	848	0.75	3.59
SPED	2198	0.82	3.67
Low SES	11005	0.87	3.65
Migrant	182	0.71	3.56
Form C			
All Students	28302	0.91	3.70
Hispanic	12339	0.88	3.72
Non-Hispanic	15963	0.92	3.58
White	22961	0.91	3.69
Black/African American	1676	0.89	3.59
Asian	924	0.94	3.33
American Indian	1512	0.85	3.70
Hawaii/Pacific Islander	127	0.90	3.73
Multiple Indicators	986	0.91	3.56
Female	14192	0.91	3.58
Male	14110	0.92	3.60
EL	913	0.69	3.58
SPED	2249	0.83	3.63
Low SES	11095	0.87	3.72
Migrant	168	0.75	3.62

Presented in Tables 9.1.1.2 through 9.1.1.4 are number of items, mean and standard deviation (SD) of the raw scores, and the internal consistency reliability estimates (Alpha) at the science strand and concept level by form.

Table 9.1.1.2
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 4
(Form A)

Strand	Number of Items	N	Raw Score Mean	Raw Score SD	Alpha
1. Scientific Inquiry	18	29383	10.23	3.64	0.73
Concept 1: Observations, Questions, and Hypotheses	6	29383	3.61	1.62	0.58
Concept 2: Scientific Testing (Investigating and Modeling)	6	29383	3.58	1.40	0.39
Concept 3/4: Analysis and Conclusions/ Communication	6	29383	3.04	1.49	0.45
2. History and Nature of Science	6	29383	3.94	1.65	0.63
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	29383	3.94	1.65	0.63
3. Science in Personal and Social Perspectives	6	29383	3.49	1.60	0.52
Concept 1/2: Changes in Environments/Science and Technology in Society	6	29383	3.49	1.60	0.52
4. Life Science	6	29383	3.74	1.52	0.54
Concept 1/3/4: Characteristics of Organisms/Organisms and Environments/ Diversity, Adaptation, and Behavior	6	29383	3.74	1.52	0.54
5. Physical Science	6	29383	3.03	1.56	0.50
Concept 3: Energy and Magnetism	6	29383	3.03	1.56	0.50
6. Earth and Space Science	12	29383	5.46	2.34	0.54
Concept 2: Earth's Processes and Systems	6	29383	2.56	1.49	0.46
Concept 3: Changes in the Earth and Sky	6	29383	2.91	1.36	0.31

Table 9.1.1.2
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 4
(Form B)

Strand	Number of Items	N	Raw Score Mean	Raw Score SD	Alpha
1. Scientific Inquiry	18	29423	10.53	3.79	0.76
Concept 1: Observations, Questions, and Hypotheses	6	29423	3.33	1.52	0.51
Concept 2: Scientific Testing (Investigating and Modeling)	6	29423	3.77	1.48	0.47
Concept 3/4: Analysis and Conclusions/ Communication	6	29423	3.42	1.61	0.55
2. History and Nature of Science	6	29423	4.01	1.64	0.63
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	29423	4.01	1.64	0.63
3. Science in Personal and Social Perspectives	6	29423	3.36	1.63	0.54
Concept 1/2: Changes in Environments/Science and Technology in Society	6	29423	3.36	1.63	0.54
4. Life Science	6	29423	3.67	1.52	0.56
Concept 1/3/4: Characteristics of Organisms/Organisms and Environments/ Diversity, Adaptation, and Behavior	6	29423	3.67	1.52	0.56
5. Physical Science	6	29423	3.09	1.56	0.51
Concept 3: Energy and Magnetism	6	29423	3.09	1.56	0.51
6. Earth and Space Science	12	29423	5.58	2.32	0.53
Concept 2: Earth's Processes and Systems	6	29423	2.61	1.50	0.47
Concept 3: Changes in the Earth and Sky	6	29423	2.97	1.34	0.28

Table 9.1.1.2
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 4
(Form C)

Strand	Number of Items	N	Raw Score Mean	Raw Score SD	Alpha
1. Scientific Inquiry	18	29443	9.97	3.69	0.74
Concept 1: Observations, Questions, and Hypotheses	6	29443	3.65	1.56	0.53
Concept 2: Scientific Testing (Investigating and Modeling)	6	29443	3.42	1.48	0.46
Concept 3/4: Analysis and Conclusions/ Communication	6	29443	2.90	1.54	0.47
2. History and Nature of Science	6	29443	4.01	1.65	0.63
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	29443	4.01	1.65	0.63
3. Science in Personal and Social Perspectives	6	29443	3.42	1.59	0.51
Concept 1/2: Changes in Environments/Science and Technology in Society	6	29443	3.42	1.59	0.51
4. Life Science	6	29443	3.63	1.50	0.54
Concept 1/3/4: Characteristics of Organisms/Organisms and Environments/ Diversity, Adaptation, and Behavior	6	29443	3.63	1.50	0.54
5. Physical Science	6	29443	3.03	1.56	0.50
Concept 3: Energy and Magnetism	6	29443	3.03	1.56	0.50
6. Earth and Space Science	12	29443	5.53	2.33	0.54
Concept 2: Earth's Processes and Systems	6	29443	2.59	1.51	0.47
Concept 3: Changes in the Earth and Sky	6	29443	2.94	1.34	0.28

Table 9.1.1.3
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 8
(Form A)

Strand	Number of Items	N	Raw Score Mean	Raw Score SD	Alpha
1. Scientific Inquiry	20	28230	11.55	3.97	0.75
Concept 1: Observations, Questions, and Hypotheses	6	28230	3.50	1.60	0.53
Concept 2: Scientific Testing (Investigating and Modeling)	4	28230	2.23	1.07	0.38
Concept 3: Analysis, Conclusions, and Refinements	6	28230	3.15	1.50	0.43
Concept 4: Communication	4	28230	2.67	1.08	0.35
2. History and Nature of Science	6	28230	2.95	1.66	0.56
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	28230	2.95	1.66	0.56
3. Science in Personal and Social Perspectives	6	28230	3.41	1.54	0.47
Concept 1/2: Changes in Environments/Science and Technology in Society	6	28230	3.41	1.54	0.47
4. Life Science	8	28230	4.96	1.98	0.64
Concept 2/4: Reproduction and Heredity/Diversity, Adaptation, and Behavior	8	28230	4.96	1.98	0.64
5. Physical Science	18	28230	9.77	3.60	0.75
Concept 1: Properties and Changes of Properties in Matter	10	28230	5.14	2.14	0.60
Concept 2: Motion and Forces	8	28230	4.63	1.91	0.61

Table 9.1.1.3
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 8
(Form B)

Strand	Number of Items	N	Raw Score Mean	Raw Score STD	Alpha
1. Scientific Inquiry	20	28154	11.64	3.90	0.74
Concept 1: Observations, Questions, and Hypotheses	6	28154	3.62	1.58	0.53
Concept 2: Scientific Testing (Investigating and Modeling)	4	28154	2.23	1.05	0.36
Concept 3: Analysis, Conclusions, and Refinements	6	28154	3.10	1.48	0.42
Concept 4: Communication	4	28154	2.69	1.08	0.38
2. History and Nature of Science	6	28154	3.04	1.65	0.55
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	28154	3.04	1.65	0.55
3. Science in Personal and Social Perspectives	6	28154	3.58	1.62	0.55
Concept 1/2: Changes in Environments/Science and Technology in Society	6	28154	3.58	1.62	0.55
4. Life Science	8	28154	4.76	2.08	0.66
Concept 2/4: Reproduction and Heredity/Diversity, Adaptation, and Behavior	8	28154	4.76	2.08	0.66
5. Physical Science	18	28154	9.82	3.56	0.74
Concept 1: Properties and Changes of Properties in Matter	10	28154	5.17	2.12	0.59
Concept 2: Motion and Forces	8	28154	4.65	1.90	0.61

Table 9.1.1.3
Spring 2018 AIMS Strand/Concept Internal Consistency
Science Grade 8
(Form C)

Strand	Number of Items	N	Raw Score Mean	Raw Score STD	Alpha
1. Scientific Inquiry	20	28310	12.13	3.85	0.75
Concept 1: Observations, Questions, and Hypotheses	6	28310	3.92	1.50	0.52
Concept 2: Scientific Testing (Investigating and Modeling)	4	28310	2.21	1.04	0.34
Concept 3: Analysis, Conclusions, and Refinements	6	28310	3.08	1.46	0.40
Concept 4: Communication	4	28310	2.92	1.06	0.44
2. History and Nature of Science	6	28310	3.21	1.65	0.57
Concept 1/2: History of Science as a Human Endeavor/ Nature of Scientific Knowledge	6	28310	3.21	1.65	0.57
3. Science in Personal and Social Perspectives	6	28310	3.56	1.61	0.54
Concept 1/2: Changes in Environments/Science and Technology in Society	6	28310	3.56	1.61	0.54
4. Life Science	8	28310	4.63	2.09	0.65
Concept 2/4: Reproduction and Heredity/Diversity, Adaptation, and Behavior	8	28310	4.63	2.09	0.65
5. Physical Science	18	28310	9.83	3.56	0.74
Concept 1: Properties and Changes of Properties in Matter	10	28310	5.15	2.13	0.59
Concept 2: Motion and Forces	8	28310	4.67	1.90	0.61

Table 9.1.1.4
Spring 2018 AIMS Strand/Concept Internal Consistency
Science High School
(Form A)

Strand	Number of Items	N	Raw Score Mean	Raw Score STD	Alpha
1. Scientific Inquiry	22	28453	11.06	4.63	0.79
Concept 1: Observations, Questions, and Hypotheses	6	28453	3.12	1.64	0.55
Concept 2: Scientific Testing (Investigating and Modeling)	6	28453	2.75	1.54	0.46
Concept 3: Analysis, Conclusions, and Refinements	6	28453	3.22	1.58	0.52
Concept 4: Communication	4	28453	1.98	1.12	0.38
2. History and Nature of Science	6	28453	3.40	1.57	0.51
Concept 1/2: History of Science as a Human Endeavor/Nature of Scientific Knowledge	6	28453	3.40	1.57	0.51
3. Science in Personal and Social Perspectives	7	28453	3.09	1.68	0.50
Concept 1/2/3: Changes in Environments/Science and Technology in Society/Human Population Characteristics	7	28453	3.09	1.68	0.50
4. Life Science	30	28453	14.32	5.76	0.82
Concept 1: The Cell	6	28453	2.39	1.51	0.47
Concept 2: Molecular Basis of Heredity	6	28453	3.16	1.67	0.58
Concept 3: Interdependence of Organisms	6	28453	3.33	1.61	0.58
Concept 4: Biological Evolution	6	28453	2.93	1.43	0.40
Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems)	6	28453	2.52	1.50	0.44

Table 9.1.1.4
Spring 2018 AIMS Strand/Concept Internal Consistency
Science High School
(Form B)

Strand	Number of Items	N	Raw Score Mean	Raw Score STD	Alpha
1. Scientific Inquiry	22	27995	11.11	4.66	0.80
Concept 1: Observations, Questions, and Hypotheses	6	27995	3.12	1.65	0.56
Concept 2: Scientific Testing (Investigating and Modeling)	6	27995	2.77	1.54	0.46
Concept 3: Analysis, Conclusions, and Refinements	6	27995	3.19	1.58	0.52
Concept 4: Communication	4	27995	2.03	1.13	0.41
2. History and Nature of Science	6	27995	3.16	1.54	0.49
Concept 1/2: History of Science as a Human Endeavor/Nature of Scientific Knowledge	6	27995	3.16	1.54	0.49
3. Science in Personal and Social Perspectives	7	27995	3.05	1.68	0.50
Concept 1/2/3: Changes in Environments/Science and Technology in Society/Human Population Characteristics	7	27995	3.05	1.68	0.50
4. Life Science	30	27995	14.23	5.81	0.82
Concept 1: The Cell	6	27995	2.36	1.51	0.47
Concept 2: Molecular Basis of Heredity	6	27995	3.12	1.61	0.54
Concept 3: Interdependence of Organisms	6	27995	3.37	1.62	0.58
Concept 4: Biological Evolution	6	27995	2.90	1.46	0.43
Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems)	6	27995	2.49	1.53	0.47

Table 9.1.1.4
Spring 2018 AIMS Strand/Concept Internal Consistency
Science High School
(Form C)

Strand	Number of Items	N	Raw Score Mean	Raw Score STD	Alpha
1. Scientific Inquiry	22	28302	11.19	4.81	0.81
Concept 1: Observations, Questions, and Hypotheses	6	28302	3.03	1.65	0.55
Concept 2: Scientific Testing (Investigating and Modeling)	6	28302	3.00	1.65	0.55
Concept 3: Analysis, Conclusions, and Refinements	6	28302	3.19	1.58	0.51
Concept 4: Communication	4	28302	1.98	1.13	0.41
2. History and Nature of Science	6	28302	3.16	1.54	0.49
Concept 1/2: History of Science as a Human Endeavor/Nature of Scientific Knowledge	6	28302	3.16	1.54	0.49
3. Science in Personal and Social Perspectives	7	28302	3.06	1.68	0.50
Concept 1/2/3: Changes in Environments/Science and Technology in Society/Human Population Characteristics	7	28302	3.06	1.68	0.50
4. Life Science	30	28302	13.52	5.90	0.83
Concept 1: The Cell	6	28302	2.35	1.50	0.47
Concept 2: Molecular Basis of Heredity	6	28302	3.06	1.63	0.55
Concept 3: Interdependence of Organisms	6	28302	2.80	1.66	0.57
Concept 4: Biological Evolution	6	28302	2.90	1.45	0.43
Concept 5: Matter, Energy, and Organization in Living Systems (Including Human Systems)	6	28302	2.42	1.58	0.52

9.2 Validity

"Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed users of tests. Validity is, therefore, the most fundamental consideration in developing and evaluating tests" (AERA/APA/NCME, 2014, p. 11). The purpose of test score validation is not to validate the test itself but to validate interpretations of the test scores for particular purposes or uses. Test score validation is not a quantifiable property but an ongoing process, beginning at initial conceptualization and continuing throughout the entire assessment process.

The Spring 2018 AIMS Science tests were designed and developed to provide fair and accurate ability scores that support appropriate, meaningful, and useful educational decisions. In addition to the evidence provided in Part 2 (Involvement of Arizona Educators), additional validity evidence may be found in the following parts as described: Part 3 (Test Design), Part 4 (Test Development), Part 5 (Test Administration), Part 6 (Classical Item Analysis), Part 7 (Calibration, Scaling and Equating), Part 9.1 (Reliability), and Part 10 (Classification). As the technical report has progressed, chapter by chapter, it has moved through the phases of the testing cycle. Each part of the technical report detailed the procedures and processes applied in the creation of AIMS tests, as well as their results. Each part also highlights the meaning and significance of the procedures, processes, and results in terms of content and construct validity and the relationship to the Standards. Part 9.2 addresses two final issues in validity: the issues of bias and construct validity. The analyses presented here add to the perspectives provided in Chapters 2 through 10. Below is a brief review.

Part 2 of the technical report described the involvement of Arizona educators, ADE, and Pearson in the test development process. As indicated in Part 2, the test development process and the involvement of Arizona educators in that process formed an important part of the validity evidence of AIMS. The knowledge, expertise, and professional judgment offered by Arizona educators ultimately ensured that the content of AIMS formed an adequate and representative sample of appropriate content and that the content formed a legitimate basis upon which to validly derive conclusions about student achievement.

Parts 3 and 4 of the technical report addressed the issue of test form development. Part 3 provided a general discussion of test book creation and editing process, the process of selecting operational test items and the process of obtaining ADE approvals. The test design process and the participation of Arizona educators in the process of test selection, including item content and bias review, provide a solid rationale for having confidence in the content and design of AIMS as a tool from which to derive valid inferences about Arizona student performance.

Part 5 of the technical report described the process, procedures, and policies that guided the administration of the AIMS, including accommodations, security, and the written procedures provided to test administrators and school personnel.

Part 6 described classical data analysis of the Spring 2018 AIMS Science tests.

Part 7 of the technical report described the calibration, scaling and equating methods, as well as processes and procedures for deriving scale scores from students' raw scores and the data cleaning steps, which ensure valid calibration and scaling. Some references to introductory and advanced discussions of IRT are provided.

Part 8 of the technical report dealt with the test results, longitudinal comparisons, score distributions and performance levels.

Part 9, above, dealt with Cronbach's alpha as a measure for internal consistency.

Part 9 below presents the results of an analysis of Differential Item Functioning (DIF). Complete tables of gender, ethnicity, and race differential functioning of all operational items for the 2018 AIMS Science assessments are presented in Appendix B.

Part 10 of the technical report will describe a detailed analysis of classification consistency and classification accuracy.

Also, note that further evidence in support of the AIMS assessment has been documented in previous AIMS annual and standard setting technical reports.

9.2.1 Differential Item Functioning

Because test scores can have many sources of variation, the test publishers' task is to develop assessments that measure the intended abilities and skills without introducing extraneous elements or construct irrelevant variance. When tests measure something other than what they are intended to measure, test scores will reflect these unintended skills and knowledge, as well as what is purportedly assessed by the test. If this occurs, these tests can be called biased (Angoff, 1993; Camilli & Shepard, 1994; Green, 1975). One of the factors that may render test scores to be biased is differing cultural and socioeconomic experiences.

The Spring 2018 AIMS Science tests were developed using procedures to minimize item and test bias and included reviews such as the Content and Sensitivity Reviews and Data Analysis Workshops after each item was field-tested as described in Part 4, Test Development. Expertise in this area is not, however, a substitute for statistical analyses of the items or the continued monitoring of the fairness of items. Thus, an empirical differential item functioning (DIF) approach was used to examine potential item bias on all operational items. DIF studies include systematic item analyses to determine if examinees, in identified groups, with the same underlying level of ability have the same probability of correctly responding to the item. Items identified with DIF are further examined to determine if item performance differences between the identifiable subgroups of the population are due to extraneous or construct irrelevant information which makes the items unfairly difficult, or easy, for one of the subgroups.

DIF analyses of the Spring 2018 AIMS Science tests were conducted for ethnic/race subgroups and gender. In order to compute DIF, students must be matched on ability level using a conditioning variable. For these analyses, raw score on the test was used as the conditioning variable.

The Mantel-Haenszel chi-square statistic was used to identify DIF in multiple-choice items. The Mantel-Haenszel statistic was first recommended by Holland and Thayer (1988), is frequently used, and is efficient in terms of statistical power (Clauser & Mazor, 1998). The Mantel-Haenszel statistic is computed as (Zwick, Donoghue, & Grima, 1993):

$$\text{Mantel } \chi^2 = \frac{\left(\sum_k F_k - \sum_k E(F_k)\right)^2}{\sum_k \text{Var}(F_k)},$$

where F_k is the sum of scores for the focal group at the k^{th} level of the matching variable. Note that the Mantel-Haenszel statistic is sensitive to N such that larger sample sizes increase the value of chi square.

In addition to the Mantel-Haenszel chi-square statistic, the Mantel-Haenszel delta statistic (ΔMH DIF) was computed for all items. Educational Testing Service (ETS) first developed the ΔMH DIF statistic. To compute delta, alpha (the odds ratio) is first computed as:

$$\alpha_{MH} = \frac{\sum_{k=1}^{K} N_{r1k} N_{f0k} / N_k}{\sum_{k=1}^{K} N_{f1k} N_{r0k} / N_k},$$

where N_{r1k} is the number of correct responses in the reference group at ability level k, N_{f0k} is the number of incorrect responses in the focal group at ability level k, N_k is the total number of responses, N_{f1k} is the number of correct responses in the focal group at ability level k, and N_{r0k} is the number of incorrect responses in the reference group at ability level k. ΔMH DIF is then computed as:

$$\Delta MH\ DIF = -2.35 \ln(\alpha_{MH})$$

Positive values of ΔMH DIF indicate items that favor the focal group, whereas negative values of ΔMH DIF indicate items that favor the reference group.

The Mantel-Haenszel chi-square statistic and the delta statistic were used in combination to identify the Spring 2018 AIMS Science items that exhibit strong, weak, or no DIF (Zieky, 1993). Table 9.2.1.1 indicates the criteria for each category used for the 2018 AIMS Science DIF analysis. An alpha level of .01 was used for all Mantel-Haenszel statistics. Note that the criteria are very lenient given very large sample sizes and the number of DIF statistics computed. In other words, a large number of items will be placed in categories B and C given the critical value. For reference, the critical value for the chi-square statistic to be significant at $p < 0.01$ is 6.635, at $p < 0.001$ the critical value is 10.827, and at $p < 0.0005$ the critical value is 12.116.

Table 9.2.1.1
Differential Item Functioning Flag Categories

Category	Description	Criterion
A	No DIF	Mantel-Haenszel chi-square not significantly different from zero
B	Weak DIF	Significant Mantel-Haenszel chi-square ($p<0.01$) and $1.0 \leq \lvert\Delta MH\rvert < 1.5$
C	Strong DIF	Significant Mantel-Haenszel chi-square ($p<0.01$) and $\lvert\Delta MH\rvert \geq 1.5$

Another measure, also used to analyze DIF for the Spring 2018 AIMS Science operational items, is the standardized mean difference (SMD; Zwick, Donoghue, & Grima, 1993). The SMD is an effect size index of DIF, which is relatively easy to interpret. The SMD compares the means of the reference and focus groups, adjusting for the distribution of reference and focal group members on the conditioning variable, which for these analyses is the raw score. Using the Zwick, Donoghue, Grima formulation, SMD is computed as:

$$SMD = \sum_{k} p_{Fk}\left(m_{Fk} - m_{Rk}\right),$$

where p_{Fk} is the proportion of the focal group members at the k^{th} level of the matching variable, m_{Fk} is the mean item response of the focal group at the k^{th} level and m_{Rk} is the mean item response of the reference group at the k^{th} level. A negative SMD value indicates an item on which the focal group has a lower mean than the reference group. A positive SMD value indicates an item on which the reference group has a lower mean than the focal group.

Mantel-Haenszel chi-square statistic, MH-D DIF, SMD, and flag category results for all items in the Spring 2018 AIMS Science tests are presented in Appendix B. It is important to note that DIF analyses were also conducted on field test items prior to these items being eligible for an operational form during form construction. Very few AIMS items are identified as exhibiting strong DIF in field testing. All items exhibiting strong DIF are investigated for possible sources of differential functioning by Pearson and ADE staff and such items are avoided in form construction. Not surprisingly, the vast majority of items on the operational AIMS Science tests exhibit no DIF or weak DIF. The DIF statistics for items flagged for exhibiting strong DIF are presented in Table 9.2.1.2 with the results for all items used in 2018 presented by form in Appendix B. Note that a special paper version, which is a re-used and pre-equated form from 2015, please refer to the 2015 technical report for the statistics.

