



Florida Standards Assessments

2014–2015

Volume 2 Test Development



FLORIDA DEPARTMENT OF
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1. INTRODUCTION

The Florida Standards Assessments (FSA) were first administered to students during the spring of 2015, replacing the Florida Comprehensive Assessment Test 2.0 (FCAT 2.0). The FSA was primarily delivered as an online, fixed-form assessment, making use of several technology-enhanced item types. For the English language arts (ELA) Reading component and Mathematics, paper forms were administered to students in grades 3 and 4, and paper accommodated versions were available to students in grades 5 through 10 and End of Course (EOC), only if such a need was indicated on a student’s Individual Education Plan (IEP) or Section 504 Plan. For the ELA Writing component, the forms were administered on paper for students in grades 4 through 7 and online for students in grades 8 through 10, with paper-based accommodations offered to students whose IEP or Section 504 Plans stipulated the need. Additional detail on the implementation of the new assessments can be found in Volume 1 of the *2014–2015 FSA Technical Report*.

The interpretation, usage, and validity of test scores rely heavily upon the process of developing the test itself. This volume provides details on the test development process of the FSA that contributes to the validity of the test scores. Specifically, this volume provides evidence to support the following:

- The Test Design Summary/Blueprint stipulated the range of operational items from each reporting category that were required on each form. This document guided item selection and test construction for Mathematics and ELA.
- The Test Item Specifications provided detailed guidance for item writers and reviewers to ensure that FSA items were aligned to the standards they were intended to measure.
- The item development procedures employed for FSA tests were consistent with industry standards.
- The development and maintenance of the FSA item pool plan established a robust item bank, in which test items cover the range of measured standards, grade-level difficulties, and cognitive complexity (e.g., depth of knowledge [DOK]) through the use of both selected-response (SR) keyed items and constructed-response (CR) machine- or hand-scored item types.
- The thorough test development process contributed to the comparability of the online tests and the paper-and-pencil tests.

2. TEST SPECIFICATIONS

Following the adoption and integration of the Florida Standards into the school curriculum, items and Test Item Specifications were developed to ensure that the tests and their items were aligned to the Standards and grade-level expectations they were intended to measure. Test Item Specifications were developed by the Florida Department of Education, content specialists, and committees of experienced Florida educators.

The FSA Test Item Specifications are based on the Florida Standards and the Florida course descriptions. The Specifications are a resource that defines the content and format for the test and test items for item writers and reviewers. Each grade-level and course Specifications document indicates the alignment of items with the Florida Standards and also serves to provide all stakeholders with information about the scope and function of the FSA. In addition to these general guidelines, specifications for FSA ELA Reading and Writing components also include guidelines for developing reading and writing passages and prompts, such as length, type, and complexity. In addition to the Specifications, a Test Design Summary/Blueprint for each FSA identifies the number of items, item types, item distribution across depth of knowledge, and reporting categories.

2.1 BLUEPRINT DEVELOPMENT PROCESS

The construction of the blueprints for Florida Standards Assessments (FSA) in English Language Arts (ELA) and Mathematics is evidenced by the ELA and Mathematics Test Design Summary documents found at <http://www.fsassessments.org/resources/?section=2-educators>. These documents were formed using Florida’s course descriptions as the basis for the design. The course descriptions can be found on the CPALMS website at: <http://www.cpalms.org/Public/search/Course>.

The ELA and Mathematics content experts at the Test Development Center (TDC) conferred with content experts in the Florida Department of Education’s Bureau of Standards and Instructional Support and Just Read, Florida! office to solidify the content of the blueprints. These meetings and calls occurred in May and June 2014.

The reporting categories for ELA Reading component were derived from the applicable “Cluster” naming convention in the Florida Standards, and the percentages of the Reporting Categories within the tests were derived from considering the number, complexity, and breadth of the Standards to be assessed. Speaking and Listening standards were folded into the Integration of Knowledge and Ideas reporting category, applicable Language standards were folded into the Craft and Structure reporting category. Guidelines for the weight of each reporting category for the FSA ELA Reading component were determined by Florida’s Technical Advisory Committee (TAC). TAC advised that to avoid “statistical noise” generated from the items scored in a small reporting category, a minimum of fifteen percent of the entire test’s raw score points should be derived from each reporting category.

The reporting categories for Mathematics were also derived from the “domain” naming convention in the Florida Standards. Like ELA, if a Mathematics domain had too few standards,

two or more domains might be combined to make the reporting category fifteen percent of the raw score points of that grade’s assessment.

2.2 TARGET BLUEPRINTS

Test blueprints provided the following guidelines:

- Length of the test (duration and number of items);
- Content areas to be covered and the acceptable range of items within each content area or reporting category;
- Acceptable range of item difficulty for the specified grade level;
- Approximate number of field test items, if applicable; and
- Descriptions of test item types.

This section provides only a summary of the blueprints. Detailed blueprints for each content level are presented in Appendix A for ELA and Appendix B for Mathematics and EOC.

In all grades and subjects, the FSA were administered as fixed-form assessments. Grades 3 and 4 were administered on paper, while grades 5 through 10 ELA Reading component, grades 5 through 8 Mathematics, and End-of-Course (EOC) assessments (Algebra 1, Algebra 2, and Geometry) were administered online. Additionally, ELA Writing was administered on paper for grades 4 through 7 and online for grades 8 through 10. For grades and subjects testing online, paper-based accommodations were provided if indicated by a student’s IEP or Section 504 Plan.

In grades 4 through 10, the FSA ELA test includes two components, which are combined to provide a whole-test FSA ELA scale score:

1. A text-based Writing component in which students respond to one writing task.
2. A reading, language, and listening component in which students respond to texts and multimedia content.

Writing and Reading component item responses were combined such that the data were calibrated concurrently and subsequently to form an overall English Language Arts (ELA) score. In this document, the term ELA is used when referring to the combined Reading and Writing, Reading is used when referring to only the Reading test form or items, and Writing is used when referring only to the text-based Writing task.

Table 1 displays the blueprint for total test length by grade and subject or course. Each year, approximately 6 to 10 items on all tests are field test items and are not included in a student’s score. Table 2 displays the number of operational and field test items on the spring 2015 forms. Writing items are not included in the item counts listed for ELA tests.