Table 9.2.1.2
DIF Statistics for Items Exhibiting Strong DIF

Content	Grade	Form	Item	Item Type	In favor of/ Against	Group	MH χ2	ΔMH	SMD
Science	4	A	33	MC	Against	Female	583.50	-1.53	-0.12
Science	4	C	10	MC	Against	Hawaiian	9.78	-2.19	-0.17
Science	8	A	35	MC	Against	Female	699.87	-1.66	-0.14
Science	8	B	34	MC	Against	Female	798.42	-1.78	-0.16
Science	8	C	34	MC	Against	Female	699.47	-1.66	-0.14
Science	10	B	7	MC	In favor of	Asian	104.93	1.96	0.16
Science	10	C	7	MC	In favor of	Asian	88.36	1.73	0.14
Science	10	B	21	MC	In favor of	Hawaiian	9.71	2.31	0.15

Note: MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference,

PART 10: CLASSIFICATION

Part 10 of this technical report provides information regarding classifying students into proficiency categories. The following AERA/APA/NCME *Standards* from the 1999 edition are covered in this part: 1.5, 1.7, 2.2, 2.14, 2.15, 4.9, 4.19, 4.20, 4.21, and 6.5. The 2014 AERA/APA/NCME *Standards* (AERA, APA, NCME, 2014) addressed by this chapter are: 1.8, 1.9, 2.13, 2.14, 2.16, 5.5, 5.21, 5.22, 5.23, and 7.4.

Scores from the Spring 2018 AIMS Science assessments are used to classify students into one of four performance categories: *Falls Far Below the Standard*, *Approaches the Standard*, *Meets the Standard*, and *Exceeds the Standard*. This part of the technical report provides information regarding classifying students into these four performance categories. Arizona educators made recommendations for cut scores for each category in the standard setting workshops in 2008. Analyses were conducted to examine the consistency and accuracy with which students were assigned to performance categories.

10.1 Standard Setting Technical Documentation

Standard setting for the AIMS Science tests was conducted in early June 2008, using the bookmark standard setting procedure. All technical documentation regarding the standard setting is available in the bookmark standard setting technical report, available from the ADE at http://www.azed.gov.

The scale score ranges for each of the four performance level categories and their associated cut scores, along with the lowest possible and highest possible scale scores for the AIMS Science tests are presented below in Table 10.1.1.

Table 10.1.1
AIMS Science
Final Scale Score Ranges by Performance Level

Grade	LOSS	FFBS	AS Cut	AS	MS Cut	MS	ES Cut	ES	HOSS
4	200	200-461	462	462-499	500	500-546	547	547-800	800
8	200	200-472	473	473-499	500	500-531	532	532-800	800
10	200	200-474	475	475-499	500	500-536	537	537-800	800

Note: LOSS=Lowest Observable Scale Score, FFBS=Fall Far Below the Standard, AS=Approaches the Standard, MS=Meets the Standard, ES=Exceeds the Standard, HOSS=Highest Observable Scale Score.

10.2 Classification Consistency and Accuracy

This section describes the analyses conducted to estimate classification consistency and accuracy for the Spring 2018 AIMS Science administration in grades 4, 8, and high school. Classification consistency can be defined as the agreement between examinees' performance category classification from two independent administrations of the same test (or two parallel forms of the test). Classification accuracy can be defined as the agreement between the actual classifications using observed cut scores and true classifications based on known true cut scores (Livingston & Lewis, 1995).

In conjunction with internal consistency, classification consistency is an important type of reliability and is particularly relevant to high-stakes tests. As a form of reliability, classification consistency represents how reliably students can be classified into performance categories. Please see Part 9 of this report for more information on the internal consistency of the 2018 AIMS Science assessments.

Classification consistency is most important for students whose ability is near each cut score. Students whose ability is far above or far below the established cut value are unlikely to be misclassified because repeated administration of the test will nearly always result in the same classification. Examinees whose true scores are close to the cut score are a more serious concern. These students' true scores will likely lie within the standard error of measurement of the cut score. For this reason, the measurement error at the cut scores should be considered when evaluating the classification consistency of a test. For convenience, the cut scores with their associated conditional standard error of measurement (CSEM) are presented by form in Table 10.2.2.1. Note that a special paper version, which is a re-used and pre-equated form from Spring 2015, please refer to the 2015 technical report for the statistics. The CSEMs around the Performance Level cuts were lower than those outside of the lowest and highest Performance Level cuts, indicating better measurement precision around the cuts.

Table 10.2.1
Spring 2018 AIMS
Standard Error of Measurement at Cut Scores

Test	Grade	Form	AS		MS		ES	
			Cut Score	CSEM	Cut Score	CSEM	Cut Score	CSEM
Science	4	A	465	15	503	14	551	16
Science		B	465	15	502	14	550	16
Science		C	464	15	502	14	549	15
Science	8	A	476	14	503	14	535	14
Science		B	475	14	502	14	534	14
Science		C	476	14	503	14	536	15
Science	HS	A	477	14	502	14	540	15
Science		B	475	14	503	14	537	15
Science		C	478	14	502	13	539	14

Note: AS = Approaches the Standard; MS = Meets the Standard; ES = Exceeds the Standard

Classification consistency and accuracy were estimated using the IRT procedure suggested by Lee, Hanson, and Brennan (2002) and Wang, Kolen, and Harris (2000) for the AIMS Science assessments. The following description of classification consistency and accuracy is based on the paper by Lee et al. (2002).

10.2.1 Classification Consistency

Assume that θ is a single latent trait measured by a test and denote Φ as a latent random variable. When a test X consists of K items and its maximum number-correct score is N, the marginal probability of the number-correct (NC) score x is:

$$P(X = x) = \int P(X = x \mid \Phi = \theta) g(\theta) d\theta, \quad x = 0,1,..., N.,$$

where $g(\theta)$ is the density of θ .

In this report, the marginal distribution $P(X = x)$ is denoted as $f(x)$, and the conditional error distribution $P(X = x \mid \Phi = \theta)$ is denoted as $f(x \mid \theta)$. It is assumed that examinees are classified into one of H mutually exclusive categories on the basis of predetermined H-1 observed score cutoffs, $C_1, C_2, \ldots, C_{H-1}$. Let L_h represent the h^{th} category into which examinees with $C_{h-1} \leq X \leq C_h$ are classified. $C_0 = 0$ and $C_H =$ the maximum number-correct score. Then, the conditional and marginal probabilities of each category classification are as follows:

$$P(X \in L_h \mid \theta) = \sum_{x=C_{h-1}}^{C_{h-1}} f(x \mid \theta), \quad h = 1, 2, \ldots, \text{H}.$$

$$P(X \in L_h) = \int \sum_{x=C_{h-1}}^{C_{h-1}} f(x \mid \theta) g(\theta) d\theta, \quad h = 1, 2, \ldots, \text{H}.$$

Because obtaining test scores from two independent administrations of AIMS Science was not feasible due to security, logistic, and cost constraints, a psychometric model was used to obtain the estimated classification consistency indices using test scores from a single administration. Based on the psychometric model, a symmetric H*H contingency table can be constructed. The elements of H*H contingency table consist of the joint probabilities of the row and column observed category classifications.

That two administrations are independent implies that if x_1 and x_2 represent the raw score random variables on the two administrations, then, conditioned on θ , x_1 and x_2 are independent and identically distributed. Consequently, the conditional bivariate distribution of x_1 and x_2 is:

$$f(x_1, \ x_2 \mid \theta) = f(x_1 \mid \theta) f(x_2 \mid \theta).$$

The marginal bivariate distribution of X_1 and X_2 can be expressed as follows:

$$f(x_1, \ x_2) = \int f(x_1, x_2 \mid \theta) f(\theta) d\theta.$$

Consistent classification means that both X_1 and X_2 fall in the same category. The conditional probability of falling in the same category on the two administrations is:

$$P(X_1 \in L_h, \ X_2 \in L_h \mid \theta) = \left[\sum_{x_1=C_{h-1}}^{C_{h-1}} f(x_1 \mid \theta) \right]^2, \quad h = 1, 2, \ldots, \text{H}.$$

The agreement index P , conditional on theta, is obtained by:

$$P(\theta) = \sum_{h=1}^{H} P(X_1 \in L_h,\ X_2 \in L_h \mid \theta).$$

The agreement index (classification consistency) can be computed as:

$$P = \int P(\theta) g(\theta) d(\theta).$$

The probability of consistent classification by chance, P_C, is the sum of squared marginal probabilities of each category classification:

$$P_C = \sum_{h=1}^{H} P(X_1 \in L_h) P(X_2 \in L_h) = \sum_{h=1}^{H} \left[P(X_1 \in L_h)\right]^2.$$

Then, the coefficient kappa (Cohen, 1960) is:

$$k = \frac{P - P_C}{1 - P_C}$$

10.2.2 Classification Accuracy

Let Γ_w denote true category. When an examinee has an observed score, $x \in L_h$ (h =1, 2,…, H), and a latent score , $\theta \in \Gamma_w$(w=1, 2,…, H), an accurate classification is made when $h = w$. The conditional probability of accurate classification is

$$\Gamma(\theta) = P(X \in L_w \mid \theta),$$

where w is the category such that $\theta \in \Gamma_w$.

10.2.3 Classification Consistency and Accuracy Results

Table 10.2.3.1 presents results from the classification consistency and classification accuracy analyses by form. Note that for a special paper version, which is a re-used and pre-equated form from Spring 2016, please refer to the 2016 technical report for the statistics. These results are for classifying students into AIMS' four performance levels. Included in the table for each grade are case counts (N), classification consistency (Agreement), classification inconsistency (Inconsistency), probability of consistent classification by chance (Chance), Cohen's Kappa (Kappa), and classification accuracy (Accuracy). Inconsistency is defined as 1-agreement.

The 2018 AIMS Science classification consistency and accuracy results are consistent with classification analyses from previous AIMS Science administrations. It is important to note that the classification results are dependent on the number of cut scores maintained in a testing program. Moreover, the acceptability of the classification results should be evaluated with respect to the associated stakes of the testing program. The results for the AIMS Science assessments are quite consistent with other testing programs with similar structure and purpose.

Table 10.2.3.1
Spring 2018 AIMS
Classification Consistency and Accuracy

Test	Grade	Form	N	Agreement	Inconsistency	Chance	Kappa	Accuracy
Science	4	A	29383	0.68	0.32	0.27	0.56	0.76
Science		B	29423	0.69	0.31	0.27	0.57	0.77
Science		C	29443	0.68	0.32	0.27	0.56	0.76
Science	8	A	28230	0.69	0.31	0.26	0.58	0.77
Science		B	28154	0.69	0.31	0.26	0.58	0.77
Science		C	28310	0.69	0.31	0.26	0.58	0.77
Science	HS	A	28453	0.72	0.28	0.30	0.60	0.79
Science		B	27995	0.72	0.28	0.29	0.60	0.79
Science		C	28302	0.73	0.27	0.31	0.61	0.80

Note: High school results include students in all cohorts. Results were computed with the IRT method suggested by Lee, Hanson, and Brennan (2002) and Wang, Kolen, and Harris (2000).

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APPENDIX A: COMMITTEE MEMBER SELECTION CRITERIA

AIMS Committee Participant Selection Criteria

ARIZONA DEPARTMENT OF EDUCATION

PROCEDURE FOR SELECTION OF EDUCATOR COMMITTEES
ARIZONA ASSESSMENT SECTION

The Assessment Section is always recruiting new teachers to serve on the committees and have prevailed upon veteran teachers to become Ambassadors of the Assessment by encouraging their colleagues to apply.

Once Arizona educators are identified and entered into the database, the Assessment Section uses the following procedures for selecting membership for a committee:

- Identify the purpose/function of the committee
- Establish the date and time of the committee
- Determine the criteria for membership on the committee:
    - Content area of expertise
    - Grade level experience
    - Specific skill or knowledge expertise for committee function
    - Prior experience on ADE committees—a minimum 50% of each committee will have prior experience
    - Location of district/school
        - Rural/urban/suburban
        - Approximately 50% of committee members from Maricopa County when appropriate for purpose of committee
    - Ethnicity of school population or committee member
    - SES of school population
    - Number of committees served on recently—a committee member cannot serve on a series of committees used to develop items. Otherwise, they would be passing judgment on their own prior work.
- Review the database for educators that meet the criteria established
- Select committee members based on criteria for particular committee for primary and alternate list
- Invitations are sent to selected committee members
- After decline and accept emails are received by established deadline, additional invitations issued to members on alternate list
- Once the committee meeting is held, performance of participants is reviewed.

Recognition of existing AIMS committee participants is an important aspect of retaining our Ambassadors of the Assessment; therefore, after each committee meeting, each participant receives a letter recognizing their excellent contributions to the assessment program and to all Arizona students.

APPENDIX B: DIF RESULTS

Table B.1
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form A)

	Reference: Male N= 14861 Focal: Female N= 14522				Reference: Hispanic N= 15431 Focal: Non Hispanic N= 13952				Reference: White N= 18161 Focal: Africa American N= 795				Reference: White N= 18161 Focal: Native American N= 1558			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	27.10	0.35	0.03	A	22.92	0.33	0.03	A	1.76	-0.27	-0.02	A	1.53	0.18	0.01	A
2	111.14	0.66	0.05	A	1.12	-0.07	0.00	A	3.48	-0.34	-0.03	A	5.53	-0.31	-0.03	A
3	1.39	0.09	0.00	A	0.50	-0.06	0.00	A	0.22	-0.10	-0.01	A	7.54	-0.41	-0.03	A
4	6.49	-0.16	-0.01	A	28.69	-0.35	-0.03	A	8.87	0.57	0.05	A	27.03	-0.74	-0.06	A
5	1.54	-0.08	-0.01	A	19.42	-0.28	-0.02	A	0.33	-0.11	-0.01	A	7.77	-0.37	-0.03	A
6	0.07	-0.02	0.00	A	1.98	-0.08	-0.01	A	0.07	-0.05	0.00	A	0.83	-0.12	-0.01	A
7	71.66	0.51	0.05	A	0.32	0.03	0.01	A	0.03	-0.03	0.00	A	2.23	-0.20	-0.02	A
8	47.22	0.42	0.04	A	4.77	-0.14	-0.01	A	1.63	-0.23	-0.02	A	1.74	-0.18	-0.02	A
9	0.11	-0.02	0.00	A	10.84	-0.19	-0.02	A	2.53	-0.28	-0.03	A	3.84	0.25	0.03	A
10	11.75	0.24	0.02	A	0.06	-0.02	0.00	A	0.11	0.07	0.00	A	5.28	-0.33	-0.03	A
11	4.99	0.13	0.01	A	0.26	-0.03	0.00	A	0.12	-0.06	-0.01	A	0.62	-0.10	-0.01	A
12	22.17	0.29	0.02	A	29.59	-0.35	-0.02	A	2.87	-0.33	-0.03	A	2.26	-0.22	-0.02	A
13	41.92	0.38	0.03	A	4.78	0.13	0.01	A	0.20	0.08	0.01	A	0.08	-0.04	0.00	A
14	61.38	-0.45	-0.04	A	2.10	0.09	0.01	A	0.41	0.11	0.01	A	4.11	0.27	0.02	A
15	25.76	0.29	0.03	A	5.03	-0.13	-0.01	A	0.12	-0.06	-0.01	A	6.24	0.32	0.03	A
16	5.34	-0.15	-0.01	A	81.84	-0.58	-0.05	A	9.12	-0.56	-0.05	A	1.91	-0.19	-0.02	A
17	10.64	0.21	0.02	A	2.68	0.11	0.01	A	1.64	-0.25	-0.02	A	1.96	0.19	0.02	A
18	0.10	0.02	0.00	A	1.13	-0.07	-0.01	A	0.50	0.13	0.01	A	6.55	-0.34	-0.03	A
19	4.90	0.14	0.01	A	2.93	-0.11	-0.01	A	0.98	-0.20	-0.02	A	1.40	0.17	0.01	A
20	61.77	-0.48	-0.04	A	53.50	-0.46	-0.04	A	0.85	-0.17	-0.02	A	17.12	-0.59	-0.05	A
21	73.25	0.60	0.04	A	0.49	-0.05	0.00	A	0.00	-0.01	0.00	A	0.12	0.05	0.00	A
22	26.95	-0.34	-0.03	A	18.32	-0.28	-0.02	A	1.26	-0.21	-0.02	A	5.04	-0.30	-0.03	A
23	15.23	0.23	0.02	A	0.06	0.01	0.00	A	0.49	-0.13	-0.01	A	0.00	0.00	0.00	A
24	0.14	-0.02	0.00	A	13.42	-0.22	-0.02	A	3.23	-0.33	-0.03	A	3.42	0.25	0.02	A
25	0.31	0.04	0.00	A	24.93	-0.39	-0.02	A	0.68	-0.18	-0.01	A	0.19	-0.07	0.00	A
26	0.26	0.03	0.00	A	0.02	0.01	0.00	A	1.40	0.22	0.02	A	0.27	-0.07	-0.01	A
27	0.06	0.02	0.00	A	0.39	0.04	0.01	A	0.24	0.09	0.01	A	0.68	-0.12	-0.01	A
28	14.14	0.22	0.02	A	0.00	0.00	0.00	A	0.01	0.02	0.00	A	0.10	0.04	0.00	A
29	1.79	0.10	0.01	A	13.62	0.28	0.02	A	0.55	-0.16	-0.01	A	0.00	0.01	0.00	A
30	3.89	0.11	0.01	A	2.85	-0.10	0.00	A	0.09	0.05	0.01	A	5.05	-0.30	-0.03	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form A)

	Reference: White N= 18161 Focal: Asian N= 998				Reference: White N= 18161 Focal: Hawaii N= 57				Reference: White N= 18161 Focal: Multiple Indicator N= 1373			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	1.94	0.30	0.02	A	3.96	-1.33	-0.11	A	0.91	-0.15	-0.01	A
2	2.34	0.30	0.02	A	0.11	-0.22	-0.02	A	4.91	-0.32	-0.03	A
3	2.71	-0.40	-0.02	A	0.13	-0.33	-0.02	A	0.03	0.03	0.00	A
4	6.21	0.48	0.03	A	1.24	0.74	0.07	A	0.21	0.07	0.01	A
5	5.21	0.46	0.03	A	0.02	-0.09	-0.01	A	0.00	0.00	0.00	A
6	6.17	-0.41	-0.04	A	0.13	0.24	0.02	A	0.18	-0.06	-0.01	A
7	7.87	0.52	0.04	A	4.97	-1.42	-0.14	A	0.62	-0.11	-0.01	A
8	0.03	-0.03	0.00	A	5.52	-1.43	-0.14	A	0.08	0.04	0.00	A
9	0.93	0.16	0.02	A	0.19	0.28	0.03	A	1.11	0.14	0.01	A
10	0.01	0.02	0.00	A	0.74	-0.65	-0.04	A	0.37	-0.10	-0.01	A
11	1.02	0.18	0.01	A	1.34	-0.75	-0.07	A	1.47	-0.17	-0.02	A
12	6.93	0.44	0.04	A	1.96	-1.00	-0.08	A	1.50	-0.18	-0.02	A
13	0.01	-0.01	0.00	A	0.23	-0.31	-0.03	A	4.84	-0.32	-0.03	A
14	9.76	-0.49	-0.05	A	5.92	1.52	0.16	A	4.77	-0.30	-0.03	A
15	1.87	0.22	0.02	A	0.59	-0.52	-0.05	A	0.00	-0.01	0.00	A
16	2.99	-0.33	-0.02	A	0.00	0.04	0.00	A	0.01	0.01	0.00	A
17	0.50	0.14	0.01	A	0.14	-0.28	-0.02	A	0.17	0.06	0.00	A
18	0.16	-0.07	-0.01	A	1.28	-0.79	-0.07	A	0.61	0.11	0.01	A
19	19.38	0.72	0.07	A	0.01	-0.07	-0.01	A	0.26	-0.08	-0.01	A
20	16.23	0.74	0.06	A	0.01	0.08	0.01	A	0.71	0.12	0.01	A
21	0.81	0.21	0.01	A	2.85	1.50	0.09	A	0.31	0.09	0.01	A
22	2.86	0.35	0.02	A	5.70	2.20	0.13	A	0.23	-0.07	-0.01	A
23	0.16	-0.07	-0.01	A	1.05	0.67	0.06	A	0.07	0.04	0.00	A
24	10.83	0.55	0.05	A	3.24	1.10	0.11	A	1.15	-0.15	-0.01	A
25	0.08	0.08	0.00	A	2.91	-1.30	-0.08	A	0.01	-0.02	0.00	A
26	6.10	0.45	0.04	A	1.28	0.86	0.07	A	0.39	0.09	0.01	A
27	14.47	0.62	0.06	A	0.09	-0.22	-0.02	A	0.95	0.14	0.01	A
28	0.22	-0.08	-0.01	A	0.44	-0.45	-0.04	A	1.29	-0.16	-0.02	A
29	0.00	0.01	0.00	A	0.40	0.57	0.03	A	0.39	0.11	0.01	A
30	1.04	-0.16	-0.02	A	1.29	0.74	0.07	A	0.06	0.03	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form A)

	Reference: Male N= 14861 Focal: Female N= 14522				Reference: Hispanic N= 15431 Focal: Non Hispanic N= 13952				Reference: White N= 18161 Focal: Africa American N= 795				Reference: White N= 18161 Focal: Native American N= 1558			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	0.00	0.00	0.00	A	0.34	0.04	0.01	A	2.18	-0.28	-0.02	A	3.93	0.27	0.02	A
32	196.54	-0.88	-0.07	A	27.70	-0.34	-0.02	A	1.25	-0.22	-0.02	A	1.84	0.20	0.02	A
33	583.50	-1.53	-0.12	C<	30.74	-0.36	-0.03	A	5.28	0.43	0.04	A	6.30	-0.37	-0.03	A
34	5.72	0.16	0.01	A	7.45	-0.18	-0.01	A	8.94	0.60	0.05	A	5.83	-0.34	-0.03	A
35	7.30	-0.17	-0.01	A	1.66	-0.08	-0.01	A	0.03	-0.03	0.00	A	0.50	-0.10	-0.01	A
36	3.77	0.11	0.01	A	0.13	-0.02	0.00	A	0.76	-0.15	-0.02	A	0.02	-0.02	0.00	A
37	4.45	-0.13	-0.01	A	7.10	0.17	0.01	A	1.05	0.19	0.02	A	7.96	-0.42	-0.03	A
38	2.81	0.10	0.01	A	1.33	0.07	0.01	A	3.36	0.33	0.03	A	0.56	0.10	0.01	A
39	53.33	0.44	0.04	A	0.32	-0.04	0.00	A	2.02	-0.27	-0.02	A	9.82	-0.45	-0.04	A
40	238.12	-1.02	-0.08	B<	0.07	-0.02	0.00	A	0.67	-0.16	-0.01	A	14.73	-0.52	-0.05	A
41	52.19	0.46	0.04	A	8.31	-0.19	-0.01	A	1.78	-0.28	-0.02	A	0.79	-0.14	-0.01	A
42	2.27	-0.09	-0.01	A	0.01	0.01	0.00	A	0.22	-0.09	-0.01	A	0.21	-0.06	-0.01	A
43	49.01	-0.42	-0.04	A	14.31	-0.23	-0.02	A	3.48	-0.35	-0.03	A	3.19	-0.24	-0.02	A
44	17.16	-0.28	-0.02	A	32.76	-0.41	-0.03	A	0.35	-0.14	-0.01	A	0.54	0.12	0.01	A
45	0.00	0.00	0.00	A	4.57	-0.13	-0.01	A	0.72	-0.16	-0.01	A	6.51	0.34	0.03	A
46	54.63	-0.61	-0.03	A	65.40	-0.68	-0.04	A	3.43	0.44	0.02	A	9.97	0.51	0.03	A
47	136.19	-0.69	-0.06	A	11.01	-0.20	-0.02	A	7.63	0.51	0.05	A	1.32	-0.15	-0.01	A
48	15.24	0.24	0.02	A	0.00	0.00	0.00	A	0.24	0.09	0.01	A	1.89	0.18	0.02	A
49	18.28	0.31	0.02	A	6.61	0.19	0.01	A	0.11	-0.07	0.00	A	2.81	0.25	0.02	A
50	50.93	-0.43	-0.04	A	0.01	0.01	0.00	A	0.04	0.03	0.00	A	0.05	-0.03	0.00	A
51	2.16	0.09	0.01	A	7.24	0.17	0.02	A	2.60	-0.30	-0.03	A	1.51	0.17	0.02	A
52	3.07	-0.11	-0.01	A	0.32	-0.04	0.00	A	0.30	-0.10	-0.01	A	3.90	0.26	0.02	A
53	26.19	0.29	0.03	A	11.75	-0.20	-0.02	A	0.01	-0.02	0.00	A	3.26	-0.23	-0.02	A
54	65.53	0.54	0.04	A	23.34	0.33	0.03	A	5.27	-0.46	-0.04	A	0.11	-0.05	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form A)