Table 1: Blueprint Test Length by Grade and Subject or Course

Subject/Course	Grade	Total Number of Items
Reading	3	56–60
Reading	4	56–60
Reading	5	56–60

Subject/Course	Grade	Total Number of Items
Reading	6	58–62
Reading	7	58–62
Reading	8	58–62
Reading	9	60–64
Reading	10	60–64
Mathematics	3	60–64
Mathematics	4	60–64
Mathematics	5	60–64
Mathematics	6	62–66
Mathematics	7	62–66
Mathematics	8	62–66
Algebra 1		64–68
Algebra 2		64–68
Geometry		64–68

Table 2: Spring 2015 Test Length by Grade and Subject or Course

Subject/Course	Grade	Number of Operational Items	Number Field Test Items	Total Items
Reading	3	50	10	60
Reading	4	50	10	60
Reading	5	50	10	60
Reading	6	52	10	62
Reading	7	52	10	62
Reading	8	52	10	62
Reading	9	54	10	64
Reading	10	54	10	64
Mathematics	3	54	10	64
Mathematics	4	54	10	64
Mathematics	5	54	10	64
Mathematics	6	56	10	66
Mathematics	7	56	10	66
Mathematics	8	56	10	66
Algebra 1		58	10	68
Algebra 2		58	10	68
Geometry		58	10	68

Reporting categories were utilized to more narrowly define the topics assessed within each content area. Individual scores on reporting categories provide information to help identify areas in which a student may have had difficulty. Table 3, Table 6, and Table 10 provide the percentage of operational items required in the blueprints by content strands, or reporting categories, for each grade level or course. The percentages below represent an acceptable range

of item counts. As many of these items on the ELA Reading component were associated with passages, flexibility was necessary for test construction for practical reasons. The ELA Writing component prompt was not included in these blueprints.

Table 4, Table 7, and Table 11 provide percentage of test items assessing each reporting category that appeared on the spring 2015 forms.

Table 3: Blueprint Percentage of Test Items Assessing Each Reporting Category in Reading

Grade	Key Ideas and Details	Craft and Structure	Integration of Knowledge and Ideas	Language and Editing Task
3	15–25%	25–35%	20–30%	15–25%
4	15–25%	25–35%	20–30%	15–25%
5	15–25%	25–35%	20–30%	15–25%
6	15–25%	25–35%	20–30%	15–25%
7	15–25%	25–35%	20–30%	15–25%
8	15–25%	25–35%	20–30%	15–25%
9	15–25%	25–35%	20–30%	15–25%
10	15–25%	25–35%	20–30%	15–25%

Table 4: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in Reading

Grade	Key Ideas and Details	Craft and Structure	Integration of Knowledge and Ideas	Language and Editing Task
3	22%	36%	26%	16%
4	22%	36%	26%	16%
5	24%	32%	28%	16%
6	21%	35%	29%	15%
7	21%	37%	27%	15%
8	25%	33%	25%	17%
9	24%	33%	28%	15%
10	22%	35%	28%	15%

Table 5: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in Reading – Accommodated Forms

Grade	Key Ideas and Details	Craft and Structure	Integration of Knowledge and Ideas	Language and Editing Task
5	26%	34%	24%	16%
6	25%	35%	25%	15%
7	23%	37%	25%	15%

Grade	Key Ideas and Details	Craft and Structure	Integration of Knowledge and Ideas	Language and Editing Task
8	25%	35%	25%	15%
9	30%	33%	22%	15%
10	26%	39%	20%	15%

Table 6: Blueprint Percentage of Test Items Assessing Each Reporting Category in Mathematics

Grade	1*	2*	3*	4*	5*
3	48%	17%	35%		
4	21%	21%	25%	33%	
5	39%	28%	33%		
6	15%	30%	15%	19%	21%
7	25%	21%	23%	16%	15%
8	30%	25%	27%	18%	

*See Table 9 for reporting category names

Table 7: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in Mathematics

Grade	1*	2*	3*	4*	5*
3	48%	17%	35%		
4	20%	20%	26%	33%	
5	39%	28%	33%		
6	14%	30%	14%	20%	21%
7	25%	21%	23%	16%	14%
8	30%	25%	27%	18%	

*See Table 9 for reporting category names

Table 8: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in Mathematics – Accommodated Forms

Grade	1*	2*	3*	4*	5*
5	39%	28%	33%		
6	14%	30%	14%	20%	21%
7	23%	23%	23%	16%	14%
8	30%	25%	27%	18%	

Table 9: Reporting Categories Used in Mathematics

Grade	Reporting Category
3	1. Operations, Algebraic Thinking, and Numbers in Base Ten

Grade	Reporting Category
	<ol style="list-style-type: none"> 2. Numbers and Operations – Fractions 3. Measurement, Data, and Geometry
4	<ol style="list-style-type: none"> 1. Operations and Algebraic Thinking 2. Numbers and Operations in Base Ten 3. Numbers and Operations – Fractions 4. Measurement, Data, and Geometry
5	<ol style="list-style-type: none"> 1. Operations, Algebraic Thinking, and Fractions 2. Numbers and Operations in Base Ten 3. Measurement, Data, and Geometry
6	<ol style="list-style-type: none"> 1. Ratio and Proportional Relationships 2. Expressions and Equations 3. Geometry 4. Statistics and Probability 5. The Number System
7	<ol style="list-style-type: none"> 1. Ratio and Proportional Relationships 2. Expressions and Equations 3. Geometry 4. Statistics and Probability 5. The Number System
8	<ol style="list-style-type: none"> 1. Expressions and Equations 2. Functions 3. Geometry 4. Statistics & Probability and The Number System

Table 10: Blueprint Percentage of Test Items Assessing Each Reporting Category in EOC

Course	1*	2*	3*
Algebra 1	41%	40%	19%
Algebra 2	36%	36%	28%
Geometry	46%	38%	16%

*See Table 13 for reporting category names

Table 11: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in EOC

Course	1*	2*	3*
Algebra 1	41%	40%	19%
Algebra 2	36%	36%	28%
Geometry	47%	38%	16%

*See Table 13 for reporting category names

Table 12: Spring 2015 Percentage of Test Items Assessing Each Reporting Category in EOC – Accommodated Forms

Course	1*	2*	3*
Algebra 1	41%	40%	19%
Algebra 2	36%	36%	28%
Geometry	45%	40%	16%

*See Table 13 for reporting category names

Table 13: Reporting Categories Used in EOC

Course	Reporting Category
Algebra 1	<ol style="list-style-type: none"> 1. Algebra and Modeling 2. Functions and Modeling 3. Statistics and the Number System
Algebra 2	<ol style="list-style-type: none"> 1. Algebra and Modeling 2. Functions and Modeling 3. Statistics, Probability, and the Number System
Geometry	<ol style="list-style-type: none"> 1. Congruence, Similarity, Right Triangles and Trigonometry 2. Circles, Geometric Measurement and Geometric Properties with Equations 3. Modeling with Geometry

The summary tables show overall that the spring 2015 forms were a match to the blueprint. In almost all cases, the percentages across reporting categories met the blueprint or blueprint range. In the instances where the blueprint was not met, the percentage of items from a reporting category was at most 4 percent away from the blueprint.