	Reference: White N= 18161 Focal: Asian N= 998				Reference: White N= 18161 Focal: Hawaii N= 57				Reference: White N= 18161 Focal: Multiple Indicator N= 1373			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	9.85	0.51	0.05	A	0.14	-0.26	-0.02	A	0.67	-0.12	-0.01	A
32	0.03	0.03	0.00	A	0.15	-0.28	-0.02	A	1.34	0.17	0.01	A
33	8.12	0.52	0.04	A	0.23	0.34	0.03	A	6.88	0.39	0.03	A
34	2.28	0.32	0.02	A	1.16	0.84	0.06	A	0.05	0.03	0.00	A
35	6.36	0.51	0.03	A	1.69	0.98	0.08	A	1.18	0.16	0.01	A
36	4.71	-0.36	-0.03	A	0.00	0.00	0.00	A	0.53	-0.10	-0.01	A
37	0.70	-0.13	-0.01	A	0.10	0.21	0.02	A	0.10	0.04	0.00	A
38	14.72	0.76	0.05	A	2.86	-1.07	-0.10	A	0.00	0.01	0.00	A
39	4.05	0.34	0.03	A	0.06	-0.16	-0.02	A	0.02	0.02	0.00	A
40	0.25	0.10	0.01	A	0.34	0.42	0.03	A	1.45	-0.19	-0.01	A
41	3.68	0.32	0.03	A	0.51	-0.52	-0.04	A	0.53	-0.11	-0.01	A
42	6.89	0.51	0.04	A	1.58	-0.83	-0.07	A	0.72	-0.12	-0.01	A
43	1.56	0.22	0.02	A	4.91	-1.36	-0.14	A	0.46	0.10	0.01	A
44	4.80	-0.42	-0.03	A	0.04	-0.15	-0.01	A	2.26	0.25	0.02	A
45	2.59	0.26	0.02	A	1.29	0.76	0.07	A	0.48	-0.10	-0.01	A
46	2.10	0.45	0.01	A	0.60	0.72	0.03	A	2.62	0.31	0.02	A
47	15.93	-0.66	-0.06	A	0.04	0.14	0.01	A	3.11	0.25	0.02	A
48	6.40	0.46	0.03	A	1.20	0.80	0.07	A	2.46	0.23	0.02	A
49	1.53	0.32	0.01	A	0.04	-0.18	-0.01	A	0.03	-0.03	0.00	A
50	6.16	-0.44	-0.03	A	0.32	0.37	0.03	A	0.40	-0.09	-0.01	A
51	0.06	0.04	0.00	A	2.23	1.12	0.09	A	0.22	0.07	0.01	A
52	2.45	0.29	0.02	A	0.04	0.14	0.01	A	0.03	0.02	0.00	A
53	0.17	0.07	0.01	A	0.03	-0.11	-0.01	A	1.51	0.17	0.02	A
54	3.84	0.44	0.02	A	0.37	0.49	0.03	A	0.01	-0.02	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.1
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form B)

	Reference: Male N= 14960 Focal: Female N= 14463				Reference: Hispanic N= 15692 Focal: Non Hispanic N= 13731				Reference: White N= 18073 Focal: Africa American N= 782				Reference: White N= 18073 Focal: Native American N= 1585			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	6.65	0.17	0.01	A	15.84	0.27	0.02	A	2.44	-0.30	-0.02	A	5.89	0.35	0.03	A
2	107.89	0.65	0.05	A	1.35	0.07	0.01	A	0.25	-0.09	-0.01	A	9.50	-0.41	-0.04	A
3	9.05	0.23	0.01	A	1.49	-0.10	0.00	A	0.03	0.04	0.00	A	4.93	-0.33	-0.02	A
4	5.77	-0.15	-0.01	A	28.43	-0.35	-0.03	A	6.17	0.48	0.04	A	11.06	-0.47	-0.04	A
5	1.84	-0.08	-0.01	A	8.01	-0.18	-0.02	A	0.32	0.11	0.01	A	5.71	-0.31	-0.03	A
6	1.07	0.06	0.01	A	5.81	-0.14	-0.02	A	0.25	0.09	0.01	A	4.32	-0.28	-0.03	A
7	46.51	0.41	0.04	A	1.90	0.09	0.01	A	0.34	-0.11	-0.01	A	1.43	-0.16	-0.02	A
8	84.39	0.57	0.05	A	1.88	-0.09	-0.01	A	0.02	-0.02	0.00	A	2.53	-0.21	-0.02	A
9	0.01	0.00	0.00	A	13.81	-0.22	-0.02	A	0.27	0.09	0.01	A	15.22	0.49	0.05	A
10	9.18	-0.21	-0.01	A	58.71	-0.55	-0.04	A	0.13	0.07	0.01	A	0.26	-0.07	-0.01	A
11	3.55	0.11	0.01	A	7.65	-0.17	-0.01	A	0.57	-0.14	-0.01	A	1.16	-0.14	-0.01	A
12	71.49	0.51	0.05	A	16.71	-0.25	-0.02	A	3.18	-0.33	-0.03	A	1.02	-0.14	-0.01	A
13	74.51	0.51	0.05	A	10.70	0.20	0.02	A	0.90	-0.18	-0.02	A	0.32	-0.08	-0.01	A
14	6.56	0.15	0.01	A	11.38	-0.21	-0.01	A	0.24	-0.10	-0.01	A	5.12	0.32	0.03	A
15	97.40	0.66	0.05	A	0.89	-0.06	0.00	A	0.00	0.00	0.00	A	2.82	-0.23	-0.02	A
16	117.99	0.66	0.06	A	1.00	0.06	0.01	A	2.03	0.27	0.02	A	3.93	-0.29	-0.02	A
17	11.41	0.21	0.02	A	3.64	-0.12	-0.01	A	0.53	0.14	0.01	A	0.63	0.11	0.01	A
18	0.53	0.04	0.00	A	2.70	-0.10	-0.01	A	0.12	-0.06	-0.01	A	8.46	-0.38	-0.04	A
19	49.42	-0.43	-0.04	A	53.65	-0.46	-0.04	A	0.96	0.18	0.02	A	2.96	-0.24	-0.02	A
20	70.81	0.60	0.04	A	0.05	0.02	0.00	A	0.73	0.18	0.01	A	0.26	0.07	0.01	A
21	47.53	-0.47	-0.03	A	21.43	-0.32	-0.02	A	2.39	-0.31	-0.02	A	0.70	-0.11	-0.01	A
22	36.26	0.36	0.03	A	3.16	0.11	0.01	A	0.00	0.00	0.00	A	0.57	0.10	0.01	A
23	2.45	0.12	0.01	A	15.14	-0.30	-0.02	A	1.71	0.29	0.02	A	1.94	-0.20	-0.02	A
24	0.17	0.02	0.00	A	16.93	-0.25	-0.02	A	0.12	0.06	0.01	A	3.28	0.24	0.02	A
25	1.39	-0.07	-0.01	A	2.80	-0.10	-0.01	A	0.67	-0.16	-0.01	A	0.56	0.10	0.01	A
26	0.45	0.04	0.00	A	1.57	-0.08	0.00	A	0.83	0.17	0.02	A	0.55	-0.10	-0.01	A
27	29.80	-0.36	-0.03	A	10.79	-0.22	-0.02	A	1.84	-0.26	-0.02	A	0.03	0.02	0.00	A
28	2.93	0.10	0.01	A	0.02	0.01	0.00	A	0.36	-0.11	-0.01	A	0.50	0.09	0.01	A
29	1.56	0.09	0.01	A	15.31	0.29	0.02	A	5.35	-0.47	-0.03	A	0.13	-0.05	0.00	A
30	1.43	0.07	0.01	A	1.75	0.08	0.01	A	2.81	-0.31	-0.03	A	0.85	-0.12	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form B)

	Reference: White N= 18073 Focal: Asian N= 997				Reference: White N= 18073 Focal: Hawaii N= 62				Reference: White N= 18073 Focal: Multiple Indicator N= 1358			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	2.65	0.35	0.02	A	1.81	1.15	0.07	A	0.00	0.00	0.00	A
2	6.85	0.52	0.03	A	0.14	0.25	0.02	A	0.02	-0.02	0.00	A
3	0.35	-0.15	-0.01	A	0.09	0.26	0.01	A	0.13	0.06	0.00	A
4	3.58	0.36	0.02	A	0.19	0.32	0.02	A	0.45	-0.10	-0.01	A
5	3.41	0.36	0.02	A	0.40	0.39	0.04	A	0.21	-0.07	-0.01	A
6	2.45	-0.25	-0.02	A	0.20	-0.28	-0.03	A	1.45	0.17	0.02	A
7	2.78	0.31	0.02	A	0.01	-0.05	0.00	A	0.18	0.06	0.01	A
8	0.53	0.14	0.01	A	1.46	0.87	0.07	A	1.15	0.16	0.01	A
9	0.00	0.01	0.00	A	1.78	0.83	0.08	A	0.59	0.10	0.01	A
10	1.16	-0.24	-0.01	A	1.60	1.12	0.06	A	5.20	0.39	0.03	A
11	0.05	0.04	0.00	A	3.69	-1.14	-0.11	A	3.85	-0.28	-0.03	A
12	1.99	0.25	0.02	A	0.01	0.07	0.01	A	0.00	0.01	0.00	A
13	3.34	0.30	0.03	A	0.14	0.23	0.02	A	2.71	0.23	0.02	A
14	0.40	-0.10	-0.01	A	0.60	-0.53	-0.05	A	2.90	0.24	0.02	A
15	4.15	-0.41	-0.02	A	2.86	-1.17	-0.09	A	0.44	0.10	0.01	A
16	0.58	0.13	0.01	A	0.36	-0.41	-0.04	A	0.29	-0.08	-0.01	A
17	14.47	0.63	0.06	A	0.72	-0.60	-0.05	A	4.31	-0.31	-0.03	A
18	0.16	0.07	0.00	A	0.16	0.29	0.02	A	0.37	-0.09	-0.01	A
19	30.19	0.99	0.08	A	0.34	0.37	0.03	A	0.98	0.14	0.01	A
20	0.38	0.14	0.01	A	0.50	0.67	0.03	A	0.04	-0.03	0.00	A
21	7.55	0.62	0.03	A	0.04	-0.15	-0.01	A	0.25	-0.08	-0.01	A
22	0.21	0.08	0.01	A	0.00	-0.02	0.00	A	2.26	-0.21	-0.02	A
23	0.35	0.16	0.01	A	0.01	-0.08	0.00	A	0.23	-0.09	0.00	A
24	8.81	0.49	0.05	A	0.04	-0.12	-0.01	A	0.36	-0.08	-0.01	A
25	5.03	0.37	0.04	A	2.61	0.98	0.10	A	0.24	0.07	0.01	A
26	0.13	-0.06	-0.01	A	3.23	-1.16	-0.11	A	0.05	0.03	0.00	A
27	1.24	0.24	0.01	A	2.51	-1.03	-0.08	A	0.69	-0.13	-0.01	A
28	7.95	0.52	0.04	A	1.67	0.84	0.08	A	0.23	0.07	0.01	A
29	0.13	0.09	0.00	A	0.02	-0.11	-0.01	A	0.44	0.12	0.01	A
30	1.29	-0.19	-0.02	A	0.31	-0.37	-0.03	A	2.73	0.23	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form B)

	Reference: Male N= 14960 Focal: Female N= 14463				Reference: Hispanic N= 15692 Focal: Non Hispanic N= 13731				Reference: White N= 18073 Focal: Africa American N= 782				Reference: White N= 18073 Focal: Native American N= 1585			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	0.78	0.05	0.00	A	1.46	0.07	0.01	A	0.18	-0.08	-0.01	A	0.90	0.13	0.01	A
32	212.61	-0.92	-0.07	A	39.56	-0.41	-0.03	A	1.62	-0.26	-0.02	A	0.00	-0.01	0.00	A
33	538.97	-1.46	-0.12	B<	30.39	-0.35	-0.03	A	7.86	0.53	0.04	A	0.01	0.01	0.00	A
34	4.61	0.14	0.01	A	2.60	-0.11	-0.01	A	5.49	0.47	0.04	A	9.48	-0.42	-0.04	A
35	6.13	-0.16	-0.01	A	0.23	-0.03	0.00	A	9.17	-0.58	-0.05	A	0.91	0.13	0.01	A
36	0.11	0.02	0.00	A	4.18	-0.12	-0.01	A	1.79	-0.24	-0.02	A	2.49	0.20	0.02	A
37	5.52	-0.14	-0.01	A	1.32	0.07	0.00	A	1.11	0.20	0.02	A	0.12	-0.05	0.00	A
38	14.55	-0.23	-0.02	A	14.66	-0.24	-0.02	A	0.48	0.13	0.01	A	0.15	0.05	0.01	A
39	18.50	0.26	0.02	A	1.95	-0.09	0.00	A	0.04	0.04	0.00	A	29.08	-0.80	-0.06	A
40	243.75	-1.04	-0.08	B<	1.23	-0.08	-0.01	A	0.02	-0.03	0.00	A	1.52	-0.17	-0.01	A
41	0.81	0.05	0.00	A	4.74	0.13	0.01	A	0.32	-0.10	-0.01	A	5.13	0.30	0.03	A
42	1.42	-0.07	-0.01	A	1.48	-0.08	0.00	A	0.82	-0.17	-0.02	A	2.62	0.21	0.02	A
43	73.21	-0.54	-0.04	A	1.03	-0.07	0.00	A	11.76	-0.64	-0.06	A	0.00	-0.01	0.00	A
44	19.29	-0.30	-0.02	A	21.25	-0.33	-0.02	A	2.87	0.37	0.02	A	2.95	0.29	0.02	A
45	121.24	-0.72	-0.05	A	15.18	-0.26	-0.02	A	2.42	0.30	0.03	A	10.54	-0.46	-0.04	A
46	24.76	-0.42	-0.02	A	59.17	-0.66	-0.04	A	8.56	0.70	0.04	A	21.26	0.74	0.05	A
47	114.46	-0.64	-0.06	A	27.44	-0.32	-0.03	A	0.41	-0.12	-0.01	A	7.24	0.35	0.03	A
48	4.81	0.13	0.01	A	0.35	0.04	0.01	A	1.33	-0.21	-0.02	A	0.14	-0.05	-0.01	A
49	30.37	0.41	0.02	A	9.51	0.23	0.02	A	1.38	-0.25	-0.02	A	0.16	-0.06	0.00	A
50	43.26	-0.40	-0.03	A	0.00	0.00	0.00	A	2.34	-0.28	-0.03	A	0.05	-0.03	0.00	A
51	3.13	0.11	0.01	A	5.93	0.15	0.01	A	5.07	-0.41	-0.04	A	0.48	0.09	0.01	A
52	0.63	-0.05	0.00	A	10.51	-0.20	-0.02	A	0.08	0.05	0.01	A	4.11	0.27	0.02	A
53	34.77	0.35	0.03	A	10.85	-0.20	-0.01	A	4.38	-0.37	-0.04	A	13.98	-0.47	-0.05	A
54	73.36	0.57	0.04	A	15.24	0.27	0.02	A	0.09	0.06	0.00	A	1.60	-0.17	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form B)

	Reference: White N= 18073 Focal: Asian N= 997				Reference: White N= 18073 Focal: Hawaii N= 62				Reference: White N= 18073 Focal: Multiple Indicator N= 1358			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	11.30	0.55	0.05	A	0.51	-0.46	-0.04	A	0.10	-0.04	0.00	A
32	0.19	0.08	0.01	A	0.82	-0.62	-0.05	A	0.04	-0.03	0.00	A
33	18.66	0.76	0.06	A	3.86	1.34	0.11	A	3.89	0.30	0.02	A
34	2.30	0.33	0.02	A	0.35	-0.37	-0.03	A	0.00	-0.01	0.00	A
35	0.60	0.15	0.01	A	2.10	-0.93	-0.08	A	0.48	-0.10	-0.01	A
36	0.08	-0.05	0.00	A	0.01	-0.06	-0.01	A	0.42	0.09	0.01	A
37	2.26	0.24	0.02	A	1.40	-0.81	-0.07	A	2.72	-0.24	-0.02	A
38	1.12	0.18	0.02	A	0.32	-0.33	-0.03	A	0.02	-0.02	0.00	A
39	5.95	0.41	0.04	A	3.63	-1.17	-0.11	A	0.45	-0.10	-0.01	A
40	0.44	0.13	0.01	A	1.32	-0.83	-0.06	A	0.00	0.01	0.00	A
41	3.38	0.31	0.03	A	1.78	0.81	0.08	A	8.37	0.42	0.04	A
42	2.32	0.29	0.02	A	0.08	0.21	0.02	A	0.23	0.07	0.01	A
43	3.28	-0.33	-0.02	A	0.75	-0.53	-0.05	A	0.01	-0.02	0.00	A
44	11.78	-0.67	-0.05	A	1.29	0.77	0.06	A	4.01	-0.35	-0.02	A
45	1.46	0.25	0.02	A	3.28	1.46	0.10	A	1.59	0.20	0.02	A
46	1.76	0.40	0.01	A	2.55	-1.53	-0.06	A	3.70	0.39	0.02	A
47	0.78	0.15	0.01	A	0.21	0.32	0.03	A	4.68	0.31	0.03	A
48	5.63	0.43	0.03	A	0.24	-0.33	-0.03	A	0.13	-0.05	0.00	A
49	2.01	0.38	0.01	A	2.13	1.31	0.07	A	0.00	0.00	0.00	A
50	2.99	-0.31	-0.02	A	0.22	0.30	0.03	A	1.45	-0.17	-0.02	A
51	1.44	0.22	0.02	A	1.59	0.87	0.07	A	0.12	-0.05	0.00	A
52	0.53	0.14	0.01	A	1.09	-0.66	-0.06	A	0.30	0.08	0.01	A
53	0.45	0.12	0.01	A	1.20	0.73	0.07	A	3.88	-0.27	-0.03	A
54	5.72	0.54	0.03	A	0.01	-0.07	0.00	A	0.03	0.03	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.1
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form C)

	Reference: Male N= 14987 Focal: Female N= 14456				Reference: Hispanic N= 15573 Focal: Non Hispanic N= 13870				Reference: White N= 18121 Focal: Africa American N= 751				Reference: White N= 18121 Focal: Native American N= 1533			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	9.12	0.20	0.01	A	37.34	0.42	0.03	A	0.03	-0.03	0.00	A	2.12	0.21	0.02	A
2	86.62	0.58	0.05	A	0.22	0.03	0.00	A	0.77	-0.16	-0.01	A	2.52	-0.21	-0.02	A
3	0.31	0.04	0.00	A	0.07	0.02	0.00	A	0.38	-0.14	-0.01	A	6.95	-0.40	-0.03	A
4	3.41	-0.12	-0.01	A	41.32	-0.42	-0.03	A	3.15	0.35	0.03	A	18.49	-0.63	-0.05	A
5	2.57	-0.10	-0.01	A	10.90	-0.21	-0.02	A	3.93	0.39	0.03	A	3.65	-0.25	-0.02	A
6	0.75	-0.05	0.00	A	13.45	-0.22	-0.02	A	0.31	0.10	0.01	A	1.96	-0.19	-0.02	A
7	53.84	0.44	0.04	A	0.00	0.00	0.00	A	0.34	-0.11	-0.01	A	0.04	0.03	0.00	A
8	49.47	0.43	0.04	A	5.85	-0.15	-0.01	A	4.01	0.39	0.03	A	0.45	-0.09	-0.01	A
9	0.87	-0.05	-0.01	A	6.68	-0.15	-0.02	A	5.06	-0.41	-0.04	A	21.15	0.59	0.06	A
10	17.81	0.25	0.02	A	2.75	-0.10	-0.01	A	0.02	0.03	0.00	A	0.06	-0.04	0.00	A
11	8.80	0.18	0.02	A	10.85	-0.21	-0.02	A	0.00	0.01	0.00	A	2.37	-0.21	-0.02	A
12	33.33	0.35	0.03	A	6.51	-0.16	-0.01	A	0.26	-0.10	-0.01	A	7.36	-0.40	-0.03	A
13	71.71	0.50	0.05	A	14.24	0.23	0.02	A	0.69	-0.16	-0.01	A	9.97	-0.45	-0.04	A
14	226.04	-0.89	-0.08	A	10.40	-0.20	-0.02	A	0.01	-0.01	0.00	A	0.00	0.00	0.00	A
15	9.72	0.19	0.02	A	0.02	0.01	0.00	A	0.75	0.17	0.01	A	0.36	0.08	0.01	A
16	39.22	0.47	0.03	A	1.16	0.08	0.01	A	0.90	0.22	0.01	A	0.64	0.12	0.01	A
17	10.32	0.20	0.02	A	2.02	-0.09	-0.01	A	0.10	0.06	0.01	A	8.47	0.42	0.03	A
18	0.12	0.02	0.00	A	0.25	0.03	0.00	A	0.21	-0.09	-0.01	A	11.90	-0.46	-0.04	A
19	51.65	-0.44	-0.04	A	56.47	-0.47	-0.04	A	1.20	-0.20	-0.02	A	2.17	-0.21	-0.02	A
20	76.26	0.62	0.04	A	4.73	0.16	0.01	A	0.10	0.07	0.00	A	1.78	-0.20	-0.02	A
21	38.36	-0.42	-0.03	A	40.13	-0.44	-0.03	A	0.47	-0.14	-0.01	A	4.84	0.31	0.03	A
22	0.06	-0.02	0.00	A	19.01	-0.34	-0.02	A	2.78	0.39	0.02	A	5.44	-0.35	-0.03	A
23	40.26	0.38	0.03	A	11.12	0.20	0.02	A	3.46	-0.35	-0.03	A	0.18	0.06	0.01	A
24	0.05	0.01	0.00	A	49.11	-0.42	-0.04	A	1.99	0.26	0.02	A	8.58	0.39	0.04	A
25	2.59	0.09	0.01	A	0.74	-0.05	0.00	A	3.24	0.34	0.03	A	0.33	0.08	0.01	A
26	12.11	-0.20	-0.02	A	3.68	-0.12	-0.01	A	0.26	-0.09	-0.01	A	3.58	0.25	0.02	A
27	0.33	0.03	0.00	A	0.08	-0.02	0.00	A	0.04	0.04	0.00	A	5.44	0.31	0.03	A
28	12.44	0.21	0.02	A	2.39	0.09	0.01	A	1.08	-0.20	-0.02	A	0.05	0.03	0.00	A
29	0.49	0.05	0.00	A	24.05	0.37	0.03	A	3.15	-0.39	-0.03	A	0.31	-0.08	-0.01	A
30	2.51	0.09	0.01	A	1.23	-0.07	0.00	A	1.63	-0.23	-0.02	A	2.43	-0.21	-0.02	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form C)