In addition to information about reporting categories, the ELA Reading component, Mathematics, and EOC blueprints also contained target information about depth of knowledge (DOK). DOK levels are used to measure the cognitive demand of instructional objectives and assessment items. The use of DOK levels to construct the FSA provided a greater depth and breadth of learning and also fulfilled the requirements of academic rigor required by the No Child Left Behind (NCLB) Act. The DOK level described the cognitive complexity involved when engaging with an item; a higher DOK level required greater conceptual understanding and cognitive processing by the students. It is important to note that the DOK levels were cumulative but not additive. For example, a DOK level 3 item could potentially contain DOK level 1 and 2 elements; however, DOK level 3 activity cannot be created with DOK level 1 and 2 elements.

Table 14 shows the range of the percent of items by DOK level by grade and subject or course. Table 15 shows the percentage of items from each DOK on the spring 2015 forms. The table shows that in most cases the percent of items from each DOK level met the blueprint. Where the blueprint was not met, there was a maximum of an 8 percent difference between the blueprint and the forms.

Table 14: Blueprint Percentage of Items by Depth of Knowledge

Grade & Subject	DOK 1	DOK 2	DOK 3
ELA 3–10	10–20%	60–80%	10–20%
Mathematics 3–8	10–20%	60–80%	10–20%
Algebra 1	10–20%	60–80%	10–20%
Algebra 2	10–20%	60–80%	10–20%
Geometry	10–20%	60–80%	10–20%

Table 15: Spring 2015 Percentage of Items by Depth of Knowledge

Grade & Subject	Grade	DOK 1	DOK 2	DOK 3
Reading	3	22%	56%	22%
Reading	4	22%	60%	18%
Reading	5	24%	62%	14%
Reading	6	19%	63%	17%
Reading	7	19%	60%	21%
Reading	8	19%	63%	17%
Reading	9	15%	69%	17%
Reading	10	22%	52%	26%
Mathematics	3	20%	74%	6%
Mathematics	4	19%	72%	9%
Mathematics	5	17%	74%	9%
Mathematics	6	20%	70%	11%
Mathematics	7	13%	77%	11%
Mathematics	8	20%	70%	11%
Algebra 1		21%	69%	10%
Algebra 2		14%	78%	9%
Geometry		9%	74%	17%

The FSA Reading component blueprint also included specifications for the genres of text presented in the passages. Two main types of text were used: literary and informational. Table 16 provides target percentages of test passages assessing each type of text. The summary table shows that for grades 3 through 6 and grade 8, the blueprint was met or within 3 percent. In grades 7, 9, and 10, the percent of informational passages was slightly lower than blueprint and the percent of literacy passages was slightly higher than blueprint.

Table 16: Blueprint Percentage of Reading Passage Types by Grade

Grade	Informational	Literary
3–5	50%	50%
6–8	60%	40%

Grade	Informational	Literary
9–10	70%	30%

Table 17: Spring 2015 Percentage of Reading Passage Types by Grade

Grade	Informational	Literary
3	50%	50%
4	50%	50%
5	50%	50%
6	60%	40%
7	50%	50%
8	57%	43%
9	57%	43%
10	60%	40%

2.3 CONTENT-LEVEL AND PSYCHOMETRIC CONSIDERATIONS

In addition to test blueprints, several content-level and psychometric considerations were used in the development of the FSA. Content-level considerations included the following:

- Correct responses A–D were evenly represented on the test for multiple-choice (MC) items;
- Selected items addressed a variety of topics (No item clones appeared on the same test.);
- Identified correct answer or key was correct;
- Each item had only one correct response (Some technology-enhanced items did in fact have more than one correct answer, and these items were reviewed to confirm that the number of correct answers matched the number asked for in the item itself.);
- Identified item content or reporting category was correct;
- No clueing or clanging existed among the items;
- Items were free from typographical, spelling, punctuation, or grammatical errors;
- Items were free of any bias concerns, and did not include topics that stakeholders might find offensive;
- Items fulfilled style specifications (e.g., italics, boldface, etc.); and
- Items marked do-not-use (DNU) were not selected.

Psychometric considerations included the following:

- A reasonable range of item difficulties;
- P-values for MC and CR items were reasonable and within specified bounds;
- Corrected point-biserial correlations were reasonable and within specified bounds;

- No items with negative corrected point-biserial correlations were used;
- Item response theory (IRT) a-parameters for all items were reasonable and greater than 0.40;
- IRT b-parameters for all items were reasonable and between -2 and 3 ;
- For MC items, IRT c-parameters were less than 0.40;
- Few items with model fit flags were used; and
- Few items with differential item functioning (DIF) flags were used.

More information about p-values, corrected point-biserial correlations, IRT parameters, and DIF calculations can be found in Volume 1. The FSA was post-equated and all item parameters used for scoring Florida students are based on statistics obtained from the spring 2015 administration. More details about post-equating and scoring can be found in Volume 1.

3. ITEM DEVELOPMENT PROCEDURES

The item development procedures employed by AIR for the FSA tests were consistent with industry practice. Just as the development of Florida’s content and performance standards was an open, consensus-driven process, the development of test items and stimuli to measure those constructs was grounded in a similar philosophy.

Item development began with the following guidelines: the FSA item specifications; the Florida Standards; language accessibility, bias, and sensitivity guidelines; editorial style guidelines; and the principles of universal design. These guidelines ensured that each aspect of a Florida item was relevant to the measured construct and was unlikely to distract or confuse examinees. In addition, these guidelines helped ensure that the wording, required background knowledge, and other aspects of the item were familiar across identifiable groups.

The principles of universal design of assessments mandate that tests are designed to minimize the impact of construct-irrelevant factors in the assessment of student achievement, removing barriers to access for the widest range of students possible. The following seven principles of universal design, as clearly defined by Thompson, Johnstone, and Thurlow (2002), were applied to the FSA development:

- Inclusive assessment population;
- Precisely defined constructs;
- Accessible, non-biased items;
- Amenable to accommodations;
- Simple, clear, and intuitive instructions and procedures;
- Maximum readability and comprehensibility; and
- Maximum legibility.

AIR applied these universal design principles in the development of all test materials, including tasks, items, and manipulatives. Test development specialists receive extensive training in item development. At every step of the review process, adherence to the principles of universal design was confirmed.

In terms of software that supports the item development process, AIR’s Item Tracking System (ITS) served as the technology platform to efficiently carry out any item and test development process. ITS facilitated the creation of the item banks, item writing and revision, cataloging of changes and comments, and exporting of accurate documents (items and passages). The ITS enforced a structured review process, ensuring that every item that was written or imported underwent the appropriate sequence of reviews and signoffs; ITS archived every version of each item along with reviewer comments throughout the process. The ITS also provided sophisticated pool management features that increased item quality by providing real-time, detailed item inventories and item use histories. Because the ITS had the capabilities to be configured to import items in multiple formats (e.g., Word, Excel, XML), AIR was able to import items from multiple sources. To support online test delivery, ITS had a unique web preview module that displayed items exactly as they were also presented to students, using exactly the same program

code used in the AIR’s test delivery system (TDS). An online test does not have a blueline (print approval) process like a paper test, and this feature provided an item-by-item “blueline” capability.

The next section describes the item sources for FSA, and the subsequent sections outline the procedure used for the development and review of new items and the alignment of existing items.

3.1 SUMMARY OF ITEM SOURCES

Items for the spring 2015 FSA came from multiple sources.

Student Assessment of Growth and Excellence (SAGE)

AIR, on behalf of FDOE, negotiated a contract with the state of Utah to use test items from its Student Assessment of Growth and Excellence (SAGE) bank provisionally until a Florida-specific item bank could be developed. For spring 2015 testing, SAGE items were used for core operational items on all forms and were also used to create the new vertical scale. Only those items that aligned to the FSA reporting categories and that met statistical criteria were used. More information about SAGE item selection can be found in Section 4 of this volume.

New Items Written by AIR

Field test items were also included on spring 2015 forms, and these items will be used to build the FSA pool in the future. Field test items came from two sources: items were written either for the Florida-specific bank (denoted as FSA bank items) or for an AIR bank to be shared with other states (denoted as AIR Core items). Items were written by AIR content experts or by trained partners. All items undergo a rigorous process of preliminary, editorial, and senior review by AIR and by FDOE’s Test Development Center (TDC) content experts who followed appropriate alignment, content, and style specifications.

Florida Comprehensive Assessment Test 2.0

On a limited basis, FCAT 2.0 items were placed in middle school Mathematics and EOC forms as necessary. In some instances it was due to a lack of appropriate SAGE items for a particular reporting category. In other instances, FCAT 2.0 items were used in order to serve as potential linking items between the previous FCAT 2.0 forms and the new FSA forms.

3.2 ITEM TYPES

One of the important features of online FSA is the administration of technology-enhanced items. Generally referred to as Machine-Scored Constructed Response (MSCR), this includes a wide range of item types. MSCR items require students to interact with the test content to select, construct, and/or support their answers.

Table 18 and Table 19 list the Reading, Mathematics, and EOC item types and provide a brief description of each type. For paper-based accommodations, some of these items must be modified or replaced with other items that assess the same standard and can be scanned and

scored electronically. Please see the Test Design Summary/Blueprint documents or the Test Item Specifications for specific details. Additional information about the item types can be found in Appendix A for Reading and Appendix B for Mathematics and EOC. Examples of various item types can be found in Appendix C.

Table 18: Reading Item Types and Descriptions

Response Type	Description
Multiple-Choice (MC)	Student selects one correct answer from a number of options.
Multiselect (MS)	Student selects all correct answers from a number of options.
Editing Task (ET)	Student identifies an incorrect word or phrase and replaces it with the correct word or phrase.
Editing Task Choice (ETC)	Student identifies an incorrect word or phrase and chooses the replacement from a number of options.
Hot Text (HT)	Student is directed to either select or use drag-and-drop feature to use text to support an analysis or make an inference.
GRID (GI)	Student selects words, phrases, or images and uses the drag-and-drop feature to place them into a graphic organizer.
Evidence-Based Selected Response (EBSR)	Student selects the correct answers from Part A and Part B. Part A often asks the student to make an analysis or inference, and Part B requires the student to use text to support Part A.
Open Response (OR)	Student uses the keyboard to enter a response into a text field.

Table 19: Mathematics and EOC Item Types and Descriptions

Response Type	Description
Multiple-Choice (MC)	Student selects one correct answer from a number of options.
Multiselect (MS)	Student selects all correct answers from a number of options.
Short Answer (SA)	Student writes a numeric response to answer the question.
GRID (GI)	Student selects words, phrases, or images and uses the drag-and-drop feature to place them into a graphic organizer.
Hot Text (HT)	Student is directed to either select or use drag-and-drop feature to use text to support an analysis or make an inference.
Equation Editor (EQ)	Student uses a toolbar with a variety of mathematical symbols to create a response.
Word Builder (WB)	Student enters a numeric value and bubbles in the corresponding number or symbol.
Open Response (OR)	Student uses the keyboard to enter a response into a text field.
Matching (MI)	Student checks a box to indicate if information from a column header matches information from a row.
Table (TI)	Student types numeric values into a given table.

3.3 DEVELOPMENT AND REVIEW PROCESS FOR NEW ITEMS

3.3.1 Development of New Items

AIR developed field test items to be embedded in the FSA operational tests. As part of the standard test development process, item writers followed the guidelines in FDOE’s approved Test Item Specifications and the Test Design Summary/Blueprint.

AIR staff used the Test Item Specifications to train qualified item writers, each of whom had prior item-writing experience. The item writers were trained at AIR item-writing workshops or had previous training on writing multiple-choice and constructed-response items. An AIR content area assessment specialist worked with the item writers to explain the purpose of the assessment, review measurement practices in item writing, and interpret the meaning of the Florida Standards and benchmarks as illustrated by the Test Item Specifications documents. Sample item stems that are included in the specifications documents served as models for the writers to use in creating items to match the Standards. To ensure that the items tapped the range of difficulty and taxonomic levels required, item writers use a method based on Webb’s cognitive demands (Webb, 2002) and depth-of-knowledge levels.