	Reference: White N= 18121 Focal: Asian N= 1004				Reference: White N= 18121 Focal: Hawaii N= 70				Reference: White N= 18121 Focal: Multiple Indicator N= 1356			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	0.37	-0.13	-0.01	A	0.05	0.16	0.01	A	0.00	0.00	0.00	A
2	0.87	0.18	0.01	A	0.00	-0.04	0.00	A	2.70	-0.24	-0.02	A
3	0.58	-0.19	-0.01	A	0.23	-0.37	-0.02	A	0.09	-0.05	0.00	A
4	5.05	0.44	0.03	A	0.78	0.58	0.05	A	6.90	0.40	0.03	A
5	5.20	0.45	0.03	A	0.00	0.00	0.00	A	0.12	0.05	0.00	A
6	4.27	-0.34	-0.03	A	0.66	-0.46	-0.05	A	0.22	0.06	0.01	A
7	7.81	0.51	0.04	A	0.00	-0.03	0.00	A	0.40	-0.09	-0.01	A
8	3.77	0.36	0.03	A	0.93	0.65	0.05	A	5.55	0.35	0.03	A
9	0.56	0.12	0.01	A	0.27	0.30	0.03	A	5.26	0.31	0.03	A
10	0.02	-0.02	0.00	A	9.78	-2.19	-0.17	C<	0.03	0.02	0.00	A
11	2.47	0.30	0.02	A	0.88	-0.54	-0.05	A	0.00	0.01	0.00	A
12	1.02	0.17	0.02	A	1.98	0.88	0.08	A	1.64	-0.19	-0.02	A
13	0.26	-0.08	-0.01	A	0.52	0.44	0.04	A	0.00	-0.01	0.00	A
14	0.07	-0.04	0.00	A	0.98	0.61	0.06	A	0.01	0.01	0.00	A
15	6.40	0.47	0.04	A	0.57	-0.44	-0.04	A	0.03	0.02	0.00	A
16	0.30	0.15	0.01	A	0.49	0.60	0.03	A	5.25	0.41	0.02	A
17	4.36	0.35	0.03	A	0.19	0.27	0.02	A	0.21	0.07	0.01	A
18	0.04	-0.04	0.00	A	2.45	-0.93	-0.08	A	0.63	0.11	0.01	A
19	14.39	0.70	0.05	A	0.96	0.63	0.05	A	0.40	-0.09	-0.01	A
20	0.38	0.15	0.01	A	0.20	0.35	0.02	A	0.19	0.07	0.00	A
21	4.44	0.50	0.02	A	5.49	2.12	0.11	A	0.45	0.11	0.01	A
22	12.09	1.03	0.03	B>	0.53	-0.59	-0.03	A	0.45	0.12	0.01	A
23	0.57	0.13	0.01	A	0.23	0.28	0.03	A	0.27	-0.07	-0.01	A
24	6.51	0.42	0.04	A	4.56	1.29	0.12	A	3.68	0.27	0.03	A
25	5.10	0.37	0.04	A	3.18	1.08	0.10	A	0.06	0.03	0.00	A
26	23.05	0.87	0.07	A	2.14	-0.86	-0.08	A	1.89	0.19	0.02	A
27	38.01	0.97	0.10	A	0.57	0.44	0.04	A	0.43	-0.09	-0.01	A
28	0.02	0.02	0.00	A	0.56	0.44	0.04	A	0.00	0.00	0.00	A
29	2.31	-0.39	-0.01	A	2.03	1.27	0.06	A	0.24	-0.08	-0.01	A
30	3.27	-0.30	-0.03	A	0.45	-0.39	-0.04	A	0.55	-0.10	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form C)

	Reference: Male N= 14987 Focal: Female N= 14456				Reference: Hispanic N= 15573 Focal: Non Hispanic N= 13870				Reference: White N= 18121 Focal: Africa American N= 751				Reference: White N= 18121 Focal: Native American N= 1533			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	0.03	0.01	0.00	A	0.04	-0.01	0.00	A	0.96	0.18	0.02	A	0.06	-0.03	0.00	A
32	157.10	-0.79	-0.06	A	39.17	-0.41	-0.03	A	1.00	-0.21	-0.02	A	2.80	0.25	0.02	A
33	536.97	-1.45	-0.12	B<	15.40	-0.25	-0.02	A	0.01	-0.02	0.00	A	0.29	-0.08	-0.01	A
34	3.83	0.13	0.01	A	0.94	-0.06	-0.01	A	9.40	0.62	0.05	A	8.86	-0.41	-0.03	A
35	4.47	-0.14	-0.01	A	0.11	-0.02	0.00	A	1.17	-0.21	-0.02	A	3.78	-0.27	-0.02	A
36	8.49	0.17	0.02	A	16.93	-0.24	-0.02	A	0.51	0.13	0.01	A	7.00	0.34	0.04	A
37	3.56	-0.11	-0.01	A	3.55	0.12	0.01	A	0.31	-0.11	-0.01	A	1.05	-0.15	-0.01	A
38	23.92	-0.29	-0.03	A	18.51	-0.26	-0.02	A	6.82	0.49	0.04	A	0.06	-0.04	0.00	A
39	35.14	0.36	0.03	A	0.88	-0.06	0.00	A	0.78	-0.17	-0.01	A	15.87	-0.59	-0.05	A
40	169.24	-0.86	-0.06	A	4.44	-0.14	-0.01	A	0.81	-0.18	-0.01	A	0.00	0.01	0.00	A
41	56.96	0.48	0.04	A	1.00	-0.07	0.00	A	0.08	0.06	0.00	A	1.61	0.19	0.01	A
42	1.86	-0.08	-0.01	A	0.28	-0.03	0.00	A	12.27	-0.65	-0.06	A	0.09	-0.04	0.00	A
43	22.30	-0.28	-0.03	A	5.80	-0.15	-0.01	A	7.73	-0.51	-0.05	A	0.16	-0.05	0.00	A
44	34.86	-0.36	-0.03	A	2.58	-0.10	-0.01	A	0.46	-0.13	-0.01	A	0.00	0.00	0.00	A
45	15.48	-0.33	-0.02	A	42.40	-0.55	-0.03	A	0.39	0.15	0.01	A	4.60	0.35	0.02	A
46	0.34	0.03	0.00	A	1.35	0.07	0.01	A	0.26	0.09	0.01	A	0.00	0.01	0.00	A
47	20.64	-0.31	-0.02	A	52.32	-0.51	-0.03	A	0.43	-0.15	-0.01	A	0.00	0.00	0.00	A
48	12.45	-0.21	-0.02	A	0.00	0.00	0.00	A	4.95	-0.41	-0.04	A	0.87	-0.12	-0.01	A
49	74.31	0.54	0.04	A	0.87	0.06	0.00	A	0.62	-0.15	-0.01	A	0.06	-0.03	0.00	A
50	39.67	-0.38	-0.03	A	1.53	-0.08	-0.01	A	0.00	0.00	0.00	A	0.22	-0.06	-0.01	A
51	11.33	0.20	0.02	A	1.29	0.07	0.01	A	1.21	-0.21	-0.02	A	0.85	0.13	0.01	A
52	0.04	0.01	0.00	A	0.34	-0.04	0.00	A	5.01	-0.42	-0.04	A	0.01	0.02	0.00	A
53	51.40	0.43	0.04	A	15.50	-0.24	-0.02	A	0.24	0.09	0.01	A	1.91	-0.18	-0.02	A
54	49.87	0.47	0.03	A	10.11	0.22	0.02	A	2.17	0.31	0.02	A	0.30	-0.08	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.1 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 4
(Form C)

	Reference: White N= 18121 Focal: Asian N= 1004				Reference: White N= 18121 Focal: Hawaii N= 70				Reference: White N= 18121 Focal: Multiple Indicator N= 1356			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
31	0.13	-0.06	0.00	A	0.00	0.02	0.00	A	0.12	-0.05	0.00	A
32	0.05	0.04	0.00	A	0.08	0.19	0.02	A	0.53	0.11	0.01	A
33	6.19	0.44	0.04	A	0.00	0.01	0.00	A	0.80	0.13	0.01	A
34	4.06	0.43	0.02	A	0.16	0.30	0.02	A	3.15	0.28	0.02	A
35	4.06	0.40	0.03	A	1.97	-0.88	-0.07	A	0.02	-0.02	0.00	A
36	3.60	-0.31	-0.03	A	0.23	-0.28	-0.03	A	1.18	-0.15	-0.01	A
37	0.66	0.13	0.01	A	0.27	0.30	0.03	A	1.02	-0.15	-0.01	A
38	0.16	0.07	0.01	A	0.47	0.37	0.04	A	2.70	0.24	0.02	A
39	8.07	0.49	0.04	A	1.70	0.78	0.07	A	1.43	-0.18	-0.02	A
40	0.18	0.09	0.00	A	0.02	-0.10	-0.01	A	0.32	-0.09	-0.01	A
41	9.14	0.52	0.05	A	0.74	-0.57	-0.04	A	1.49	-0.19	-0.01	A
42	0.72	0.16	0.01	A	0.00	0.02	0.00	A	1.66	-0.19	-0.02	A
43	3.85	0.35	0.03	A	0.02	0.09	0.01	A	0.10	0.04	0.00	A
44	0.03	0.03	0.00	A	0.40	0.40	0.03	A	0.05	-0.03	0.00	A
45	0.01	0.02	0.00	A	0.34	-0.53	-0.02	A	3.26	0.35	0.02	A
46	0.40	-0.11	-0.01	A	0.93	-0.56	-0.06	A	0.59	-0.11	-0.01	A
47	3.30	-0.33	-0.03	A	4.58	1.30	0.10	A	3.25	-0.31	-0.02	A
48	0.81	-0.16	-0.01	A	2.01	-0.84	-0.08	A	0.52	0.10	0.01	A
49	0.04	-0.04	0.00	A	0.45	-0.45	-0.04	A	0.40	0.09	0.01	A
50	0.31	0.10	0.01	A	0.15	-0.25	-0.02	A	4.82	-0.32	-0.03	A
51	0.03	0.03	0.00	A	4.41	-1.31	-0.12	A	0.19	-0.06	-0.01	A
52	1.80	-0.24	-0.02	A	0.59	-0.46	-0.04	A	2.69	-0.24	-0.02	A
53	2.87	-0.30	-0.02	A	2.57	-0.92	-0.09	A	1.15	0.16	0.01	A
54	6.90	0.60	0.03	A	0.00	0.03	0.00	A	2.01	0.23	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.2
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form A)

	Reference: Male N= 14586 Focal: Female N= 13644				Reference: Hispanic N= 15565 Focal: Non Hispanic N= 12665				Reference: White N= 17067 Focal: Africa American N= 722				Reference: White N= 17067 Focal: Native American N= 1590			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	48.04	-0.53	-0.03	A	16.72	-0.32	-0.02	A	0.11	0.08	0.01	A	0.06	-0.04	0.00	A
2	12.42	-0.23	-0.02	A	2.94	-0.11	-0.01	A	0.17	0.08	0.01	A	0.79	-0.12	-0.01	A
3	188.59	0.83	0.08	A	50.10	-0.44	-0.04	A	0.07	-0.05	0.00	A	14.25	0.49	0.05	A
4	54.24	0.50	0.04	A	0.46	-0.05	0.00	A	2.46	0.34	0.03	A	6.40	-0.36	-0.03	A
5	19.97	-0.32	-0.02	A	17.00	-0.30	-0.02	A	1.00	0.21	0.02	A	0.61	-0.11	-0.01	A
6	8.21	-0.17	-0.02	A	32.48	0.35	0.03	A	0.01	-0.02	0.00	A	0.72	-0.11	-0.01	A
7	0.07	0.02	0.00	A	8.91	-0.23	-0.02	A	0.07	0.06	0.00	A	2.62	-0.23	-0.02	A
8	62.53	-0.76	-0.03	A	13.08	-0.35	-0.02	A	0.46	-0.19	-0.01	A	26.05	-0.84	-0.05	A
9	225.36	0.91	0.08	A	1.99	0.09	0.01	A	1.01	-0.19	-0.02	A	7.39	-0.35	-0.03	A
10	7.26	-0.17	-0.01	A	14.97	-0.25	-0.02	A	9.54	-0.58	-0.05	A	0.56	-0.10	-0.01	A
11	11.22	-0.21	-0.02	A	3.11	-0.11	-0.01	A	0.47	-0.13	-0.01	A	0.92	-0.12	-0.01	A
12	125.27	0.74	0.06	A	12.91	0.24	0.02	A	0.90	-0.19	-0.02	A	4.01	0.28	0.02	A
13	1.95	0.10	0.01	A	1.81	0.10	0.01	A	0.53	-0.15	-0.01	A	5.46	-0.32	-0.03	A
14	0.60	0.05	0.00	A	15.08	0.24	0.02	A	0.00	0.01	0.00	A	0.97	-0.13	-0.01	A
15	5.38	0.14	0.01	A	1.29	0.07	0.01	A	0.14	0.07	0.01	A	6.60	0.34	0.03	A
16	4.94	0.14	0.01	A	1.81	-0.09	-0.01	A	0.64	-0.15	-0.01	A	0.74	0.11	0.01	A
17	44.87	0.43	0.04	A	0.14	-0.02	0.00	A	0.45	-0.13	-0.01	A	2.82	-0.23	-0.02	A
18	12.98	0.23	0.02	A	0.11	0.02	0.00	A	0.51	0.15	0.01	A	0.57	0.11	0.01	A
19	144.98	0.82	0.06	A	2.09	-0.10	-0.01	A	0.30	-0.11	-0.01	A	9.19	0.42	0.04	A
20	36.35	-0.40	-0.03	A	57.30	-0.53	-0.03	A	0.38	-0.14	-0.01	A	23.04	-0.82	-0.05	A
21	0.01	-0.01	0.00	A	0.00	0.00	0.00	A	2.09	-0.28	-0.03	A	8.43	0.38	0.04	A
22	26.79	-0.31	-0.03	A	89.44	-0.58	-0.05	A	0.85	0.17	0.02	A	0.03	-0.02	0.00	A
23	44.77	-0.42	-0.04	A	15.27	-0.25	-0.02	A	1.76	-0.26	-0.02	A	12.63	-0.49	-0.04	A
24	9.73	0.21	0.02	A	36.73	-0.43	-0.03	A	1.18	0.24	0.02	A	1.43	-0.19	-0.01	A
25	43.35	0.40	0.04	A	0.07	-0.02	0.00	A	4.51	-0.40	-0.04	A	0.02	0.02	0.00	A
26	2.23	-0.09	-0.01	A	48.16	-0.44	-0.04	A	12.26	0.66	0.06	A	0.98	-0.13	-0.01	A
27	2.85	-0.11	-0.01	A	28.17	-0.36	-0.02	A	2.84	0.35	0.03	A	3.89	-0.30	-0.02	A
28	37.13	-0.37	-0.03	A	19.91	-0.28	-0.02	A	2.93	-0.32	-0.03	A	1.16	-0.15	-0.01	A
29	107.73	-0.66	-0.06	A	61.86	-0.51	-0.04	A	0.06	0.05	0.00	A	8.77	-0.42	-0.03	A
30	124.72	0.77	0.05	A	12.27	0.25	0.02	A	0.30	0.11	0.01	A	3.27	0.26	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form A)

	Reference: White N= 17067 Focal: Asian N= 952				Reference: White N= 17067 Focal: Hawaii N= 70				Reference: White N= 17067 Focal: Multiple Indicator N= 1160			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	4.11	-0.47	-0.02	A	0.02	0.11	0.01	A	2.97	0.33	0.02	A
2	3.38	-0.36	-0.02	A	0.68	0.55	0.04	A	1.91	-0.22	-0.02	A
3	38.03	-1.04	-0.09	B<	0.56	0.45	0.04	A	1.66	0.20	0.02	A
4	0.11	-0.07	0.00	A	0.44	0.48	0.03	A	0.36	-0.10	-0.01	A
5	1.98	-0.35	-0.01	A	1.78	-0.88	-0.06	A	0.07	0.05	0.00	A
6	2.65	-0.27	-0.03	A	1.01	-0.57	-0.06	A	1.22	0.17	0.02	A
7	1.43	-0.30	-0.01	A	3.61	1.68	0.09	A	0.60	0.15	0.01	A
8	0.40	-0.22	0.00	A	0.19	-0.41	-0.02	A	4.44	-0.46	-0.02	A
9	3.19	-0.32	-0.03	A	0.10	-0.18	-0.02	A	0.86	-0.14	-0.01	A
10	4.50	-0.39	-0.03	A	0.00	-0.02	0.00	A	2.12	0.23	0.02	A
11	0.97	0.19	0.01	A	2.50	-0.96	-0.09	A	0.30	0.08	0.01	A
12	1.12	0.23	0.01	A	4.03	1.62	0.10	A	3.37	0.31	0.02	A
13	0.34	0.13	0.01	A	0.47	-0.50	-0.03	A	1.60	-0.22	-0.02	A
14	7.84	0.47	0.05	A	1.26	0.65	0.06	A	0.43	-0.10	-0.01	A
15	18.55	0.78	0.07	A	0.04	-0.12	-0.01	A	2.34	0.24	0.02	A
16	0.37	0.12	0.01	A	0.05	-0.13	-0.01	A	2.29	-0.24	-0.02	A
17	0.07	0.05	0.00	A	3.30	-1.07	-0.10	A	0.90	-0.15	-0.01	A
18	13.36	0.62	0.06	A	0.05	0.15	0.01	A	0.29	-0.09	-0.01	A
19	4.71	0.52	0.03	A	1.98	-0.84	-0.07	A	2.56	-0.26	-0.02	A
20	13.72	0.68	0.06	A	0.05	-0.15	-0.01	A	0.06	-0.04	0.00	A
21	2.46	0.27	0.03	A	0.01	-0.05	0.00	A	1.70	-0.20	-0.02	A
22	1.96	0.24	0.02	A	2.71	0.91	0.09	A	0.33	0.09	0.01	A
23	0.12	-0.06	0.00	A	0.26	-0.31	-0.03	A	0.97	-0.16	-0.01	A
24	14.85	0.72	0.06	A	2.62	-1.15	-0.08	A	0.83	-0.16	-0.01	A
25	8.86	0.55	0.04	A	1.07	0.58	0.06	A	2.19	-0.22	-0.02	A
26	2.36	0.27	0.02	A	1.77	-0.81	-0.07	A	0.16	0.06	0.01	A
27	22.24	0.94	0.07	A	0.26	0.32	0.03	A	1.55	-0.21	-0.02	A
28	0.00	-0.01	0.00	A	0.62	-0.50	-0.04	A	2.32	-0.23	-0.02	A
29	1.22	-0.20	-0.02	A	3.55	-1.15	-0.10	A	0.27	-0.08	-0.01	A
30	0.03	-0.04	0.00	A	1.45	0.85	0.06	A	0.00	0.00	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science CRT Grade 8
(Form A)

	Reference: Male N= 14586 Focal: Female N= 13644				Reference: Hispanic N= 15565 Focal: Non Hispanic N= 12665				Reference: White N= 17067 Focal: Africa American N= 722				Reference: White N= 17067 Focal: Native American N= 1590			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	6.17	-0.15	-0.01	A	3.20	-0.11	-0.01	A	1.73	0.25	0.02	A	0.37	-0.08	-0.01	A
32	227.66	1.25	0.06	B>	2.62	-0.13	-0.01	A	1.59	0.30	0.02	A	0.63	-0.12	-0.01	A
33	5.94	-0.14	-0.01	A	29.16	0.32	0.03	A	1.38	-0.22	-0.02	A	7.72	0.35	0.04	A
34	0.02	-0.01	0.00	A	0.69	0.06	0.01	A	0.36	0.12	0.01	A	0.06	-0.03	0.00	A
35	699.87	-1.66	-0.14	C<	8.36	-0.19	-0.01	A	8.28	-0.59	-0.05	A	1.47	-0.17	-0.01	A
36	0.72	0.05	0.00	A	18.41	-0.26	-0.02	A	3.07	0.33	0.03	A	0.01	0.01	0.00	A
37	16.01	-0.29	-0.02	A	9.65	-0.24	-0.01	A	0.59	-0.19	-0.01	A	22.62	-0.90	-0.05	A
38	64.85	0.49	0.04	A	22.62	0.30	0.03	A	0.13	-0.07	-0.01	A	1.20	-0.15	-0.01	A
39	2.47	-0.10	-0.01	A	9.48	-0.19	-0.02	A	0.03	0.04	0.00	A	0.00	0.00	0.00	A
40	5.29	-0.15	-0.01	A	0.35	-0.04	0.00	A	1.13	-0.21	-0.02	A	0.09	0.04	0.00	A
41	1.95	-0.09	-0.01	A	0.30	0.04	0.01	A	1.37	-0.22	-0.02	A	0.01	-0.02	0.00	A
42	1.91	-0.10	-0.01	A	3.83	-0.14	-0.01	A	0.11	-0.07	-0.01	A	0.79	-0.12	-0.01	A
43	0.17	0.03	0.00	A	6.65	-0.16	-0.01	A	0.13	-0.07	-0.01	A	4.81	-0.29	-0.03	A
44	61.84	0.62	0.03	A	12.75	0.29	0.02	A	4.89	-0.51	-0.03	A	2.54	0.24	0.02	A
45	0.08	-0.02	0.00	A	27.66	-0.32	-0.03	A	0.04	-0.04	0.00	A	0.55	-0.09	-0.01	A
46	65.88	-0.50	-0.05	A	0.24	-0.03	0.00	A	0.07	-0.05	0.00	A	0.41	0.09	0.01	A
47	2.39	0.12	0.01	A	1.75	-0.11	-0.01	A	0.55	-0.18	-0.01	A	0.25	0.08	0.01	A
48	1.62	-0.09	-0.01	A	25.00	-0.34	-0.03	A	0.00	0.00	0.00	A	2.51	-0.23	-0.02	A
49	112.63	0.64	0.06	A	11.84	0.22	0.02	A	0.13	-0.07	-0.01	A	1.12	0.14	0.01	A
50	5.85	0.16	0.01	A	5.79	-0.17	-0.01	A	0.01	0.02	0.00	A	7.17	-0.40	-0.03	A
51	9.33	0.18	0.02	A	5.96	0.15	0.01	A	1.74	-0.25	-0.02	A	5.40	-0.31	-0.03	A
52	1.08	-0.06	-0.01	A	24.13	-0.31	-0.03	A	2.54	0.31	0.03	A	0.49	-0.09	-0.01	A
53	2.71	0.13	0.01	A	3.77	-0.16	-0.01	A	0.05	-0.05	0.00	A	1.10	-0.16	-0.01	A
54	18.17	-0.28	-0.02	A	4.93	-0.15	-0.01	A	0.46	-0.14	-0.01	A	0.91	-0.13	-0.01	A
55	56.46	0.49	0.04	A	22.23	-0.32	-0.02	A	0.21	0.10	0.01	A	0.69	-0.12	-0.01	A
56	0.27	-0.03	0.00	A	0.26	0.03	0.00	A	0.20	-0.10	-0.01	A	0.10	-0.05	0.00	A
57	136.15	-0.67	-0.07	A	25.44	-0.30	-0.02	A	0.46	0.12	0.01	A	2.31	-0.19	-0.02	A
58	34.16	-0.35	-0.03	A	42.97	-0.41	-0.03	A	9.75	-0.60	-0.06	A	5.05	0.29	0.03	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form A)