Item writing and passage selection were guided by the following principles for each of the item types. When writing items, item writers were trained to develop items that:

- have an appropriate number of correct response options or combinations;
- contain plausible distractors that represent feasible misunderstandings of the content;
- represent the range of cognitive complexities and include challenging items for students performing at all levels;
- are appropriate for students in the assigned grade in terms of reading level, vocabulary, interest, and experience;
- are embedded in a real-world context, where indicated;
- do not provide answers or hints to other items in the set or test;
- are in the form of questions or directions for task completion;
- use clear language and avoid negative constructions unless doing so provides substantial advantages; and
- are free of ethnic, gender, political, and religious bias.

Similarly, Reading passages should:

- represent literary (fiction), informational (nonfiction), multimedia (audio and audio-visual), and practical selections (e.g., nontraditional pieces, including tables, charts, glossaries, indexes);
- provide students with the opportunity to interact with complex, authentic texts that may employ a variety of different structures;
- include multimedia and audio elements when appropriate;

- be of high interest and appropriate readability for the grade level;
- be of appropriate length for the grade level;
- include topics that are in alignment with sensitivity guidelines;
- be free of ethnic, gender, political, and religious bias;
- not provide answers or hints to other items in the test; and
- include real-world texts (consumer or workplace documents, public documents such as letters to the editor, newspaper and magazine articles, thesaurus entries) to the extent possible.

When selecting passages, word count, readability, and text complexity are used in conjunction with other aspects of the passages (level of interest, accessibility of the topic, thematic elements) to determine appropriateness for a particular grade level. Table 20 below provides the guidelines used in FSA Reading.

Table 20: Word Counts and Readabilities of Reading Passages in FSA Reading

Grade	Word Count (approximate)	Lexile Range (approximate)
3	100–700	450–900
4	100–900	770–1050
5	200–1000	770–1050
6	200–1100	955–1200
7	300–1100	955–1200
8	350–1200	955–1200
9	350–1300	1080–1400
10	350–1350	1080–1400

In FSA Reading, the texts are categorized into informational and literary texts. *Informational texts* include texts that inform the reader, such as the following:

- Exposition: informational trade books, news articles, historical documents, essays
- Persuasive text: speeches, essays, letters to the editor, informational trade books
- Procedural texts and documents: directions, recipes, manuals, contracts

Literary texts include texts that enable the reader to explore other people’s experiences or to simply read for pleasure, such as the following:

- Narrative fiction: historical and contemporary fiction, science fiction, folktales, legends, and myths and fables
- Literary nonfiction: personal essay, biography/autobiography, memoir, and speeches

- Poetry: lyrical, narrative, and epic works; sonnets, odes, and ballads

Department Item Review and Approval

After internal review, the sets of items were reviewed by content specialists at the TDC. If needed, AIR and TDC content staff discussed requested revisions, ensuring that all items appropriately measured the Florida Standards. The items were then revised by AIR and brought to Florida bias, sensitivity, and content committees for review. After any final adjustments were made to the items, the TDC provided a decision for each item: *Accept as Appears*, *Accept as Revised*, or *Reject*. Items that were approved by the Test Development Center were subsequently web-approved and placed on field test forms.

Committee Review of New Items

All items generated for use on Florida statewide assessments were required to pass a series of rigorous reviews before they could appear as field test items on operational test forms. The items were reviewed by two committees—the Bias and Sensitivity Committee and the Content Item Review Committee.

The Bias and Sensitivity Committee reviewed items for potential bias and controversial content. This committee consisted of Florida reviewers who were selected to ensure geographic and ethnic diversity. The committee ensured that items:

- present racial, ethnic, and cultural groups in a positive light;
- do not contain controversial, offensive, or potentially upsetting content;
- avoid content familiar only to specific groups of students because of race or ethnicity, class, or geographic location;
- aid in the elimination of stereotypes; and
- avoid words or phrases that have multiple meanings.

TDC and AIR reviewed the Bias and Sensitivity Committee feedback and conveyed any issues to the attention of the Content Item Review Committee.

The Content Item Review Committee consisted of Florida classroom teachers or content specialists by grade for each subject area. The primary responsibility of the committee members was to review all new items to ensure that they were free from such flaws as (a) inappropriate readability level, (b) ambiguity, (c) incorrect or multiple answer keys, (d) unclear instructions, and (e) factual inaccuracy. These items were approved, approved with modifications, revised, or rejected. Only approved items were added to the item pool for the field test stage.

After items were field tested, members of the rubric validation committee reviewed the responses provided to MSCR items and either approved the scoring rubric or suggested a revised score based on their interpretation of the item task and the rubric.

3.3.2 Rubric Validation

The rubric used for scoring MSCR items was validated by a team of grade-level Florida educators. These individuals reviewed the machine-assigned scores for constructed-response items based on the scoring rubrics, and either approved the rubric or suggested a revision.

Prior to the meeting, AIR staff selected a sample of 45 student responses for each item. The sample consisted of the following:

- Fifteen randomly selected student responses;
- Fifteen responses from students who were predicted to perform well on the item given their overall performance, but instead performed poorly on the item; and
- Fifteen responses from students who were predicted to perform poorly on the item given their overall performance, but instead performed well on the item.

The rubric validation committee reviewed 45 responses for every item, having the option to approve the score or suggest a different score based on the committee’s understanding of the rubric. FDOE and AIR staff ensured that the committee was scoring consistently. The committee meetings used the following procedures:

- Each item was displayed with a projector.
- The committee discussed how to answer the item and how each point was earned.
- Each of the 45 student response papers and machine-assigned scores were displayed with a projector.
- If the committee members reached a consensus that a score was incorrect, the committee proposed modifications to the rubric.
- AIR rescored the responses using the revised rubric.
- AIR reviewed the responses that received changed scores to determine if they were correctly scored.
- FDOE reviewed the rescored responses and approved the rubric.

If any scores changed based on the rubric validation committee review, AIR staff revised the machine rubric and rescored the item. After the item was rescored, AIR staff reviewed at least 10 percent of responses for which the score changed. This review ensured that committee suggestions were honored, that the item was scored consistently, and that no unintended changes in scoring occurred as a result of the revision to the machine rubric. AIR staff reviewed changes with TDC staff, and TDC staff had one final opportunity to revise the rubric or approve or reject the item.

The approved items were embedded into the spring 2015 operational test forms. At the end of the testing window, AIR conducted classical item analysis on these field test items to ensure that the items functioned as intended with respect to the underlying scales. AIR’s analysis program computed the required item and test statistics for each multiple-choice and constructed-response item to check the integrity of the item and to verify the appropriateness of the difficulty level of

the item. Key statistical analyses included item discrimination, distractor analysis, item difficulty analysis, and infit and outfit analysis. Details of these analyses are presented in Section 5 of Volume 1.