	Reference: White N= 17067 Focal: Asian N= 952				Reference: White N= 17067 Focal: Hawaii N= 70				Reference: White N= 17067 Focal: Multiple Indicator N= 1160			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	6.80	0.47	0.04	A	0.67	0.48	0.05	A	2.53	0.24	0.02	A
32	0.18	-0.12	0.00	A	0.22	0.38	0.02	A	0.01	0.01	0.00	A
33	0.00	0.00	0.00	A	0.57	0.43	0.04	A	0.60	0.11	0.01	A
34	21.63	1.21	0.05	B>	1.00	0.67	0.05	A	2.42	-0.27	-0.02	A
35	12.31	0.62	0.06	A	0.00	0.01	0.00	A	2.44	-0.25	-0.02	A
36	7.04	0.46	0.05	A	0.10	-0.18	-0.02	A	0.72	0.13	0.01	A
37	3.52	0.34	0.03	A	0.58	-0.60	-0.03	A	2.18	-0.28	-0.02	A
38	1.38	0.22	0.02	A	0.40	-0.37	-0.03	A	1.05	-0.16	-0.01	A
39	7.52	0.51	0.04	A	1.65	-0.79	-0.07	A	4.14	0.32	0.03	A
40	16.79	0.90	0.05	A	0.30	0.33	0.03	A	0.53	0.12	0.01	A
41	1.46	0.23	0.02	A	0.00	0.02	0.00	A	0.04	0.03	0.00	A
42	0.00	0.01	0.00	A	1.84	-0.92	-0.07	A	0.06	0.04	0.00	A
43	0.32	-0.11	-0.01	A	0.00	-0.01	0.00	A	0.49	-0.11	-0.01	A
44	0.60	0.22	0.01	A	6.05	-1.75	-0.11	A	0.10	0.06	0.00	A
45	5.37	0.40	0.04	A	0.25	-0.30	-0.03	A	0.01	-0.02	0.00	A
46	16.07	0.76	0.06	A	0.01	0.05	0.00	A	1.16	0.17	0.02	A
47	0.00	0.01	0.00	A	0.74	-0.67	-0.04	A	1.75	0.25	0.02	A
48	0.08	0.06	0.00	A	0.14	-0.24	-0.02	A	0.22	0.08	0.01	A
49	14.15	0.70	0.06	A	0.31	-0.33	-0.03	A	1.25	0.18	0.02	A
50	23.20	1.00	0.06	B>	0.54	-0.51	-0.04	A	0.01	0.02	0.00	A
51	0.83	0.17	0.02	A	1.64	0.81	0.07	A	0.53	0.11	0.01	A
52	0.64	0.15	0.01	A	0.11	0.22	0.02	A	0.01	-0.01	0.00	A
53	1.11	0.33	0.01	A	1.82	-1.04	-0.06	A	0.00	0.00	0.00	A
54	10.16	0.70	0.04	A	0.25	-0.31	-0.03	A	0.58	0.13	0.01	A
55	20.35	0.80	0.07	A	1.71	0.72	0.07	A	0.03	0.03	0.00	A
56	17.95	0.73	0.07	A	0.63	0.51	0.04	A	1.17	-0.18	-0.01	A
57	2.09	0.24	0.02	A	0.03	-0.10	-0.01	A	1.27	-0.16	-0.02	A
58	9.96	0.58	0.05	A	2.80	-1.07	-0.09	A	0.14	-0.06	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form B)

	Reference: Male N= 14392 Focal: Female N= 13762				Reference: Hispanic N= 15387 Focal: Non Hispanic N= 12767				Reference: White N= 17077 Focal: Africa American N= 734				Reference: White N= 17077 Focal: Native American N= 1574			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	23.66	-0.37	-0.02	A	5.09	-0.18	-0.01	A	0.63	-0.18	-0.01	A	0.65	-0.12	-0.01	A
2	10.17	-0.21	-0.02	A	5.19	-0.15	-0.01	A	0.17	0.08	0.01	A	0.25	0.07	0.01	A
3	35.71	0.34	0.04	A	5.41	0.14	0.01	A	0.00	-0.01	0.00	A	0.47	0.09	0.01	A
4	23.65	0.33	0.02	A	2.80	-0.12	-0.01	A	0.25	-0.10	-0.01	A	13.56	0.52	0.04	A
5	19.93	0.30	0.02	A	11.19	-0.23	-0.02	A	2.54	-0.33	-0.03	A	12.91	-0.56	-0.04	A
6	8.21	-0.17	-0.02	A	12.54	-0.22	-0.02	A	0.82	-0.17	-0.02	A	0.07	-0.03	0.00	A
7	0.08	-0.02	0.00	A	9.89	-0.24	-0.02	A	0.04	0.04	0.00	A	2.42	0.23	0.02	A
8	101.74	-0.97	-0.03	A	7.95	-0.28	-0.01	A	0.36	-0.16	-0.01	A	30.50	-0.88	-0.05	A
9	169.18	0.79	0.07	A	0.32	0.04	0.00	A	0.69	0.16	0.01	A	1.32	-0.15	-0.01	A
10	5.31	-0.14	-0.01	A	30.21	-0.35	-0.03	A	0.52	-0.13	-0.01	A	0.07	-0.03	0.00	A
11	5.04	0.16	0.01	A	4.34	0.15	0.01	A	0.02	0.03	0.00	A	8.66	-0.41	-0.03	A
12	129.05	0.74	0.06	A	21.19	0.31	0.03	A	0.81	-0.17	-0.02	A	2.50	0.22	0.02	A
13	0.12	-0.02	0.00	A	8.08	0.17	0.02	A	2.52	-0.30	-0.03	A	0.17	0.05	0.01	A
14	8.63	0.18	0.02	A	0.17	0.03	0.00	A	0.62	0.15	0.01	A	4.10	0.27	0.02	A
15	28.77	0.34	0.03	A	10.10	0.21	0.02	A	0.05	0.05	0.00	A	0.15	0.06	0.00	A
16	0.75	0.05	0.01	A	0.64	-0.05	-0.01	A	2.83	-0.32	-0.03	A	1.80	0.18	0.02	A
17	74.06	0.55	0.05	A	8.19	-0.19	-0.02	A	0.42	0.13	0.01	A	0.13	0.05	0.00	A
18	140.61	0.81	0.06	A	5.48	0.16	0.01	A	0.22	-0.10	-0.01	A	3.83	0.27	0.02	A
19	66.39	-0.52	-0.04	A	7.27	-0.17	-0.01	A	1.29	0.22	0.02	A	12.93	-0.49	-0.04	A
20	23.43	-0.33	-0.02	A	31.86	-0.40	-0.02	A	0.39	-0.14	-0.01	A	26.63	-0.94	-0.05	A
21	7.17	-0.16	-0.02	A	3.40	0.12	0.01	A	4.35	-0.40	-0.04	A	2.74	-0.22	-0.02	A
22	35.64	0.36	0.03	A	0.00	0.00	0.00	A	11.40	-0.62	-0.06	A	1.30	0.15	0.01	A
23	32.11	-0.36	-0.03	A	13.30	-0.24	-0.02	A	2.67	-0.32	-0.03	A	6.22	-0.35	-0.03	A
24	21.76	0.32	0.02	A	36.37	-0.43	-0.03	A	0.02	0.03	0.00	A	7.13	-0.45	-0.03	A
25	4.71	-0.14	-0.01	A	56.79	-0.51	-0.04	A	0.36	0.12	0.01	A	7.56	-0.41	-0.03	A
26	0.48	-0.04	0.00	A	49.36	-0.44	-0.03	A	2.09	0.28	0.02	A	6.01	-0.34	-0.03	A
27	14.20	-0.27	-0.02	A	16.72	-0.32	-0.02	A	0.02	-0.04	0.00	A	4.09	-0.36	-0.02	A
28	37.09	-0.37	-0.03	A	9.12	-0.19	-0.02	A	1.44	-0.23	-0.02	A	0.27	-0.07	-0.01	A
29	161.44	-0.80	-0.07	A	96.13	-0.63	-0.05	A	0.24	-0.09	-0.01	A	2.42	-0.22	-0.02	A
30	110.69	0.72	0.05	A	17.35	0.29	0.02	A	0.06	-0.05	0.00	A	16.36	0.59	0.05	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form B)

	Reference: White N= 17077 Focal: Asian N= 993				Reference: White N= 17077 Focal: Hawaii N= 62				Reference: White N= 17077 Focal: Multiple Indicator N= 1152			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	3.62	-0.43	-0.02	A	0.29	-0.42	-0.02	A	6.48	0.50	0.03	A
2	2.37	-0.29	-0.02	A	0.16	-0.28	-0.02	A	2.89	-0.27	-0.02	A
3	0.03	0.03	0.00	A	0.38	0.38	0.04	A	1.15	0.16	0.02	A
4	0.84	0.21	0.01	A	0.01	0.08	0.01	A	0.02	0.02	0.00	A
5	14.39	0.79	0.05	A	0.08	-0.20	-0.02	A	1.33	-0.20	-0.01	A
6	13.21	-0.60	-0.05	A	5.59	-1.41	-0.14	A	1.16	-0.16	-0.02	A
7	0.07	0.06	0.00	A	0.01	-0.10	-0.01	A	7.78	0.53	0.03	A
8	2.63	-0.53	-0.01	A	1.17	1.31	0.04	A	0.24	0.12	0.00	A
9	0.63	-0.14	-0.01	A	1.53	0.85	0.07	A	0.58	-0.12	-0.01	A
10	5.82	-0.43	-0.03	A	0.11	-0.22	-0.02	A	0.01	-0.02	0.00	A
11	0.65	-0.18	-0.01	A	0.14	-0.28	-0.02	A	0.83	0.16	0.01	A
12	2.84	0.36	0.02	A	0.14	-0.25	-0.02	A	0.69	-0.13	-0.01	A
13	6.10	0.40	0.04	A	1.80	-0.88	-0.08	A	0.11	0.05	0.00	A
14	20.96	0.82	0.07	A	0.01	0.06	0.01	A	0.07	-0.04	0.00	A
15	1.23	0.19	0.02	A	1.29	0.72	0.06	A	0.10	0.05	0.00	A
16	5.60	0.45	0.03	A	2.69	1.12	0.10	A	0.10	-0.05	0.00	A
17	2.81	0.32	0.02	A	0.49	0.46	0.04	A	0.06	-0.04	0.00	A
18	7.05	0.62	0.03	A	0.13	-0.26	-0.02	A	1.69	-0.22	-0.02	A
19	3.31	0.35	0.03	A	0.06	-0.16	-0.01	A	0.31	-0.09	-0.01	A
20	21.55	0.83	0.07	A	0.06	0.19	0.01	A	0.40	-0.11	-0.01	A
21	3.17	0.32	0.03	A	0.10	-0.20	-0.02	A	0.46	0.10	0.01	A
22	3.06	0.31	0.03	A	0.07	-0.16	-0.02	A	0.20	0.07	0.01	A
23	0.13	-0.07	0.00	A	2.34	-1.00	-0.09	A	2.28	-0.24	-0.02	A
24	37.49	1.14	0.09	B>	0.34	-0.40	-0.03	A	0.13	0.06	0.00	A
25	20.63	0.82	0.06	A	0.40	-0.43	-0.04	A	7.28	-0.45	-0.04	A
26	1.18	0.18	0.02	A	0.06	-0.16	-0.01	A	0.00	0.00	0.00	A
27	3.09	0.32	0.03	A	0.72	-0.77	-0.04	A	0.46	-0.13	-0.01	A
28	0.03	0.03	0.00	A	5.15	1.50	0.14	A	4.64	-0.34	-0.03	A
29	0.03	0.03	0.00	A	0.02	0.09	0.01	A	2.64	-0.26	-0.02	A
30	1.36	0.25	0.01	A	2.50	-1.25	-0.08	A	0.28	0.09	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form B)

	Reference: Male N= 14392 Focal: Female N= 13762				Reference: Hispanic N= 15387 Focal: Non Hispanic N= 12767				Reference: White N= 17077 Focal: Africa American N= 734				Reference: White N= 17077 Focal: Native American N= 1574			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	2.08	-0.09	-0.01	A	9.83	-0.20	-0.02	A	0.39	0.12	0.01	A	0.19	-0.06	0.00	A
32	171.03	1.12	0.05	B>	0.52	-0.06	0.00	A	0.22	0.12	0.01	A	2.93	-0.26	-0.02	A
33	3.09	-0.12	-0.01	A	0.09	0.02	0.00	A	0.45	0.14	0.01	A	1.42	0.16	0.01	A
34	798.42	-1.78	-0.16	C<	5.35	-0.15	-0.01	A	0.03	-0.04	0.00	A	3.16	-0.26	-0.02	A
35	11.32	0.20	0.02	A	32.73	-0.35	-0.03	A	1.99	0.26	0.03	A	0.09	-0.04	0.00	A
36	0.45	-0.04	0.00	A	4.73	-0.14	-0.01	A	2.63	0.30	0.03	A	0.33	0.08	0.01	A
37	0.32	-0.04	0.00	A	17.32	-0.28	-0.02	A	1.23	0.22	0.02	A	0.35	0.08	0.01	A
38	61.83	0.48	0.04	A	31.23	0.36	0.03	A	5.83	-0.46	-0.04	A	0.05	0.03	0.00	A
39	0.14	-0.02	0.00	A	0.72	-0.05	0.00	A	0.03	0.03	0.00	A	0.57	0.10	0.01	A
40	12.61	-0.23	-0.02	A	0.02	0.01	0.00	A	0.27	-0.10	-0.01	A	2.27	-0.21	-0.02	A
41	13.00	-0.26	-0.02	A	22.34	-0.34	-0.02	A	0.03	-0.03	0.00	A	0.17	0.06	0.01	A
42	166.01	1.03	0.05	B>	0.62	0.06	0.01	A	2.30	-0.35	-0.02	A	0.45	-0.10	-0.01	A
43	0.18	0.03	0.00	A	4.08	-0.13	-0.01	A	1.89	-0.26	-0.02	A	2.83	-0.22	-0.02	A
44	41.18	0.51	0.03	A	9.19	0.24	0.01	A	0.82	0.21	0.01	A	0.03	-0.02	0.00	A
45	1.85	-0.08	-0.01	A	8.46	-0.18	-0.02	A	3.26	0.32	0.03	A	0.49	-0.09	-0.01	A
46	54.42	-0.45	-0.04	A	9.04	-0.19	-0.02	A	0.34	-0.11	-0.01	A	0.02	0.02	0.00	A
47	1.13	0.06	0.01	A	0.72	0.05	0.01	A	1.78	0.25	0.02	A	1.39	-0.15	-0.01	A
48	8.31	-0.19	-0.02	A	47.59	-0.47	-0.04	A	1.45	0.25	0.02	A	1.61	-0.18	-0.02	A
49	0.39	-0.04	0.00	A	0.26	-0.04	0.00	A	0.00	-0.01	0.00	A	1.33	-0.16	-0.01	A
50	101.63	0.66	0.05	A	42.05	-0.44	-0.03	A	1.76	0.27	0.02	A	0.03	-0.03	0.00	A
51	65.19	0.49	0.05	A	14.84	0.24	0.02	A	0.13	-0.07	-0.01	A	1.55	0.16	0.02	A
52	2.16	-0.09	-0.01	A	15.23	-0.25	-0.02	A	0.02	0.03	0.00	A	0.19	-0.06	0.00	A
53	1.01	0.08	0.00	A	0.70	0.07	0.00	A	3.37	-0.41	-0.03	A	1.16	-0.16	-0.01	A
54	17.16	-0.26	-0.02	A	2.34	-0.10	0.00	A	0.43	-0.13	-0.01	A	0.12	-0.05	0.00	A
55	0.20	0.03	0.00	A	3.51	-0.13	-0.01	A	2.04	0.29	0.02	A	0.48	0.10	0.01	A
56	0.71	-0.06	0.00	A	5.33	0.16	0.01	A	7.45	-0.54	-0.05	A	1.01	0.14	0.01	A
57	122.24	-0.64	-0.06	A	19.23	-0.26	-0.02	A	0.14	-0.07	-0.01	A	0.90	-0.12	-0.01	A
58	36.81	-0.37	-0.03	A	40.47	-0.40	-0.03	A	2.70	-0.30	-0.03	A	0.01	0.01	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form B)

	Reference: White N= 17077 Focal: Asian N= 993				Reference: White N= 17077 Focal: Hawaii N= 62				Reference: White N= 17077 Focal: Multiple Indicator N= 1152			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	8.39	0.51	0.04	A	0.00	-0.03	0.00	A	9.19	0.46	0.04	A
32	0.44	-0.20	-0.01	A	3.60	2.50	0.08	A	0.99	-0.20	-0.01	A
33	22.15	1.19	0.05	B>	0.38	-0.40	-0.03	A	0.22	-0.08	-0.01	A
34	11.15	0.58	0.05	A	1.82	-0.90	-0.08	A	2.46	-0.25	-0.02	A
35	0.86	0.15	0.01	A	1.86	0.85	0.08	A	0.33	0.09	0.01	A
36	15.16	0.71	0.06	A	0.14	0.24	0.02	A	0.02	-0.02	0.00	A
37	0.00	0.00	0.00	A	0.84	-0.59	-0.05	A	0.88	-0.15	-0.01	A
38	0.96	0.17	0.01	A	0.06	-0.18	-0.01	A	0.34	0.09	0.01	A
39	6.79	0.44	0.04	A	0.03	0.12	0.01	A	0.02	-0.02	0.00	A
40	32.70	1.28	0.07	B>	0.76	0.60	0.05	A	1.07	0.17	0.01	A
41	0.12	0.08	0.00	A	4.98	1.93	0.11	A	0.00	0.00	0.00	A
42	3.78	0.57	0.02	A	0.42	-0.53	-0.03	A	0.00	0.01	0.00	A
43	0.20	-0.08	0.00	A	2.41	-1.04	-0.09	A	0.25	0.08	0.01	A
44	2.91	0.51	0.02	A	0.29	0.49	0.02	A	0.23	0.10	0.01	A
45	3.73	0.32	0.03	A	0.32	-0.35	-0.04	A	0.81	-0.13	-0.01	A
46	6.28	0.46	0.04	A	0.60	0.48	0.05	A	0.60	0.12	0.01	A
47	10.11	0.57	0.05	A	1.33	-0.71	-0.07	A	0.87	-0.14	-0.01	A
48	3.37	0.38	0.02	A	0.71	0.66	0.05	A	4.59	0.36	0.03	A
49	0.68	-0.19	-0.01	A	0.10	-0.24	-0.02	A	0.14	-0.06	0.00	A
50	42.31	1.11	0.10	B>	1.96	0.91	0.08	A	0.60	-0.13	-0.01	A
51	0.01	0.02	0.00	A	0.05	0.14	0.01	A	0.00	-0.01	0.00	A
52	0.07	-0.05	0.00	A	1.62	0.85	0.07	A	1.03	-0.16	-0.01	A
53	0.52	0.21	0.01	A	0.12	0.36	0.02	A	0.78	-0.17	-0.01	A
54	6.51	0.49	0.04	A	0.65	-0.49	-0.05	A	0.26	-0.08	-0.01	A
55	37.46	1.04	0.10	B>	4.86	1.45	0.12	A	0.03	0.03	0.00	A
56	0.88	-0.19	-0.01	A	0.88	0.78	0.05	A	0.79	-0.15	-0.01	A
57	0.42	-0.10	-0.01	A	1.56	0.74	0.08	A	0.10	0.05	0.00	A
58	11.91	0.61	0.05	A	0.48	0.43	0.04	A	0.30	0.08	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.2
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form C)