3.4 DEVELOPMENT AND MAINTENANCE OF THE ITEM POOL

As described above, new items are developed each year to be added to the operational item pool after being field tested. Several factors determine the development of new items. The item development team conducts a gap analysis for distributions of items across multiple dimensions, such as item counts, item types, item difficulty, depth-of-knowledge (DOK) levels, and numbers in each reporting category.

In spring 2015, field test items were embedded in online forms. Future FSA items were not being field tested on paper, so there were no field test items in grades 3 and 4. All assessments were fixed-form with a predetermined number and location of field test items. Table 21 and Table 22 provide the number of field test items by type for Reading, Mathematics, and EOC.

Table 21: Number of Reading Field Test Items by Type

Item Type	5	6	7	8	9	10
MC	89	110	116	99	107	94
MS	18	18	35	12	12	9
Editing Task Choice	52	51	48	50	53	51
Hot Text	37	36	24	27	26	18
Grid	1					
EBSR	9	14	18	19	18	14
NL	3		3	1	1	

Table 22: Number of Mathematics and EOC Field Test Items by Type

Item Type	5	6	7	8	Algebra I	Algebra 2	Geometry
MC4	35	38	48	64	61	35	39
MS5	27	12	6	15	4	4	6
MS6	6	9	5	4	3	3	4
Grid	23	26	20	34	12	17	14
HT						2	10
EQ	123	121	129	92	55	74	59
NL		6	3	4		1	2
Match	4	4	5	2	2	3	
Table	6	8	4	8	3	1	1

3.5 ALIGNMENT PROCESS FOR EXISTING ITEMS AND RESULTS FROM ALIGNMENT STUDIES

A third-party, independent alignment study was conducted in February 2016. Those results will be included in the 2015-2016 FSA Technical Report.

4. TEST CONSTRUCTION

4.1 OVERVIEW

During the summer of 2014, psychometricians and content experts from FDOE, TDC, and AIR convened for three weeks, to build forms for the spring 2015 administration. FSA test construction utilized a structured test construction plan, explicit blueprints, and active collaborative participation from all parties.

4.1.1 Roles and Responsibilities of Participants

AIR Content Team

AIR ELA and Mathematics content teams were responsible for the initial form construction and subsequent revisions. These initial forms were pivotal to the test construction activities during the preparation period and during onsite test construction. AIR content teams performed the following tasks:

- Selection of the initial set of operational items;
- Revision of the forms according to feedback from senior AIR content staff;
- Revision of the forms according to feedback from AIR psychometricians;
- Assisting in the generation of materials for TDC and FDOE review; and
- Revision of the forms to incorporate feedback from TDC and FDOE.

AIR Technical Team

The AIR technical team, which included psychometricians and statistical support associates, prepared the item bank by updating the ITS with current item statistics and provided test construction training to the internal content team. During onsite test construction, at least one psychometrician was facilitating with each content area. The technical team performed the following tasks:

- Preparing item bank statistics and updating of AIR's ITS;
- Creating the master data sheets (MDS) for each grade and subject;
- Providing feedback on the statistical properties of initial item pulls;
- Providing explanations surrounding the item bank;
- Providing feedback on the statistical properties of each subsequent item selection; and
- Creating materials for FDOE psychometrician and leadership review.

TDC Content Specialists and Leads

TDC content specialists collaborated with AIR content specialists to revise forms and select replacement items. Both parties selected items with respect to the statistical guidelines and the FSA content and blueprint guidelines. Content specialists communicated with content leads and psychometricians if they had concerns about either blueprints or statistical summaries.

TDC content leads reviewed the test forms and provided either approval or feedback to AIR content specialists. Once a form was approved, content leads completed verification logs for FDOE psychometricians to review. Once a form was approved from both a content and psychometric perspective, the reports were given to FDOE leadership.

FDOE Psychometrics

The FDOE psychometrics team evaluated the statistical properties of the constructed forms against statistical targets. These targets are outlined in the verification log in Appendix D. The proposed forms were either returned to TDC and AIR content teams for additional edits or approved and forwarded to FDOE and TDC leadership for final review.

FDOE and TDC Leadership

All proposed forms were reviewed by the FDOE leadership team to determine the overall suitability of the proposed forms. When evaluating any given form, leadership considered the diversity of topics, projected level of difficulty, statistical summaries, adherence to blueprint, and overall challenge to the examinees. The leadership team was given the opportunity to approve proposed forms or return them with comments to AIR’s content team for further revision.

4.2 TEST CONSTRUCTION PROCESS

The FSA test construction process began in early summer with the following tasks:

1. Confirmation of test construction checklists and blueprints;
2. Identification of key dates for each activity;
3. Preparation for onsite meetings, including room reservations and agendas; and
4. Updating of verification logs.

After the test construction checklists and blueprints were approved, offsite test construction began.

4.2.1 Offsite Test Construction

Once item calibrations were complete, AIR’s technical team updated the item bank with all possible items for test construction. For the first year of the FSA administration, the item bank for core or operational and vertical linking items consisted of SAGE items. On a limited basis, FCAT 2.0 items were used to ensure appropriate reporting category coverage (see explanation in Section 3.1 of this volume). AIR’s Item Tracking System was updated with the most current item statistics for any given item. Master data sheets (MDS) were also created to assist FDOE psychometricians in their form review. For each grade and subject the MDS lists all items and provides item characteristics, classical statistics, and item response theory statistics.

AIR’s content team created initial item lists according to test construction checklists and blueprints. These preliminary versions of the forms were given to AIR’s technical team for review. AIR psychometricians compiled statistical summaries and provided feedback. The selection of items was updated to incorporate this feedback. There were often several iterations

of the proposed preliminary forms between AIR’s teams before final approval of initial item lists. This communication and interaction ensured that the initial forms delivered to FDOE and TDC were of high quality and representative in terms of both content and item statistics.

At least one week before the onsite meetings, initial item lists and summaries were provided to FDOE and TDC. This allowed for review before onsite face-to-face meetings.

4.2.2 Onsite Meetings

Onsite meetings occurred at the AIR offices. All parties, including program management, were actively involved in onsite test construction. On the morning of the first day, a commencement meeting was held to introduce all team members, explain any changes to test specifications or blueprints, discuss proposed forms, and prioritize upcoming activities. ELA, Mathematics, and EOC content specialists proceeded to their separate rooms to discuss proposed forms. For each grade and subject, there was at least one AIR content specialist and one TDC content specialist present for deliberations; at least one AIR psychometrician was available in each room.