	Reference: Male N= 14514 Focal: Female N= 13796				Reference: Hispanic N= 15522 Focal: Non Hispanic N= 12788				Reference: White N= 17224 Focal: Africa American N= 731				Reference: White N= 17224 Focal: Native American N= 1518			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	48.28	-0.54	-0.03	A	1.87	-0.11	-0.01	A	0.69	-0.19	-0.01	A	6.12	-0.37	-0.03	A
2	16.73	-0.26	-0.02	A	0.61	-0.05	-0.01	A	2.00	0.28	0.02	A	0.47	0.10	0.01	A
3	17.19	0.26	0.02	A	1.41	0.08	0.00	A	0.12	0.07	0.01	A	7.13	0.36	0.03	A
4	26.56	0.41	0.02	A	0.79	0.07	0.00	A	5.40	-0.51	-0.03	A	1.10	0.16	0.01	A
5	20.62	0.31	0.02	A	10.23	-0.22	-0.02	A	2.01	-0.29	-0.02	A	5.18	-0.35	-0.03	A
6	45.19	0.52	0.03	A	0.83	0.07	0.00	A	1.70	-0.29	-0.02	A	19.91	-0.66	-0.05	A
7	5.67	0.18	0.01	A	4.95	-0.17	-0.01	A	1.25	0.25	0.02	A	1.35	-0.17	-0.01	A
8	49.98	-0.68	-0.02	A	3.32	-0.18	-0.01	A	6.25	-0.64	-0.03	A	19.94	-0.76	-0.04	A
9	129.31	0.68	0.06	A	0.03	0.01	0.00	A	0.01	-0.02	0.00	A	4.73	-0.28	-0.03	A
10	7.32	-0.17	-0.01	A	26.27	-0.32	-0.03	A	1.41	-0.22	-0.02	A	4.66	-0.29	-0.03	A
11	7.05	0.19	0.01	A	0.01	0.01	0.00	A	0.09	0.06	0.00	A	5.67	-0.34	-0.03	A
12	130.67	0.74	0.06	A	7.54	0.18	0.02	A	0.42	0.13	0.01	A	0.92	0.13	0.01	A
13	0.18	0.03	0.00	A	6.87	0.16	0.02	A	8.93	-0.58	-0.05	A	0.04	0.03	0.00	A
14	6.49	0.15	0.01	A	3.16	0.11	0.01	A	0.97	0.19	0.02	A	5.49	0.32	0.03	A
15	17.96	0.27	0.02	A	8.10	0.19	0.01	A	0.37	0.12	0.01	A	1.07	0.15	0.01	A
16	7.61	0.17	0.01	A	2.25	-0.10	-0.01	A	2.06	-0.27	-0.03	A	0.02	-0.02	0.00	A
17	76.83	0.56	0.05	A	6.29	-0.16	-0.01	A	0.67	0.16	0.01	A	0.12	0.05	0.00	A
18	1.48	0.08	0.01	A	60.52	-0.54	-0.04	A	6.08	0.51	0.04	A	2.32	-0.21	-0.02	A
19	100.06	0.68	0.05	A	2.77	0.12	0.01	A	5.54	0.49	0.04	A	0.22	0.07	0.01	A
20	35.99	-0.41	-0.03	A	87.15	-0.66	-0.04	A	0.31	0.12	0.01	A	34.66	-1.11	-0.06	B<
21	6.99	0.15	0.02	A	1.20	0.07	0.01	A	2.23	-0.27	-0.03	A	1.74	0.17	0.02	A
22	28.65	0.33	0.03	A	0.54	0.05	0.00	A	3.05	-0.33	-0.03	A	0.48	0.09	0.01	A
23	12.63	-0.22	-0.02	A	26.13	-0.33	-0.03	A	4.81	-0.44	-0.04	A	2.08	-0.20	-0.02	A
24	13.27	0.25	0.02	A	30.90	-0.39	-0.02	A	2.92	0.37	0.03	A	0.19	-0.07	0.00	A
25	11.38	-0.22	-0.02	A	75.54	-0.58	-0.04	A	3.74	0.38	0.03	A	0.00	-0.01	0.00	A
26	3.16	-0.11	-0.01	A	29.93	-0.34	-0.03	A	2.72	0.32	0.03	A	2.19	-0.21	-0.02	A
27	27.75	-0.38	-0.02	A	4.53	-0.16	-0.01	A	3.44	-0.47	-0.03	A	1.17	-0.20	-0.01	A
28	55.30	-0.45	-0.04	A	6.38	-0.16	-0.01	A	0.13	-0.07	-0.01	A	0.05	-0.03	0.00	A
29	197.73	-0.88	-0.08	A	74.18	-0.55	-0.04	A	0.94	-0.19	-0.02	A	1.34	-0.16	-0.01	A
30	126.46	0.77	0.05	A	21.77	0.33	0.03	A	0.74	-0.18	-0.01	A	1.32	0.17	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form C)

	Reference: White N= 17224 Focal: Asian N= 978				Reference: White N= 17224 Focal: Hawaii N= 56				Reference: White N= 17224 Focal: Multiple Indicator N= 1208			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	12.67	-0.79	-0.04	A	0.00	0.05	0.00	A	3.72	0.37	0.02	A
2	5.28	-0.44	-0.03	A	0.86	0.58	0.06	A	1.39	-0.19	-0.02	A
3	1.35	-0.22	-0.01	A	0.01	0.06	0.01	A	0.04	0.03	0.00	A
4	4.84	-0.59	-0.02	A	6.56	-1.99	-0.13	A	2.71	-0.30	-0.02	A
5	11.99	0.73	0.05	A	0.32	-0.46	-0.03	A	0.03	-0.03	0.00	A
6	2.13	-0.37	-0.01	A	0.19	0.39	0.02	A	2.59	-0.29	-0.02	A
7	4.48	-0.49	-0.02	A	0.07	-0.19	-0.01	A	1.74	-0.24	-0.02	A
8	2.78	-0.60	-0.01	A	1.04	1.10	0.05	A	2.10	-0.31	-0.01	A
9	0.04	-0.03	0.00	A	0.01	-0.07	-0.01	A	0.90	0.14	0.01	A
10	3.74	-0.35	-0.03	A	0.08	0.20	0.02	A	0.12	0.05	0.00	A
11	1.15	-0.24	-0.01	A	0.00	0.01	0.00	A	0.83	-0.15	-0.01	A
12	19.89	1.01	0.06	B>	0.07	0.20	0.02	A	1.18	-0.17	-0.01	A
13	2.30	0.25	0.03	A	0.47	0.44	0.04	A	0.58	-0.11	-0.01	A
14	9.64	0.55	0.05	A	0.20	-0.29	-0.03	A	0.22	0.07	0.01	A
15	3.91	0.33	0.03	A	0.42	0.44	0.04	A	0.62	0.12	0.01	A
16	0.81	0.17	0.01	A	1.44	-0.80	-0.07	A	0.72	-0.13	-0.01	A
17	2.01	0.28	0.02	A	2.86	1.16	0.10	A	0.16	-0.06	-0.01	A
18	2.68	0.39	0.02	A	0.66	0.64	0.05	A	1.25	0.19	0.01	A
19	6.00	0.58	0.03	A	3.04	1.28	0.10	A	0.42	0.11	0.01	A
20	24.67	0.88	0.08	A	1.69	0.92	0.07	A	0.13	-0.06	0.00	A
21	0.06	0.04	0.00	A	0.55	0.48	0.05	A	0.02	0.02	0.00	A
22	8.24	0.54	0.04	A	0.41	-0.45	-0.04	A	0.11	0.05	0.00	A
23	5.48	-0.42	-0.03	A	1.07	-0.77	-0.06	A	0.03	-0.03	0.00	A
24	22.10	0.88	0.07	A	0.08	-0.27	-0.02	A	0.10	-0.06	0.00	A
25	12.65	0.67	0.05	A	0.66	-0.59	-0.05	A	0.20	-0.07	-0.01	A
26	0.01	-0.02	0.00	A	0.06	0.16	0.01	A	0.21	-0.07	-0.01	A
27	8.60	0.53	0.04	A	0.17	0.34	0.02	A	0.25	0.09	0.01	A
28	0.72	-0.15	-0.01	A	0.79	0.63	0.05	A	0.01	0.02	0.00	A
29	2.69	-0.29	-0.02	A	2.05	-1.06	-0.09	A	0.44	-0.10	-0.01	A
30	0.07	-0.06	0.00	A	1.65	-0.96	-0.07	A	0.10	-0.05	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form C)

	Reference: Male N= 14514 Focal: Female N= 13796				Reference: Hispanic N= 15522 Focal: Non Hispanic N= 12788				Reference: White N= 17224 Focal: Africa American N= 731				Reference: White N= 17224 Focal: Native American N= 1518			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	9.69	-0.19	-0.02	A	2.73	-0.10	-0.01	A	0.23	-0.09	-0.01	A	0.00	-0.01	0.00	A
32	218.49	1.26	0.06	B>	0.33	0.05	0.00	A	0.54	-0.18	-0.01	A	4.57	-0.34	-0.02	A
33	4.48	-0.15	-0.01	A	3.15	0.12	0.01	A	0.82	-0.19	-0.01	A	0.48	0.10	0.01	A
34	699.47	-1.66	-0.14	C<	0.12	-0.02	0.00	A	0.95	-0.20	-0.02	A	1.00	-0.14	-0.01	A
35	6.79	-0.16	-0.01	A	17.59	-0.26	-0.02	A	3.06	0.33	0.03	A	3.55	0.25	0.02	A
36	34.27	-0.38	-0.03	A	26.60	-0.34	-0.03	A	0.88	-0.18	-0.02	A	3.99	-0.27	-0.03	A
37	0.49	0.04	0.00	A	40.60	-0.39	-0.03	A	0.69	0.16	0.01	A	0.15	-0.05	-0.01	A
38	59.32	0.47	0.04	A	23.09	0.31	0.03	A	0.44	-0.13	-0.01	A	2.04	-0.20	-0.02	A
39	1.20	-0.07	-0.01	A	0.19	0.03	0.00	A	0.59	0.15	0.01	A	2.51	0.21	0.02	A
40	13.20	-0.24	-0.02	A	0.31	-0.04	0.00	A	1.59	0.25	0.02	A	0.19	0.06	0.01	A
41	9.47	-0.22	-0.02	A	9.81	-0.22	-0.01	A	0.18	-0.09	-0.01	A	0.25	0.07	0.01	A
42	195.81	1.11	0.06	B>	1.74	0.11	0.01	A	0.18	0.10	0.01	A	0.17	0.06	0.01	A
43	1.96	-0.09	-0.01	A	0.95	-0.06	0.00	A	3.28	-0.35	-0.03	A	12.41	-0.49	-0.04	A
44	62.29	0.62	0.03	A	11.55	0.27	0.02	A	1.17	0.25	0.02	A	0.01	0.01	0.00	A
45	1.89	-0.08	-0.01	A	14.70	-0.23	-0.02	A	0.00	0.00	0.00	A	0.00	0.00	0.00	A
46	50.42	-0.43	-0.04	A	0.09	-0.02	0.00	A	4.14	-0.39	-0.04	A	0.31	0.08	0.01	A
47	0.40	0.04	0.00	A	0.00	0.00	0.00	A	0.07	-0.05	0.00	A	0.02	-0.02	0.00	A
48	4.95	-0.15	-0.01	A	18.55	-0.29	-0.03	A	0.84	0.19	0.02	A	0.32	-0.08	-0.01	A
49	59.50	0.47	0.04	A	33.54	0.37	0.03	A	0.85	0.18	0.02	A	0.00	0.00	0.00	A
50	7.88	-0.18	-0.01	A	1.49	-0.08	-0.01	A	0.98	0.19	0.02	A	1.95	-0.19	-0.02	A
51	76.46	0.57	0.05	A	28.05	-0.36	-0.02	A	0.57	0.16	0.01	A	0.84	0.14	0.01	A
52	10.73	-0.20	-0.02	A	26.26	-0.32	-0.03	A	0.20	-0.09	-0.01	A	5.42	0.31	0.03	A
53	1.21	0.07	0.01	A	5.69	0.15	0.02	A	0.17	0.08	0.01	A	6.83	-0.35	-0.03	A
54	39.86	-0.40	-0.03	A	4.22	-0.13	-0.01	A	0.85	-0.18	-0.02	A	0.21	-0.06	0.00	A
55	0.09	0.02	0.00	A	0.11	-0.02	0.00	A	0.08	-0.06	0.00	A	2.65	-0.26	-0.02	A
56	10.44	0.25	0.01	A	2.05	0.11	0.01	A	0.87	-0.21	-0.01	A	1.07	-0.16	-0.01	A
57	125.86	-0.65	-0.07	A	18.94	-0.26	-0.02	A	2.17	-0.27	-0.03	A	2.22	0.19	0.02	A
58	39.23	-0.38	-0.03	A	27.34	-0.33	-0.02	A	10.42	-0.62	-0.06	A	0.32	-0.08	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.2 (continued)
Spring 2018 AIMS Differential Item Functioning
Science Grade 8
(Form C)

	Reference: White N= 17224 Focal: Asian N= 978				Reference: White N= 17224 Focal: Hawaii N= 56				Reference: White N= 17224 Focal: Multiple Indicator N= 1208			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
31	5.19	0.41	0.04	A	0.76	0.57	0.05	A	3.06	0.26	0.02	A
32	3.01	-0.54	-0.01	A	1.79	1.16	0.07	A	0.19	-0.09	0.00	A
33	7.79	0.68	0.03	A	2.05	1.05	0.08	A	0.20	-0.07	-0.01	A
34	19.29	0.77	0.07	A	0.12	0.24	0.02	A	0.14	-0.06	-0.01	A
35	21.25	0.84	0.07	A	0.48	-0.47	-0.04	A	0.02	0.02	0.00	A
36	0.94	0.20	0.01	A	0.73	-0.55	-0.05	A	0.21	-0.07	-0.01	A
37	15.43	0.67	0.06	A	0.43	-0.45	-0.04	A	0.00	0.00	0.00	A
38	1.88	0.25	0.02	A	0.00	0.03	0.00	A	0.42	0.10	0.01	A
39	0.01	0.02	0.00	A	0.81	0.62	0.06	A	0.34	0.09	0.01	A
40	29.92	1.22	0.07	B>	0.72	0.58	0.05	A	3.47	0.31	0.02	A
41	0.26	0.12	0.01	A	0.08	0.22	0.02	A	0.87	-0.16	-0.01	A
42	0.01	-0.03	0.00	A	0.33	0.47	0.03	A	3.11	-0.32	-0.02	A
43	0.20	-0.08	-0.01	A	0.00	0.01	0.00	A	0.67	0.13	0.01	A
44	0.74	0.25	0.01	A	0.37	-0.53	-0.03	A	0.57	0.14	0.01	A
45	6.53	0.43	0.04	A	0.84	-0.65	-0.06	A	0.06	-0.04	0.00	A
46	7.43	0.49	0.04	A	0.22	-0.31	-0.03	A	3.20	0.27	0.02	A
47	0.00	0.01	0.00	A	0.05	0.15	0.01	A	1.25	-0.18	-0.01	A
48	0.24	-0.10	-0.01	A	0.05	0.15	0.01	A	3.35	0.30	0.02	A
49	8.61	0.56	0.04	A	0.04	0.15	0.01	A	1.04	-0.16	-0.01	A
50	0.16	-0.08	0.00	A	2.27	-1.09	-0.09	A	4.88	0.34	0.03	A
51	39.22	1.10	0.10	B>	0.68	0.56	0.05	A	0.03	-0.03	0.00	A
52	0.67	0.15	0.01	A	3.14	1.14	0.11	A	2.13	0.22	0.02	A
53	0.79	0.16	0.01	A	0.40	-0.41	-0.04	A	0.45	-0.10	-0.01	A
54	4.76	0.44	0.03	A	0.82	-0.64	-0.05	A	0.48	-0.11	-0.01	A
55	31.56	0.97	0.09	A	0.46	0.48	0.04	A	0.64	0.13	0.01	A
56	0.02	-0.04	0.00	A	0.06	-0.18	-0.01	A	0.02	-0.02	0.00	A
57	0.12	0.05	0.01	A	0.00	-0.03	0.00	A	0.34	-0.08	-0.01	A
58	4.14	0.37	0.03	A	3.20	1.13	0.11	A	3.67	-0.29	-0.03	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.3
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form A)

	Reference: Male N= 14288 Focal: Female N= 14165				Reference: Hispanic N= 15957 Focal: Non Hispanic N= 12496				Reference: White N= 13322 Focal: Africa American N= 663				Reference: White N= 13322 Focal: Native American N= 1324			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	8.36	0.17	0.02	A	5.42	0.15	0.01	A	0.00	0.00	0.00	A	11.65	-0.51	-0.05	A
2	8.61	0.19	0.01	A	0.62	-0.05	-0.01	A	2.56	0.35	0.03	A	0.30	-0.09	-0.01	A
3	4.31	-0.13	-0.01	A	5.92	-0.15	-0.01	A	3.49	0.38	0.03	A	8.03	0.41	0.04	A
4	35.49	-0.36	-0.03	A	0.00	0.00	0.00	A	0.02	-0.03	0.00	A	0.12	-0.05	0.00	A
5	0.06	0.01	0.00	A	21.90	0.29	0.03	A	0.00	0.00	0.00	A	19.66	0.63	0.06	A
6	0.47	-0.04	0.00	A	13.35	-0.22	-0.02	A	0.02	-0.02	0.00	A	1.88	-0.20	-0.02	A
7	1.15	0.07	0.01	A	72.29	0.56	0.04	A	4.24	0.43	0.04	A	3.22	0.28	0.02	A
8	35.65	-0.36	-0.03	A	2.31	0.09	0.01	A	0.45	-0.13	-0.01	A	2.50	0.23	0.02	A
9	4.97	0.14	0.01	A	4.48	-0.14	-0.01	A	12.38	-0.71	-0.06	A	1.08	-0.15	-0.01	A
10	31.20	0.35	0.03	A	0.10	-0.02	0.00	A	0.23	0.10	0.01	A	0.03	0.03	0.00	A
11	0.01	0.00	0.00	A	0.18	-0.03	0.00	A	0.96	0.19	0.02	A	6.85	-0.38	-0.04	A
12	11.57	-0.22	-0.02	A	28.18	-0.35	-0.03	A	1.77	0.29	0.02	A	0.44	0.11	0.01	A
13	2.29	0.11	0.01	A	26.88	-0.38	-0.03	A	1.59	-0.29	-0.02	A	22.21	-0.75	-0.06	A
14	5.36	0.13	0.01	A	11.82	0.21	0.02	A	0.56	-0.14	-0.01	A	0.45	0.09	0.01	A
15	61.96	0.53	0.04	A	1.58	0.09	0.01	A	0.98	-0.21	-0.02	A	8.50	-0.44	-0.04	A
16	94.94	-0.61	-0.05	A	83.76	-0.58	-0.05	A	2.37	-0.31	-0.03	A	10.19	-0.46	-0.04	A
17	5.64	-0.14	-0.01	A	0.01	-0.01	0.00	A	1.66	0.25	0.02	A	2.63	-0.24	-0.02	A
18	429.23	-1.37	-0.11	B<	58.48	-0.51	-0.04	A	0.99	-0.22	-0.02	A	0.07	-0.04	0.00	A
19	86.07	0.57	0.05	A	70.67	-0.53	-0.04	A	1.60	-0.26	-0.02	A	26.10	-0.78	-0.07	A
20	6.77	-0.16	-0.01	A	0.19	0.03	0.00	A	0.14	0.08	0.01	A	9.15	-0.47	-0.04	A
21	129.25	-0.95	-0.05	A	8.44	-0.24	-0.01	A	0.26	-0.13	-0.01	A	1.59	-0.22	-0.01	A
22	2.48	0.09	0.01	A	0.21	0.03	0.00	A	0.05	-0.05	0.00	A	5.63	0.34	0.03	A
23	63.62	-0.55	-0.04	A	0.16	-0.03	0.00	A	0.67	0.19	0.01	A	1.86	0.21	0.02	A
24	116.65	-0.78	-0.05	A	29.24	-0.39	-0.03	A	0.73	-0.19	-0.01	A	6.49	0.41	0.03	A
25	200.99	0.87	0.08	A	1.93	0.09	0.01	A	1.55	-0.24	-0.02	A	0.21	0.07	0.01	A
26	0.57	-0.05	0.00	A	13.03	-0.23	-0.02	A	1.73	-0.28	-0.02	A	0.17	-0.06	-0.01	A
27	68.47	-0.53	-0.04	A	4.87	-0.15	-0.01	A	0.00	0.01	0.00	A	12.65	-0.62	-0.04	A
28	0.00	0.00	0.00	A	5.65	-0.15	-0.02	A	2.05	0.30	0.03	A	0.00	0.00	0.00	A
29	19.20	0.26	0.02	A	0.31	-0.03	0.00	A	2.25	0.29	0.03	A	0.00	0.00	0.00	A
30	1.44	0.07	0.01	A	5.86	-0.15	-0.01	A	4.33	0.42	0.04	A	2.31	-0.22	-0.02	A
31	4.03	-0.12	-0.01	A	26.95	-0.33	-0.03	A	5.93	0.50	0.04	A	1.63	-0.19	-0.02	A
32	36.43	0.36	0.03	A	0.37	-0.04	0.00	A	2.56	0.31	0.03	A	2.33	0.22	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form A)

	Reference: White N= 13322 Focal: Asian N= 968				Reference: White N= 13322 Focal: Hawaii N= 46				Reference: White N= 13322 Focal: Multiple Indicator N= 742			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	2.59	-0.28	-0.02	A	0.02	0.09	0.01	A	0.77	-0.16	-0.02	A
2	14.54	0.77	0.05	A	1.40	1.05	0.07	A	0.01	-0.02	0.00	A
3	18.95	0.76	0.07	A	5.25	1.73	0.16	A	0.61	0.15	0.01	A
4	35.24	1.02	0.10	B>	0.01	-0.07	-0.01	A	0.00	0.00	0.00	A
5	15.76	0.67	0.07	A	4.07	1.42	0.14	A	0.08	-0.05	-0.01	A
6	4.48	0.36	0.04	A	0.06	-0.17	-0.02	A	0.32	-0.11	-0.01	A
7	17.18	0.70	0.07	A	1.03	0.77	0.07	A	0.40	-0.13	-0.01	A
8	2.29	0.28	0.02	A	0.91	-0.75	-0.07	A	0.82	0.17	0.02	A
9	3.06	-0.34	-0.02	A	0.16	-0.32	-0.03	A	0.30	0.11	0.01	A
10	17.41	0.83	0.06	A	0.33	0.45	0.04	A	0.10	-0.06	-0.01	A
11	0.19	-0.08	-0.01	A	0.29	-0.39	-0.04	A	0.71	0.16	0.01	A
12	17.57	0.70	0.07	A	3.43	1.38	0.12	A	1.01	-0.21	-0.02	A
13	0.42	0.16	0.01	A	1.49	1.22	0.07	A	4.77	0.49	0.03	A
14	0.70	0.14	0.02	A	0.87	-0.68	-0.07	A	1.82	0.25	0.02	A
15	10.29	-0.66	-0.04	A	2.07	1.48	0.09	A	0.09	-0.07	0.00	A
16	0.37	-0.11	-0.01	A	1.25	1.03	0.07	A	4.61	-0.41	-0.04	A
17	7.85	0.51	0.04	A	0.01	0.07	0.01	A	0.12	-0.07	-0.01	A
18	0.86	0.18	0.01	A	4.36	1.77	0.13	A	0.72	0.18	0.01	A
19	0.09	-0.06	0.00	A	0.01	0.09	0.01	A	3.31	-0.36	-0.03	A
20	8.91	0.50	0.05	A	0.94	0.76	0.07	A	0.04	-0.04	0.00	A
21	9.53	-0.85	-0.03	A	2.88	2.06	0.08	A	2.63	0.43	0.02	A
22	6.00	-0.42	-0.04	A	0.09	-0.20	-0.02	A	2.12	0.27	0.03	A
23	0.34	0.14	0.01	A	0.18	-0.39	-0.02	A	2.17	0.31	0.02	A
24	3.25	0.45	0.02	A	0.01	-0.07	0.00	A	2.07	0.32	0.02	A
25	13.81	0.70	0.05	A	1.68	1.01	0.09	A	0.25	0.10	0.01	A
26	0.58	0.14	0.01	A	0.34	-0.52	-0.04	A	0.07	-0.05	0.00	A
27	0.95	0.17	0.02	A	0.22	0.32	0.03	A	0.03	-0.04	0.00	A
28	2.42	0.29	0.02	A	5.13	1.73	0.15	A	1.39	-0.22	-0.02	A
29	4.80	0.38	0.03	A	0.03	0.13	0.01	A	1.40	0.23	0.02	A
30	8.76	0.53	0.05	A	1.70	0.95	0.09	A	1.38	0.22	0.02	A
31	2.72	0.30	0.03	A	0.58	-0.52	-0.05	A	0.50	0.14	0.01	A
32	3.94	0.34	0.03	A	0.99	0.76	0.07	A	0.58	0.15	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form A)