Content specialists discussed proposed forms considering each item individually, ensuring that the composition of the items satisfied the blueprint and content-level considerations. For spring 2015 test forms, operational items were selected from the SAGE item bank. Each item was carefully reviewed to confirm that it aligned with Florida Standards and fulfilled statistical criteria. In some instances, content experts realigned items or changed DOK levels during their item review. If content experts had questions about item statistics, psychometricians were available to provide clarification.

Once a form was judged to be satisfactory from a content perspective, forms were again reviewed by AIR psychometricians to ensure that they met the psychometric considerations. If any particular item did not meet the statistical criteria, content specialists were asked to submit a replacement item. Once all items satisfied both content and statistical considerations, the verification log was completed and summary materials were prepared. An example of the verification log can be found in Appendix D. Summary materials are discussed in Section 4.3.

FDOE psychometricians were given the verification log and summary materials to perform their own item-by-item review. If questions about content level or statistical criteria arose, discussions were held with all parties. Forms were either returned to content specialists with feedback to replace problematic items or approved and passed on to FDOE leadership.

FDOE leadership reviewed the verification log, summary materials, and comments from the FDOE psychometricians. Forms were once again either approved or returned to content specialists with feedback to replace problematic items as necessary.

Once a form was approved, it was entered into ITS, where it was evaluated for a final time to confirm that the intended items were placed on the individual forms. Final verification of approval from FDOE was obtained, and the necessary steps were taken to prepare the form for use in AIR’s test delivery system (TDS).

4.3 TEST CONSTRUCTION SUMMARY MATERIALS

4.3.1 Item Cards

Item cards, generated within ITS, contained statistical information about an individual item. Item cards contained classical item statistics, IRT statistics, and DIF statistics. When possible, item cards also contained a screenshot of the item. This was not possible in the case of some technology-enhanced items. In these instances, the items were viewed directly in ITS. Item cards were typically used to determine the viability of an individual field test item for the next administration. Figure 1 provides an example item card.

Figure 1: Example Item Card

Item Card		
IRT Statistics		
A	1.01	
B	1.07	
Q1 Statistic	97.48	
Points	Percent in Category	Average Score of Students in Category
0	77.32%	34.71
1	22.68%	46.64
omit	0.00%	
Point Biserial		0.47
Fairness Statistics		
African American/White	-A	
ELL/Non ELL	+A	
Female/Male	+B	
Hispanic/White	-B	
SWD/Non-SWD	+B	

4.3.2 Bookmaps

A bookmap is a spreadsheet that lists characteristics of all items on a form. Bookmaps contain information such as:

- Item ID
- Item position
- Form
- Grade
- Role (e.g., operational or field test)
- Item format (e.g., multiple choice)

- Point value
- Answer key
- Reporting Category
- DOK

Bookmaps were used as an accessible resource to both content specialists and psychometricians to find information about a test form. Bookmaps differed from item cards in that there were no statistical summaries in a bookmap.

4.3.3 Graphical Summaries

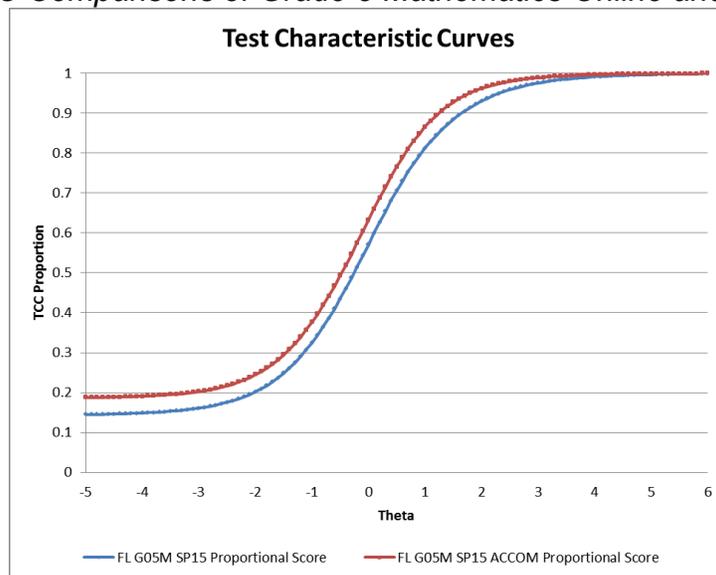
In addition to numerical summaries and spreadsheets, it was often useful to create graphical summaries for visualization.

Test Characteristic Curve

An item characteristic curve (ICC) shows the probability of a correct response as a function of ability, given an item's parameters. Test characteristic curves (TCCs) can be constructed as the sum of ICCs for the items included on any given test. The TCC can be used to determine examinee raw scores or percent-correct scores that are expected at a given ability level. When two tests are developed to measure the same ability, their scores can be equated through the use of TCCs.

Given that spring 2015 was the first year for the FSA, there were no target TCCs for the online forms. However, the online TCC was used as a target while building paper accommodated forms. Items were selected for the paper form so that the paper form TCC matched the online form TCC as closely as possible. Figure 2 compares the TCCs for both online and paper forms of grade 5 Mathematics.

Figure 2: TCC Comparisons of Grade 5 Mathematics Online and Paper Forms

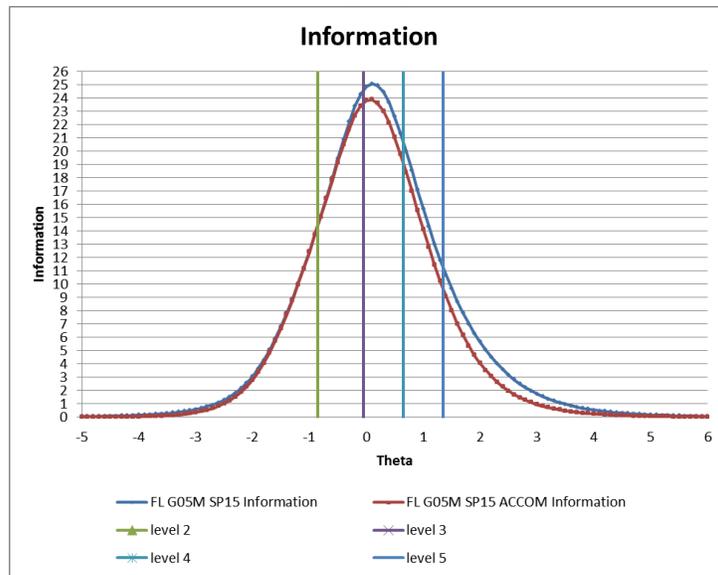


Target points based on previous experience were provided by FDOE psychometricians. Efforts were made to maximize information at the targets. However, these general targets were used for guidance but not as a definitive rule.

Test Information Curve

Item information is calculated with the use of item parameters to determine how much information an item contributes and at what location it resides along the ability scale. Test information is the sum of item information over all items, and it can be used to help control measurement error. The test information function provides the degree of precision at different values of student ability. As test information increases, so does the precision of the test. Figure 3 compares the information of the grade 5 Mathematics online and paper forms.

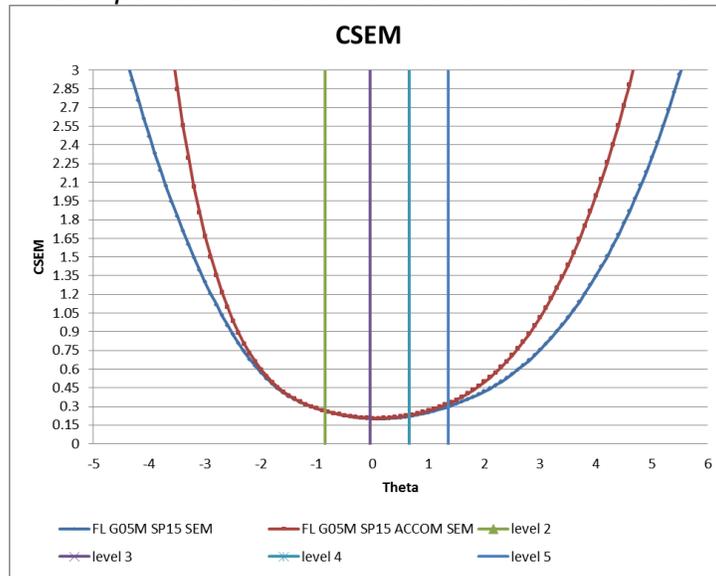
Figure 3: Test Information Comparison of Grade 5 Mathematics Online and Paper Forms



Standard Error of Measurement Curve

The standard error of measurement (CSEM) curve shows the level of error of measurement expected at each ability level. The CSEM is calculated as the reciprocal of the square root of the test information curve, and thus the CSEM is lowest when information is highest. Ability estimates in the middle of the distribution often appear more reliable than the ability estimates at the high and low ends of the scale. Figure 4 compares the CSEM of the grade 5 Mathematics online and paper forms.

Figure 4: CSEM Comparison of Grade 5 Mathematics Online and Paper Forms



4.4 PAPER ACCOMMODATION FORM CONSTRUCTION

Student scores should not depend upon the mode of administration or type of test form. Because the FSA was administered in an online test system, scores obtained via alternate modes of administration must be established as comparable to scores obtained through online testing. This section outlines the overall test development plans that ensured the comparability of online and paper-and-pencil tests.

During test development, forms across all modes were required to adhere to the same test blueprints and content-level and psychometric considerations. To build paper forms, content specialists began with the online form and removed any technology-enhanced items that could not be rendered on paper. These items were then replaced with either multiple-choice items or other technology-enhanced items that could be rendered from the same reporting category. In some instances, it was necessary to select replacement items from a different reporting category in order to satisfy statistical expectations; however, all parties ensured that each reporting category was still appropriately represented in the final test forms. Table 23 provides the number of items replaced across the online and paper accommodated forms.

Table 23: Number of Item Replacements for Paper Accommodated Forms

Mathematics	Number of Items Replaced	ELA	Number of Items Replaced
Grade 5	9	Grade 5	3
Grade 6	17	Grade 6	3
Grade 7	20	Grade 7	2
Grade 8	18	Grade 8	8
Algebra 1	22	Grade 9	9
Algebra 2	21	Grade 10	4
Geometry	26		

The online and paper accommodated forms were then reviewed for their comparability of item counts and point values, both at the overall test level and at the reporting category levels. ELA

Reading tests in both administration modes were additionally compared for the distribution of passages by length. The forms were then submitted for psychometric reviews, during which the following statistics were computed and compared between the online and paper accommodated forms:

- Maximum possible score
- IRT b-parameter mean and standard deviation
- IRT b-parameter minimum and maximum
- IRT a-parameter difficulty mean and standard deviation
- IRT a-parameter minimum and maximum
- IRT c-parameter mean and standard deviation
- IRT c-parameter minimum and maximum
- Item p-value mean and standard deviation
- Item p-value minimum and maximum
- Lowest bi/polyserial
- Mean bi/polyserial
- Expected raw score at cut points

A sample output with summary statistics for grade 5 Mathematics is presented in Table 24 below. As the table shows, the IRT b-parameter mean and the item p-value mean are similar between the forms.

Parallelism among test forms was further evaluated by comparing TCCs, test information curves, and CSEMs between the online and paper forms.

Table 24: Test Summary Comparison for Grade 5 Mathematics Online and Paper

Test summaries		
	G5M Online	G5M Paper
number of items (IRT;IA)	54; 54	54; 54
possible score (IRT; IA)	57; 57	54; 54
item IRT difficulty mean	-0.02	-0.13
item IRT difficulty stdev	0.64	0.62
item IRT difficulty min	-1.28	-1.28
item IRT difficulty max	1.73	0.99
item IRT-A mean	1.00	1.02
item IRT-A stdev	0.29	0.28
item IRT-A min	0.47	0.44
item IRT-A max	1.61	1.61
item IRT-C mean	0.18	0.19
item IRT-C stdev	0.08	0.08
item IRT-C min	0.06	0.05
item IRT-C max	0.40	0.40

Test summaries		
	G5M Online	G5M Paper
item raw score sum	32.55	33.76
item p-value mean	0.58	0.63
item p-value stdev	0.15	0.12
item p-value min	0.13	0.35
item p-value max	0.84	0.84
lowest point bi/poly-serial	0.25	0.21
mean point bi/poly-serial	0.45	0.43
Expected Raw score at level 2 cut	20.18	22.02
Expected Raw score at level 3 cut	31.73	33.37
Expected Raw score at level 4 cut	42.26	43.18
Expected Raw score at level 5 cut	49.33	49.26

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