	Reference: Male N= 14288 Focal: Female N= 14165				Reference: Hispanic N= 15957 Focal: Non Hispanic N= 12496				Reference: White N= 13322 Focal: Africa American N= 663				Reference: White N= 13322 Focal: Native American N= 1324			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
33	6.29	-0.16	-0.01	A	5.25	-0.15	-0.01	A	3.57	-0.40	-0.03	A	0.00	0.00	0.00	A
34	47.18	-0.46	-0.03	A	11.32	-0.24	-0.01	A	0.17	0.09	0.01	A	19.12	0.70	0.05	A
35	0.33	0.04	0.00	A	2.09	-0.10	-0.01	A	0.17	-0.09	-0.01	A	3.09	-0.28	-0.02	A
36	17.90	0.31	0.02	A	0.77	-0.06	0.00	A	9.21	-0.68	-0.05	A	3.75	0.31	0.02	A
37	7.88	-0.17	-0.01	A	34.03	-0.36	-0.03	A	0.65	0.16	0.01	A	1.31	0.17	0.01	A
38	0.55	-0.05	0.00	A	0.95	-0.06	0.00	A	5.66	0.49	0.04	A	6.00	0.37	0.03	A
39	0.28	0.03	0.00	A	4.79	0.14	0.02	A	3.60	-0.38	-0.04	A	12.59	-0.51	-0.05	A
40	1.18	0.07	0.01	A	8.95	-0.19	-0.01	A	2.86	-0.35	-0.03	A	2.01	-0.21	-0.02	A
41	0.05	0.01	0.00	A	3.16	0.11	0.01	A	0.56	-0.15	-0.01	A	3.95	0.29	0.03	A
42	20.09	0.28	0.02	A	50.98	-0.45	-0.03	A	2.10	-0.30	-0.03	A	0.12	-0.05	0.00	A
43	1.98	-0.09	-0.01	A	5.60	-0.15	-0.01	A	0.30	-0.11	-0.01	A	2.35	0.22	0.02	A
44	18.33	-0.26	-0.02	A	3.27	-0.11	-0.01	A	8.21	-0.60	-0.05	A	1.33	-0.18	-0.01	A
45	3.76	0.13	0.01	A	5.03	-0.16	-0.01	A	0.84	0.21	0.01	A	0.01	0.02	0.00	A
46	68.92	0.51	0.05	A	70.92	-0.52	-0.04	A	0.74	0.17	0.02	A	0.01	-0.01	0.00	A
47	30.68	-0.35	-0.03	A	67.89	-0.53	-0.04	A	0.03	-0.03	0.00	A	1.95	-0.21	-0.02	A
48	27.25	-0.33	-0.03	A	0.73	-0.06	-0.01	A	0.73	0.18	0.01	A	0.81	-0.15	-0.01	A
49	65.30	0.49	0.04	A	21.53	0.29	0.03	A	0.14	0.08	0.01	A	0.00	-0.01	0.00	A
50	27.40	0.35	0.03	A	0.26	-0.03	0.00	A	0.63	0.17	0.01	A	2.69	-0.25	-0.02	A
51	28.46	0.32	0.03	A	0.62	-0.05	0.00	A	0.01	0.02	0.00	A	0.31	0.08	0.01	A
52	7.28	0.16	0.02	A	3.73	-0.12	-0.01	A	1.37	0.23	0.02	A	1.71	0.19	0.02	A
53	88.35	0.56	0.05	A	5.16	-0.14	-0.01	A	1.12	-0.21	-0.02	A	3.99	-0.28	-0.03	A
54	107.80	-0.71	-0.05	A	96.12	-0.68	-0.05	A	0.09	-0.06	0.00	A	0.72	-0.14	-0.01	A
55	4.88	0.13	0.01	A	0.20	-0.03	0.00	A	1.19	-0.21	-0.02	A	0.80	0.13	0.01	A
56	4.80	0.14	0.01	A	5.29	-0.15	-0.01	A	1.39	-0.25	-0.02	A	0.23	-0.08	-0.01	A
57	0.17	0.02	0.00	A	0.09	-0.02	0.00	A	0.04	-0.04	0.00	A	0.69	-0.12	-0.01	A
58	24.10	-0.32	-0.03	A	16.11	-0.27	-0.02	A	0.00	0.01	0.00	A	2.73	-0.28	-0.02	A
59	25.43	-0.32	-0.03	A	3.82	-0.13	-0.01	A	0.52	-0.16	-0.01	A	0.00	-0.01	0.00	A
60	0.80	-0.05	-0.01	A	3.82	0.12	0.01	A	0.02	-0.03	0.00	A	4.54	-0.30	-0.03	A
61	66.16	0.55	0.04	A	0.34	0.04	0.00	A	1.42	0.26	0.02	A	1.53	-0.19	-0.02	A
62	7.43	-0.16	-0.01	A	0.08	0.02	0.00	A	0.08	0.06	0.01	A	3.18	-0.26	-0.02	A
63	19.19	0.27	0.02	A	0.10	-0.02	0.00	A	0.12	-0.08	-0.01	A	0.83	-0.14	-0.01	A
64	0.42	-0.04	0.00	A	17.51	-0.27	-0.02	A	0.07	-0.05	0.00	A	5.51	-0.36	-0.03	A
65	2.30	-0.09	-0.01	A	27.53	-0.32	-0.03	A	4.27	-0.41	-0.04	A	0.47	0.10	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form A)

	Reference: White N= 13322 Focal: Asian N= 968				Reference: White N= 13322 Focal: Hawaii N= 46				Reference: White N= 13322 Focal: Multiple Indicator N= 742			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
33	5.37	0.41	0.04	A	0.18	0.32	0.03	A	0.26	0.10	0.01	A
34	35.24	1.06	0.09	B>	0.12	0.28	0.02	A	0.00	0.01	0.00	A
35	0.28	0.11	0.01	A	1.16	0.94	0.07	A	0.24	0.10	0.01	A
36	4.90	0.61	0.02	A	0.10	0.30	0.02	A	2.23	0.34	0.02	A
37	14.52	0.64	0.07	A	0.06	-0.20	-0.02	A	0.01	0.01	0.00	A
38	40.06	1.09	0.10	B>	0.57	-0.65	-0.05	A	7.01	-0.55	-0.04	A
39	0.00	-0.01	0.00	A	3.12	1.33	0.12	A	0.54	-0.14	-0.01	A
40	1.81	0.23	0.02	A	0.09	-0.22	-0.02	A	0.57	-0.14	-0.01	A
41	0.00	0.00	0.00	A	0.99	0.83	0.07	A	0.04	0.04	0.00	A
42	0.04	-0.04	0.00	A	0.99	-0.75	-0.07	A	1.53	-0.24	-0.02	A
43	0.01	0.02	0.00	A	0.09	-0.23	-0.02	A	0.01	0.02	0.00	A
44	1.04	-0.17	-0.02	A	1.13	-0.87	-0.07	A	1.79	0.25	0.02	A
45	4.52	0.36	0.03	A	0.00	-0.01	0.00	A	1.47	0.26	0.02	A
46	1.23	-0.20	-0.02	A	0.01	-0.08	-0.01	A	0.43	0.12	0.01	A
47	1.47	0.23	0.02	A	0.68	-0.72	-0.05	A	0.29	0.11	0.01	A
48	0.53	0.13	0.01	A	1.17	-0.92	-0.07	A	10.76	-0.71	-0.05	A
49	3.11	0.33	0.03	A	0.09	-0.22	-0.02	A	0.26	-0.10	-0.01	A
50	0.01	-0.02	0.00	A	1.98	-1.04	-0.09	A	0.12	0.07	0.01	A
51	2.28	0.28	0.02	A	0.37	0.44	0.04	A	0.00	0.01	0.00	A
52	1.65	0.22	0.02	A	0.73	-0.64	-0.06	A	0.30	0.10	0.01	A
53	4.83	0.39	0.03	A	1.59	0.98	0.09	A	0.58	0.15	0.01	A
54	0.00	0.00	0.00	A	3.27	1.61	0.11	A	0.41	0.13	0.01	A
55	0.12	-0.06	0.00	A	0.06	0.18	0.02	A	0.00	0.01	0.00	A
56	6.90	0.45	0.04	A	0.00	-0.03	0.00	A	0.07	-0.05	0.00	A
57	12.12	0.61	0.06	A	0.39	-0.45	-0.04	A	5.17	-0.43	-0.04	A
58	5.79	0.44	0.04	A	0.93	0.74	0.06	A	0.24	0.10	0.01	A
59	32.48	0.98	0.09	A	0.42	-0.58	-0.04	A	2.21	-0.32	-0.02	A
60	8.89	0.48	0.05	A	0.97	0.70	0.07	A	3.06	0.32	0.03	A
61	6.80	0.61	0.03	A	0.00	0.01	0.00	A	0.17	0.08	0.01	A
62	5.23	0.40	0.04	A	0.07	0.19	0.02	A	0.57	-0.14	-0.01	A
63	13.12	0.67	0.06	A	1.20	0.94	0.07	A	0.12	-0.07	-0.01	A
64	7.93	0.51	0.05	A	0.27	-0.42	-0.03	A	4.85	-0.45	-0.04	A
65	0.75	-0.15	-0.01	A	0.07	0.20	0.02	A	0.19	0.08	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.3
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form B)

	Reference: Male N= 14125 Focal: Female N= 13870				Reference: Hispanic N= 15809 Focal: Non Hispanic N= 12186				Reference: White N= 13113 Focal: Africa American N= 649				Reference: White N= 13113 Focal: Native American N= 1259			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	21.05	0.28	0.03	A	0.18	0.03	0.00	A	1.56	-0.25	-0.02	A	1.95	-0.21	-0.02	A
2	14.29	0.25	0.02	A	0.02	-0.01	0.00	A	3.54	0.42	0.03	A	0.39	0.10	0.01	A
3	0.18	0.03	0.00	A	4.17	-0.13	-0.01	A	2.34	0.31	0.03	A	2.10	0.22	0.02	A
4	8.56	-0.18	-0.02	A	8.46	-0.18	-0.01	A	2.37	0.32	0.03	A	3.19	0.27	0.02	A
5	2.55	-0.09	-0.01	A	28.58	0.33	0.03	A	0.00	0.01	0.00	A	24.11	0.70	0.07	A
6	8.69	-0.17	-0.02	A	17.78	-0.26	-0.02	A	0.02	0.03	0.00	A	0.72	-0.13	-0.01	A
7	11.05	0.23	0.02	A	27.81	-0.39	-0.02	A	0.48	0.17	0.01	A	4.13	0.38	0.02	A
8	53.02	-0.45	-0.04	A	4.21	0.13	0.01	A	0.16	-0.08	-0.01	A	1.51	-0.18	-0.02	A
9	0.66	0.05	0.00	A	2.75	-0.11	-0.01	A	3.20	-0.37	-0.03	A	3.01	-0.26	-0.02	A
10	23.74	0.31	0.03	A	1.10	-0.07	-0.01	A	0.76	0.18	0.02	A	0.79	0.14	0.01	A
11	0.00	0.00	0.00	A	0.48	-0.04	0.00	A	1.28	-0.23	-0.02	A	6.10	-0.36	-0.03	A
12	4.59	-0.14	-0.01	A	6.42	-0.17	-0.01	A	0.34	0.13	0.01	A	1.08	0.17	0.01	A
13	10.16	0.23	0.01	A	22.54	-0.35	-0.03	A	0.32	-0.13	-0.01	A	5.59	-0.38	-0.03	A
14	2.49	0.09	0.01	A	22.79	0.29	0.03	A	0.40	-0.12	-0.01	A	0.26	-0.07	-0.01	A
15	62.45	0.53	0.04	A	0.63	0.06	0.01	A	0.08	-0.06	-0.01	A	1.50	-0.19	-0.02	A
16	62.10	-0.50	-0.04	A	69.26	-0.54	-0.05	A	0.03	-0.04	0.00	A	5.97	-0.36	-0.03	A
17	0.01	-0.01	0.00	A	4.57	0.14	0.01	A	0.51	0.15	0.01	A	11.10	-0.50	-0.05	A
18	361.95	-1.26	-0.10	B<	41.42	-0.43	-0.03	A	4.37	-0.47	-0.04	A	9.84	0.49	0.04	A
19	3.91	-0.12	-0.01	A	0.49	-0.04	0.00	A	1.22	0.23	0.02	A	0.16	-0.06	-0.01	A
20	71.19	-0.72	-0.03	A	1.37	-0.10	-0.01	A	3.28	-0.46	-0.03	A	8.51	-0.52	-0.03	A
21	79.25	-0.61	-0.05	A	2.66	-0.11	-0.01	A	4.30	-0.44	-0.04	A	5.12	0.36	0.03	A
22	0.88	0.06	0.01	A	24.22	0.30	0.03	A	0.09	0.06	0.01	A	11.17	0.49	0.05	A
23	56.33	-0.52	-0.04	A	2.28	0.11	0.01	A	0.10	0.07	0.01	A	0.66	-0.13	-0.01	A
24	165.31	0.79	0.07	A	0.35	0.04	0.01	A	0.29	0.11	0.01	A	0.39	0.09	0.01	A
25	124.23	0.69	0.06	A	42.48	-0.42	-0.03	A	5.69	-0.49	-0.04	A	46.85	-1.11	-0.09	B<
26	168.14	-0.83	-0.07	A	13.07	-0.24	-0.01	A	0.63	-0.18	-0.01	A	0.21	0.08	0.01	A
27	1.11	0.07	0.01	A	9.92	-0.20	-0.02	A	0.03	0.04	0.00	A	0.30	0.08	0.01	A
28	24.88	0.30	0.03	A	6.40	-0.16	-0.01	A	0.74	0.17	0.02	A	0.19	0.06	0.01	A
29	1.54	-0.08	-0.01	A	8.49	-0.19	-0.01	A	2.25	-0.32	-0.03	A	0.95	-0.15	-0.01	A
30	0.00	0.00	0.00	A	0.05	-0.01	0.00	A	2.48	-0.31	-0.03	A	0.01	-0.01	0.00	A
31	0.68	0.05	0.01	A	7.51	-0.17	-0.02	A	0.12	0.07	0.01	A	0.00	0.00	0.00	A
32	65.96	0.49	0.05	A	17.65	0.26	0.03	A	0.00	-0.01	0.00	A	1.25	0.17	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form B)

	Reference: White N= 13113 Focal: Asian N= 930				Reference: White N= 13113 Focal: Hawaii N= 79				Reference: White N= 13113 Focal: Multiple Indicator N= 709			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	0.53	-0.13	-0.01	A	0.73	-0.50	-0.04	A	3.08	-0.34	-0.03	A
2	4.29	0.42	0.03	A	1.77	0.87	0.06	A	0.00	-0.01	0.00	A
3	26.58	0.91	0.08	A	0.06	-0.14	-0.01	A	1.71	-0.26	-0.02	A
4	17.13	0.73	0.07	A	0.11	-0.20	-0.02	A	1.25	0.22	0.02	A
5	25.56	0.87	0.09	A	4.46	-1.28	-0.11	A	3.62	0.36	0.04	A
6	0.00	0.00	0.00	A	0.43	-0.37	-0.03	A	1.61	-0.24	-0.02	A
7	104.93	1.96	0.16	C>	1.69	0.81	0.06	A	0.14	-0.09	-0.01	A
8	2.72	0.31	0.02	A	0.81	-0.50	-0.05	A	0.84	-0.18	-0.02	A
9	2.60	0.34	0.02	A	0.23	0.28	0.02	A	0.97	-0.20	-0.02	A
10	5.28	0.47	0.04	A	0.00	0.00	0.00	A	0.06	-0.05	0.00	A
11	6.78	0.49	0.04	A	1.71	0.70	0.07	A	0.00	0.01	0.00	A
12	3.32	0.31	0.03	A	2.05	0.91	0.07	A	0.04	0.04	0.00	A
13	0.90	0.25	0.01	A	0.18	0.28	0.02	A	0.03	0.04	0.00	A
14	0.64	0.14	0.02	A	1.52	-0.66	-0.07	A	1.70	-0.24	-0.02	A
15	8.02	-0.58	-0.04	A	0.05	-0.14	-0.01	A	3.82	-0.41	-0.03	A
16	3.37	-0.36	-0.02	A	1.23	-0.61	-0.06	A	0.61	-0.16	-0.01	A
17	3.82	0.37	0.03	A	3.62	1.09	0.10	A	0.11	-0.06	-0.01	A
18	0.99	0.20	0.01	A	0.92	0.58	0.05	A	0.48	-0.14	-0.01	A
19	19.77	0.79	0.08	A	0.21	-0.27	-0.02	A	1.62	-0.26	-0.02	A
20	5.55	-0.74	-0.02	A	3.02	-1.19	-0.07	A	1.44	-0.32	-0.02	A
21	12.63	0.84	0.04	A	9.71	2.31	0.15	C>	2.90	-0.37	-0.03	A
22	1.15	-0.19	-0.02	A	0.08	0.16	0.02	A	0.11	0.06	0.01	A
23	0.08	-0.07	0.00	A	0.82	-0.55	-0.04	A	0.27	-0.11	-0.01	A
24	40.72	1.27	0.10	B>	0.04	0.10	0.01	A	0.02	0.03	0.00	A
25	0.19	-0.08	0.00	A	0.06	-0.13	-0.01	A	0.15	0.08	0.01	A
26	10.97	0.58	0.05	A	0.77	0.56	0.04	A	0.64	0.17	0.01	A
27	2.44	0.29	0.02	A	0.96	0.57	0.05	A	0.23	-0.09	-0.01	A
28	6.05	0.45	0.04	A	0.31	0.30	0.03	A	1.76	0.26	0.02	A
29	1.78	0.24	0.02	A	2.36	0.85	0.08	A	0.09	0.06	0.01	A
30	32.59	1.01	0.10	B>	1.15	-0.61	-0.06	A	0.05	0.04	0.00	A
31	13.28	0.66	0.06	A	6.26	1.38	0.13	A	0.14	-0.07	-0.01	A
32	14.27	0.71	0.06	A	0.21	0.24	0.02	A	1.66	-0.24	-0.02	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form B)

	Reference: Male N= 14125 Focal: Female N= 13870				Reference: Hispanic N= 15809 Focal: Non Hispanic N= 12186				Reference: White N= 13113 Focal: Africa American N= 649				Reference: White N= 13113 Focal: Native American N= 1259			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
33	2.72	-0.10	-0.01	A	0.38	-0.04	0.00	A	8.85	-0.65	-0.05	A	0.89	-0.15	-0.01	A
34	48.61	-0.47	-0.04	A	0.11	0.02	0.00	A	1.23	-0.26	-0.02	A	0.17	0.07	0.00	A
35	3.36	-0.12	-0.01	A	0.73	0.06	0.01	A	4.61	0.49	0.04	A	0.03	-0.03	0.00	A
36	60.22	0.57	0.04	A	3.80	-0.14	-0.01	A	6.24	-0.57	-0.04	A	10.76	0.54	0.04	A
37	0.59	0.05	0.00	A	1.08	-0.07	0.00	A	0.23	-0.10	-0.01	A	2.86	0.25	0.02	A
38	16.90	0.25	0.02	A	30.04	-0.35	-0.02	A	7.41	-0.57	-0.05	A	5.60	-0.36	-0.03	A
39	4.40	0.13	0.01	A	6.22	-0.16	-0.01	A	0.00	0.00	0.00	A	8.60	0.44	0.04	A
40	0.02	0.01	0.00	A	4.09	0.13	0.01	A	1.76	0.27	0.02	A	0.18	-0.06	-0.01	A
41	2.41	0.10	0.01	A	0.08	0.02	0.01	A	2.85	0.35	0.03	A	0.70	-0.13	-0.01	A
42	15.77	-0.25	-0.02	A	14.74	-0.25	-0.02	A	0.20	0.09	0.01	A	0.97	0.16	0.01	A
43	0.46	-0.04	0.00	A	6.21	-0.16	-0.01	A	0.00	0.00	0.00	A	0.00	0.00	0.00	A
44	21.24	-0.28	-0.03	A	0.75	-0.05	0.00	A	0.56	-0.15	-0.01	A	0.81	0.14	0.01	A
45	4.23	0.14	0.01	A	2.91	-0.12	-0.01	A	0.66	0.18	0.01	A	1.43	-0.21	-0.01	A
46	26.11	-0.33	-0.03	A	122.73	-0.72	-0.06	A	2.05	0.30	0.03	A	0.03	-0.03	0.00	A
47	43.05	0.40	0.04	A	35.64	-0.38	-0.03	A	0.00	-0.01	0.00	A	1.52	0.18	0.02	A
48	32.23	-0.37	-0.03	A	0.09	-0.02	0.00	A	1.19	-0.25	-0.02	A	0.06	0.04	0.00	A
49	1.32	0.07	0.01	A	46.28	-0.43	-0.03	A	3.72	0.39	0.04	A	7.45	-0.43	-0.04	A
50	28.65	0.36	0.03	A	0.16	-0.03	0.00	A	2.23	0.32	0.03	A	4.72	-0.34	-0.03	A
51	98.03	0.60	0.06	A	4.24	-0.13	-0.01	A	1.02	-0.21	-0.02	A	3.64	-0.28	-0.03	A
52	38.26	0.38	0.03	A	0.01	-0.01	0.00	A	0.09	-0.06	-0.01	A	1.29	-0.16	-0.02	A
53	47.77	0.44	0.04	A	3.10	-0.11	-0.01	A	0.81	0.19	0.02	A	3.89	-0.30	-0.03	A
54	189.39	-0.96	-0.07	A	62.40	-0.55	-0.04	A	3.47	-0.43	-0.03	A	9.39	-0.52	-0.04	A
55	48.26	-0.44	-0.04	A	3.32	0.12	0.01	A	13.12	-0.81	-0.06	A	14.35	-0.65	-0.05	A
56	0.32	-0.03	0.00	A	2.35	-0.09	-0.01	A	1.68	0.26	0.02	A	0.15	0.06	0.01	A
57	0.11	0.02	0.00	A	0.37	0.04	0.01	A	0.57	-0.16	-0.01	A	4.85	-0.35	-0.03	A
58	23.29	-0.32	-0.02	A	30.32	-0.38	-0.02	A	1.10	-0.23	-0.02	A	6.87	-0.46	-0.03	A
59	2.13	0.09	0.01	A	12.04	-0.22	-0.02	A	0.00	0.00	0.00	A	6.05	0.37	0.03	A
60	8.81	-0.18	-0.02	A	0.31	-0.04	0.00	A	0.41	-0.13	-0.01	A	3.29	-0.27	-0.02	A
61	104.17	0.70	0.05	A	0.18	-0.03	0.00	A	10.87	0.75	0.06	A	0.02	0.02	0.00	A
62	12.35	-0.21	-0.02	A	0.00	0.00	0.00	A	0.06	0.05	0.00	A	1.23	-0.16	-0.01	A
63	8.15	-0.19	-0.01	A	2.40	-0.11	-0.01	A	0.32	-0.13	-0.01	A	0.68	0.14	0.01	A
64	0.01	0.00	0.00	A	0.15	-0.02	0.00	A	0.38	0.12	0.01	A	0.30	0.08	0.01	A
65	0.55	-0.05	0.00	A	27.30	-0.33	-0.03	A	17.17	-0.82	-0.08	A	4.71	0.32	0.03	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form B)

	Reference: White N= 13113 Focal: Asian N= 930				Reference: White N= 13113 Focal: Hawaii N= 79				Reference: White N= 13113 Focal: Multiple Indicator N= 709			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
33	4.21	0.37	0.03	A	0.01	-0.06	0.00	A	0.36	0.12	0.01	A
34	25.35	0.94	0.08	A	1.46	-0.90	-0.05	A	8.00	0.59	0.04	A
35	0.24	0.10	0.01	A	1.10	-0.64	-0.05	A	0.02	0.03	0.00	A
36	13.28	0.98	0.04	A	1.75	0.87	0.06	A	2.76	-0.38	-0.03	A
37	0.21	0.09	0.01	A	0.87	-0.55	-0.05	A	1.86	0.27	0.02	A
38	1.48	0.22	0.02	A	0.58	-0.45	-0.04	A	1.35	-0.23	-0.02	A
39	0.43	0.12	0.01	A	0.04	-0.11	-0.01	A	0.91	-0.19	-0.02	A
40	0.52	0.14	0.01	A	1.93	0.80	0.07	A	0.06	0.05	0.00	A
41	59.79	1.34	0.13	B>	1.20	-0.70	-0.05	A	0.02	-0.03	0.00	A
42	20.67	0.79	0.08	A	0.04	0.11	0.01	A	0.01	0.02	0.00	A
43	0.01	-0.01	0.00	A	1.69	0.75	0.07	A	0.60	-0.15	-0.01	A
44	4.60	-0.37	-0.03	A	2.10	-0.92	-0.08	A	0.35	-0.12	-0.01	A
45	0.33	0.10	0.01	A	0.65	0.47	0.04	A	0.02	0.03	0.00	A
46	4.94	0.45	0.04	A	0.20	0.25	0.02	A	0.04	-0.04	0.00	A
47	1.13	-0.20	-0.02	A	0.30	-0.29	-0.03	A	1.70	0.25	0.02	A
48	0.20	-0.08	-0.01	A	0.40	-0.42	-0.03	A	0.33	0.12	0.01	A
49	7.25	0.49	0.05	A	0.81	-0.53	-0.05	A	1.04	-0.21	-0.02	A
50	1.10	-0.22	-0.01	A	0.00	-0.01	0.00	A	3.69	0.40	0.03	A
51	6.26	0.46	0.04	A	0.56	0.43	0.04	A	2.90	0.33	0.03	A
52	0.01	0.01	0.00	A	1.58	-0.71	-0.07	A	0.17	-0.08	-0.01	A
53	11.88	0.67	0.05	A	6.61	1.58	0.13	A	1.11	-0.21	-0.02	A
54	6.02	0.54	0.03	A	0.58	-0.44	-0.04	A	1.10	-0.24	-0.02	A
55	1.08	0.18	0.02	A	0.00	0.01	0.00	A	0.20	-0.09	-0.01	A
56	0.95	-0.17	-0.01	A	0.33	0.32	0.03	A	0.86	0.18	0.02	A
57	14.15	0.69	0.06	A	0.71	-0.48	-0.04	A	0.09	-0.06	-0.01	A
58	9.89	0.60	0.05	A	1.20	-0.70	-0.05	A	1.10	0.22	0.02	A
59	4.85	0.39	0.04	A	0.02	-0.08	-0.01	A	1.57	0.25	0.02	A
60	5.37	0.46	0.03	A	0.09	-0.19	-0.02	A	0.00	0.00	0.00	A
61	30.01	1.40	0.07	B>	0.03	0.09	0.01	A	0.55	-0.15	-0.01	A
62	3.33	0.33	0.03	A	1.32	0.64	0.06	A	0.03	0.03	0.00	A
63	18.10	0.77	0.07	A	0.02	0.10	0.01	A	0.01	-0.02	0.00	A
64	1.54	0.21	0.02	A	2.47	-0.90	-0.09	A	1.23	0.21	0.02	A
65	7.99	-0.50	-0.04	A	0.25	0.30	0.03	A	0.11	-0.06	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

Table B.3
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form C)

	Reference: Male N= 14110 Focal: Female N= 14192				Reference: Hispanic N= 15963 Focal: Non Hispanic N= 12339				Reference: White N= 13296 Focal: Africa American N= 675				Reference: White N= 13296 Focal: Native American N= 1328			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
1	5.86	0.15	0.01	A	7.43	0.17	0.01	A	2.10	-0.29	-0.03	A	2.02	-0.21	-0.02	A
2	38.24	0.41	0.03	A	3.45	-0.13	-0.01	A	6.44	0.54	0.04	A	1.57	-0.20	-0.02	A
3	6.75	-0.16	-0.01	A	10.88	-0.21	-0.02	A	1.81	0.28	0.02	A	10.21	0.48	0.04	A
4	23.01	-0.29	-0.03	A	0.00	0.00	0.00	A	0.86	-0.19	-0.02	A	4.01	0.29	0.03	A
5	0.90	0.06	0.00	A	50.15	0.45	0.04	A	3.17	0.35	0.03	A	1.86	0.20	0.02	A
6	86.71	-0.57	-0.05	A	18.96	-0.27	-0.02	A	0.55	-0.15	-0.01	A	0.06	-0.04	0.00	A
7	3.19	0.12	0.01	A	20.41	-0.33	-0.02	A	0.71	0.20	0.01	A	3.64	-0.36	-0.02	A
8	26.56	-0.31	-0.03	A	1.23	0.07	0.01	A	0.06	-0.05	0.00	A	0.28	0.08	0.01	A
9	1.01	0.06	0.01	A	11.21	-0.22	-0.02	A	8.97	-0.60	-0.05	A	0.24	-0.07	-0.01	A
10	12.38	0.22	0.02	A	9.33	-0.19	-0.02	A	1.80	0.27	0.02	A	1.79	0.20	0.02	A
11	0.10	0.02	0.00	A	6.51	-0.16	-0.01	A	2.34	-0.30	-0.03	A	0.47	-0.10	-0.01	A
12	9.26	-0.19	-0.02	A	13.20	-0.25	-0.02	A	0.25	0.11	0.01	A	0.36	0.10	0.01	A
13	6.10	0.18	0.01	A	34.23	-0.43	-0.03	A	0.84	0.20	0.01	A	7.49	-0.43	-0.03	A
14	3.26	0.10	0.01	A	9.78	0.19	0.02	A	0.00	0.01	0.00	A	1.94	0.19	0.02	A
15	59.21	0.52	0.04	A	0.95	0.07	0.01	A	0.12	0.08	0.01	A	3.57	-0.29	-0.02	A
16	91.83	-0.60	-0.05	A	72.27	-0.54	-0.05	A	0.98	-0.20	-0.02	A	1.49	-0.18	-0.02	A
17	46.27	-0.42	-0.04	A	23.48	-0.31	-0.03	A	1.69	0.26	0.02	A	8.01	-0.45	-0.04	A
18	1.17	-0.07	-0.01	A	4.31	0.13	0.01	A	2.87	0.34	0.03	A	4.88	-0.33	-0.03	A
19	6.05	0.15	0.01	A	2.22	0.10	0.01	A	1.83	-0.30	-0.02	A	2.98	-0.27	-0.02	A
20	397.54	-1.32	-0.10	B<	57.64	-0.51	-0.04	A	6.13	-0.52	-0.04	A	0.12	0.06	0.00	A
21	95.33	-0.65	-0.05	A	5.53	-0.16	-0.01	A	3.04	-0.37	-0.03	A	20.34	0.69	0.06	A
22	0.07	-0.02	0.00	A	2.80	0.10	0.01	A	1.01	-0.20	-0.02	A	1.83	0.19	0.02	A
23	47.91	-0.47	-0.03	A	1.08	0.07	0.00	A	4.65	-0.46	-0.04	A	0.18	0.06	0.01	A
24	167.17	0.80	0.07	A	0.96	-0.06	0.00	A	1.41	0.24	0.02	A	5.29	0.33	0.03	A
25	82.28	0.56	0.05	A	45.20	-0.43	-0.04	A	0.23	-0.09	-0.01	A	25.08	-0.76	-0.06	A
26	7.65	-0.17	-0.01	A	5.93	-0.16	-0.01	A	0.29	-0.11	-0.01	A	0.11	0.05	0.00	A
27	0.72	0.05	0.01	A	4.66	-0.14	-0.01	A	4.65	0.41	0.04	A	0.01	-0.02	0.00	A
28	54.15	-0.51	-0.04	A	1.16	-0.08	0.00	A	1.05	0.24	0.02	A	11.73	0.57	0.04	A
29	95.85	-0.63	-0.05	A	17.74	-0.28	-0.01	A	0.31	0.12	0.01	A	4.47	-0.35	-0.02	A
30	14.59	-0.24	-0.02	A	8.16	-0.18	-0.02	A	0.90	-0.19	-0.02	A	0.18	-0.06	-0.01	A
31	3.65	0.12	0.01	A	0.61	-0.05	0.00	A	3.71	0.39	0.04	A	2.78	-0.25	-0.02	A
32	66.56	0.49	0.05	A	5.28	0.14	0.01	A	0.05	0.04	0.00	A	0.28	0.08	0.01	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form C)

	Reference: White N= 13296 Focal: Asian N= 992				Reference: White N= 13296 Focal: Hawaii N= 57				Reference: White N= 13296 Focal: Multiple Indicator N= 714			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
1	0.00	-0.01	0.00	A	3.30	-1.22	-0.11	A	0.54	0.14	0.01	A
2	4.37	0.42	0.03	A	0.40	0.52	0.04	A	1.75	-0.27	-0.02	A
3	31.57	1.03	0.09	B>	0.14	-0.25	-0.02	A	0.37	0.13	0.01	A
4	34.36	1.00	0.10	B>	0.01	-0.05	0.00	A	2.64	0.31	0.03	A
5	20.14	0.76	0.08	A	0.05	0.14	0.01	A	2.36	0.30	0.03	A
6	20.11	0.78	0.07	A	3.36	1.21	0.11	A	3.11	0.35	0.03	A
7	88.36	1.73	0.14	C>	0.14	-0.30	-0.02	A	2.44	0.35	0.02	A
8	3.58	0.34	0.03	A	1.15	0.70	0.07	A	4.83	-0.42	-0.04	A
9	4.60	0.44	0.03	A	0.09	-0.21	-0.02	A	0.67	0.17	0.01	A
10	11.95	0.68	0.05	A	0.10	0.24	0.02	A	0.26	0.10	0.01	A
11	0.88	0.17	0.02	A	0.01	0.05	0.00	A	0.61	-0.15	-0.01	A
12	6.86	0.43	0.04	A	1.19	-0.87	-0.06	A	1.91	0.28	0.02	A
13	0.06	0.06	0.00	A	0.11	-0.26	-0.02	A	0.01	0.02	0.00	A
14	0.45	-0.11	-0.01	A	2.42	1.03	0.10	A	0.28	-0.10	-0.01	A
15	2.36	-0.31	-0.02	A	3.84	-1.46	-0.11	A	0.03	-0.04	0.00	A
16	0.21	-0.09	-0.01	A	0.01	-0.08	-0.01	A	0.24	0.10	0.01	A
17	24.53	0.83	0.08	A	2.29	0.96	0.09	A	0.09	-0.06	-0.01	A
18	6.05	0.45	0.04	A	0.08	-0.20	-0.02	A	0.76	-0.17	-0.02	A
19	3.12	0.30	0.03	A	1.81	-0.98	-0.08	A	1.99	0.28	0.02	A
20	0.80	0.17	0.01	A	0.96	0.62	0.06	A	0.11	-0.07	-0.01	A
21	5.05	0.49	0.03	A	0.01	-0.06	-0.01	A	2.09	0.31	0.02	A
22	13.53	-0.61	-0.06	A	0.44	0.47	0.04	A	1.05	0.19	0.02	A
23	0.24	0.11	0.01	A	1.98	-1.09	-0.08	A	0.66	0.18	0.01	A
24	11.79	0.65	0.05	A	1.15	0.84	0.07	A	0.21	0.09	0.01	A
25	2.72	-0.29	-0.02	A	1.77	-0.84	-0.08	A	13.08	-0.72	-0.06	A
26	0.01	0.02	0.01	A	0.54	-0.52	-0.04	A	0.01	0.02	0.00	A
27	6.54	0.46	0.04	A	0.13	0.23	0.02	A	5.69	-0.48	-0.04	A
28	21.08	0.83	0.07	A	1.02	0.74	0.06	A	0.01	0.02	0.00	A
29	9.63	0.53	0.05	A	2.09	-1.09	-0.09	A	0.23	-0.10	-0.01	A
30	0.00	-0.01	0.00	A	1.28	0.74	0.07	A	2.15	0.28	0.03	A
31	5.20	0.40	0.04	A	0.39	-0.41	-0.04	A	0.90	0.18	0.02	A
32	12.67	0.64	0.06	A	0.29	0.36	0.03	A	0.34	-0.11	-0.01	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form C)

	Reference: Male N= 14110 Focal: Female N= 14192				Reference: Hispanic N= 15963 Focal: Non Hispanic N= 12339				Reference: White N= 13296 Focal: Africa American N= 675				Reference: White N= 13296 Focal: Native American N= 1328			
Item	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag	MH χ2	ΔMH	SMD	Flag
33	0.04	0.01	0.00	A	0.43	-0.04	0.00	A	0.96	-0.20	-0.02	A	0.05	-0.03	0.00	A
34	25.43	0.30	0.03	A	10.97	0.21	0.02	A	4.64	0.42	0.04	A	0.04	0.03	0.00	A
35	3.05	0.11	0.01	A	0.05	-0.01	0.00	A	9.64	0.62	0.05	A	0.08	-0.04	0.00	A
36	37.56	0.44	0.03	A	0.23	-0.04	0.00	A	7.71	-0.60	-0.04	A	11.01	0.54	0.04	A
37	1.19	0.07	0.00	A	0.09	0.02	0.01	A	1.73	-0.27	-0.02	A	0.17	-0.06	-0.01	A
38	16.50	0.25	0.02	A	29.16	-0.34	-0.02	A	2.98	-0.35	-0.03	A	4.42	-0.31	-0.03	A
39	4.51	0.13	0.01	A	13.00	-0.23	-0.02	A	4.45	-0.43	-0.04	A	6.67	0.38	0.03	A
40	4.05	-0.12	-0.01	A	6.40	0.16	0.01	A	1.24	-0.22	-0.02	A	3.40	-0.26	-0.02	A
41	21.37	-0.29	-0.02	A	18.25	-0.28	-0.02	A	5.07	0.46	0.04	A	0.47	0.11	0.01	A
42	0.16	-0.02	0.00	A	0.24	-0.03	0.00	A	7.92	-0.58	-0.05	A	2.89	-0.25	-0.02	A
43	1.07	-0.07	-0.01	A	0.36	-0.04	0.00	A	2.18	-0.31	-0.03	A	0.17	0.06	0.01	A
44	21.33	-0.28	-0.03	A	11.43	-0.21	-0.02	A	10.84	-0.68	-0.06	A	3.83	0.29	0.03	A
45	2.22	0.10	0.01	A	4.88	-0.15	-0.01	A	0.16	0.09	0.01	A	0.19	0.07	0.01	A
46	55.37	0.46	0.04	A	32.50	-0.36	-0.03	A	0.02	0.03	0.00	A	4.92	-0.32	-0.03	A
47	35.95	-0.38	-0.03	A	143.71	-0.76	-0.06	A	5.28	0.46	0.04	A	0.49	-0.11	-0.01	A
48	0.15	-0.02	0.00	A	3.22	-0.11	-0.01	A	0.31	-0.11	-0.01	A	0.25	-0.07	-0.01	A
49	36.43	-0.38	-0.03	A	0.06	0.02	0.00	A	0.27	-0.11	-0.01	A	6.76	-0.43	-0.03	A
50	40.25	0.42	0.03	A	0.17	-0.03	0.00	A	0.00	0.00	0.00	A	11.06	-0.51	-0.04	A
51	47.29	-0.43	-0.04	A	4.67	0.14	0.01	A	1.69	-0.27	-0.02	A	5.50	-0.38	-0.03	A
52	3.45	-0.11	-0.01	A	3.42	-0.12	-0.01	A	5.22	-0.45	-0.04	A	0.00	0.01	0.00	A
53	2.38	-0.10	-0.01	A	4.59	0.15	0.02	A	0.20	-0.10	-0.01	A	3.61	-0.32	-0.02	A
54	5.96	0.15	0.01	A	11.54	-0.22	-0.02	A	5.45	-0.50	-0.04	A	5.52	-0.37	-0.03	A
55	170.59	-0.90	-0.06	A	85.13	-0.64	-0.04	A	3.34	-0.40	-0.03	A	4.44	-0.35	-0.03	A
56	181.13	0.87	0.07	A	4.69	0.14	0.01	A	0.12	-0.07	-0.01	A	1.83	0.20	0.02	A
57	0.72	-0.05	0.00	A	0.38	0.04	0.01	A	0.03	0.03	0.00	A	4.11	-0.30	-0.03	A
58	16.97	-0.27	-0.02	A	16.41	-0.28	-0.02	A	1.82	-0.30	-0.02	A	10.94	-0.56	-0.04	A
59	3.02	0.11	0.01	A	1.17	-0.07	0.00	A	0.42	-0.13	-0.01	A	0.09	-0.04	0.00	A
60	1.06	0.07	0.00	A	3.51	0.13	0.01	A	0.72	-0.17	-0.01	A	1.49	-0.19	-0.02	A
61	83.07	0.62	0.05	A	1.40	-0.08	-0.01	A	13.12	0.80	0.06	A	3.67	-0.29	-0.03	A
62	5.89	-0.14	-0.01	A	0.72	-0.05	0.00	A	0.14	0.07	0.01	A	0.06	-0.04	0.00	A
63	50.30	0.43	0.04	A	13.22	-0.23	-0.02	A	1.45	0.24	0.02	A	0.60	0.11	0.01	A
64	1.92	-0.08	-0.01	A	20.24	-0.28	-0.02	A	0.15	0.08	0.01	A	5.75	0.35	0.03	A
65	20.39	0.27	0.02	A	0.69	0.05	0.01	A	0.20	-0.09	-0.01	A	0.00	0.00	0.00	A

Note: African Am. = African American, Native Am. = Native American, MH χ2 = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group. Item number does not indicate test booklet location due to field test items and NRT items.

(table continues)

Table B.3 (continued)
Spring 2018 AIMS Differential Item Functioning
Science High School
(Form C)

	Reference: White N= 13296 Focal: Asian N= 992				Reference: White N= 13296 Focal: Hawaii N= 57				Reference: White N= 13296 Focal: Multiple Indicator N= 714			
Item	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag	MH $\chi 2$	ΔMH	SMD	Flag
33	3.54	0.34	0.03	A	3.72	-1.48	-0.12	A	0.51	0.14	0.01	A
34	18.92	0.75	0.07	A	5.29	1.41	0.15	A	10.29	0.60	0.06	A
35	49.85	1.19	0.12	B>	0.37	0.40	0.04	A	1.02	-0.21	-0.02	A
36	1.12	0.27	0.01	A	2.07	-1.13	-0.07	A	1.94	-0.32	-0.02	A
37	0.46	-0.13	-0.01	A	2.83	1.25	0.10	A	0.69	0.16	0.01	A
38	0.48	0.12	0.01	A	0.52	0.50	0.04	A	2.49	-0.31	-0.03	A
39	0.00	0.01	0.00	A	0.05	0.14	0.01	A	0.04	0.04	0.00	A
40	0.53	0.14	0.01	A	0.11	0.23	0.02	A	3.34	-0.36	-0.03	A
41	13.68	0.62	0.06	A	0.01	0.05	0.00	A	2.80	0.33	0.03	A
42	0.45	0.12	0.01	A	0.13	-0.26	-0.02	A	0.01	-0.02	0.00	A
43	24.73	0.92	0.08	A	0.13	-0.26	-0.02	A	0.83	-0.19	-0.02	A
44	19.89	-0.76	-0.07	A	0.10	-0.22	-0.02	A	1.52	0.24	0.02	A
45	0.25	0.09	0.01	A	0.11	0.25	0.02	A	0.79	-0.19	-0.01	A
46	8.19	-0.53	-0.04	A	0.07	-0.16	-0.02	A	0.19	0.08	0.01	A
47	16.51	0.80	0.06	A	0.32	-0.40	-0.03	A	0.64	-0.16	-0.01	A
48	0.86	0.16	0.02	A	0.00	-0.01	0.00	A	0.14	0.07	0.01	A
49	0.70	0.14	0.01	A	0.58	0.51	0.05	A	1.98	-0.30	-0.02	A
50	0.15	-0.08	0.00	A	0.64	-0.61	-0.05	A	0.24	-0.10	-0.01	A
51	0.23	0.08	0.01	A	2.78	-1.29	-0.10	A	8.15	-0.61	-0.05	A
52	13.75	0.70	0.05	A	0.28	0.36	0.03	A	0.00	-0.01	0.00	A
53	17.63	0.72	0.07	A	0.15	0.26	0.02	A	2.48	-0.35	-0.03	A
54	5.23	0.41	0.04	A	2.23	-1.03	-0.09	A	0.34	0.12	0.01	A
55	0.37	-0.13	-0.01	A	0.42	0.46	0.04	A	0.12	0.07	0.01	A
56	3.43	0.39	0.02	A	0.06	-0.16	-0.01	A	0.36	0.13	0.01	A
57	7.88	0.51	0.05	A	0.03	-0.12	-0.01	A	1.00	-0.20	-0.02	A
58	11.02	0.61	0.05	A	0.85	0.70	0.05	A	0.04	-0.04	0.00	A
59	0.69	0.14	0.02	A	0.34	0.40	0.04	A	0.16	0.08	0.01	A
60	1.04	0.20	0.01	A	2.32	1.12	0.09	A	1.64	-0.27	-0.02	A
61	30.70	1.35	0.07	B>	0.69	0.64	0.05	A	6.46	-0.52	-0.04	A
62	3.90	0.35	0.03	A	5.00	-1.60	-0.14	A	0.36	0.11	0.01	A
63	11.03	0.60	0.05	A	0.66	0.53	0.05	A	4.74	0.42	0.04	A
64	4.97	-0.38	-0.04	A	0.61	-0.50	-0.05	A	0.08	-0.05	-0.01	A
65	0.43	0.12	0.01	A	0.00	0.00	0.00	A	1.24	0.21	0.02	A

Note: African Am. = African American, Native Am. = Native American, MH $\chi 2$ = Mantel_Haenszel Chi-Square, ΔMH = Mantel-Haenszel Delta DIF, SMD = Standardized Mean Difference, A=No DIF, B=Weak DIF, C=Strong DIF, < favors reference group, > favors focal group.
Item number does not indicate test booklet location due to field test items and NRT items.