OKLAHOMA STATE DEPARTMENT OF EDUCATION

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Oklahoma School Testing Program

2012 Technical Report

Achieving Classroom Excellence

End-of-Instruction

Assessments

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Executive Summary

Introduction

The Oklahoma School Testing Program (OSTP) is a state-wide assessment program that includes the End-of-Instruction (EOI) assessments, where students who complete an area of instruction must also take the corresponding standardized assessment. The subjects included within this testing program are Algebra I, Algebra II, Geometry, Biology I, English II, English III, and U.S. History. Each test is a measure of a student's knowledge relative to the *Priority Academic Student Skills (PASS)*, Oklahoma's content standards. These tests are part of the Achieving Classroom Excellence (ACE) legislation passed in 2005 and amended in 2006, which outlines the curriculum, the competencies, and the testing requirements for students to receive a high school diploma from the state of Oklahoma. Algebra I, English II, Biology I, and U.S. History were existing tests in the program with Algebra II, Geometry, and English III added as operational tests for the 2007-2008 testing cycle. These End-of-Instruction tests are administered in Winter, Trimester, Spring, and Summer. The OSTP was established to improve academic achievement for all Oklahoma students, and it also meets the requirements of the No Child Left Behind Act (NCLB), which was introduced by the Federal Government in 2001. In 2006, Pearson was contracted by the Oklahoma State Department of Education (SDE) to develop, administer, and maintain the OSTP-ACE EOI tests. This report provides technical details of work accomplished through the end of Spring 2012 on these tests.

Purpose

The purpose of this Technical Report is to provide objective information regarding technical aspects of the OSTP-ACE EOI assessments. This volume is intended to be one source of information to Oklahoma K-12 educational stakeholders (including testing coordinators, educators, parents, and other interested citizens) about the development, implementation, scoring, and technical attributes of the OSTP-ACE EOI assessments. Other sources of information regarding the OSTP-ACE EOI tests—administered mostly online, with some paper formatted tests available—include the administration manuals, interpretation manuals, student-, teacher-, and parent guides, implementation materials, and training materials.

The information provided here fulfills legal, professional, and scientific guidelines (AERA, APA, & NCME, 1999) for technical reports of large-scale educational assessments and is intended for use by qualified users within schools who use the OSTP-ACE EOI assessments and interpret the results. Specifically, information was selected for inclusion in this report based on NCLB requirements and the following Standards for Educational and Psychological Testing:

- Standards 6.1 – 6.15 Supporting Documentation for Tests
- Standards 10.1—10.12 Testing Individuals with Disabilities
- Standards13.1—13.19 Educational Testing and Assessment

This technical report provides accurate, complete, current, and clear documentation of the OSTP-ACE EOI development methods, data analysis, and results, and is appropriate for use by qualified users and technical experts. Section 1 provides an overview of the test design, test content, and content standards. Section 2 provides summary information about the test administration. Section 3 details the classical item analyses and reliability results. Section 4 details the calibration, equating, scaling analyses, and results. Section 5 provides the results of the classification accuracy and classifications studies. Finally, Section 6 provides higher-level summaries of all the tests included in the OSTP-ACE EOI testing program.

Information provided in this report presents valuable information about the OSTP-ACE EOI assessments regarding:

1. Content standards,
2. Content of the tests,
3. Test form design,
4. Administration of the tests,
5. Identification of ineffective items,
6. Detection of item bias,
7. Reliability of the tests,
8. Calibration of the tests,
9. Equating of tests,
10. Scaling and scoring of the tests, and
11. Decision accuracy and classification.

Each of these facets in the OSTP-ACE EOI assessments development and use cycle is critical to validity of test scores and interpretation of results. This technical report covers all of these topics for the 2011-12 testing year.

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Achieving Classroom Excellence (ACE) End-of-Instruction (EOI) Assessments

1.1 Overview of the OSTP-ACE EOI Assessments

The Achieving Classroom Excellence End-of-Instruction assessment is a state-mandated, secondary-level, criterion-referenced testing program used to assess student proficiency at the End-of-Instruction in Algebra I, Algebra II, Geometry, Biology I, English II, English III, and U.S. History. The Oklahoma ACE EOI tests are used to assess student proficiency relative to a specific set of academic skills established by committees of Oklahoma educators. In 2011-12, this special set of skills was referred to as the *Priority Academic Student Skills* (*PASS*), which represents skills that students are expected to master by the End-of-Instruction for each subject. All secondary-level students, who have completed instruction in Algebra I, Algebra II, Geometry, Biology I, English II, English III, and U.S. History must take the corresponding Oklahoma ACE EOI tests. The Spring 2009 administration was the first administration with graduation requirements attached to them for the incoming freshman students. For these students and future students, to graduate with a high school diploma from the State of Oklahoma, students must score proficient or above in Algebra I and English II, and two of the following five: Algebra II, Biology I, English III, Geometry, or U.S. History. Students who fail to earn a proficient score are permitted to retake these tests. All *PASS* standards and objectives are measured exclusively by multiple-choice items, except for English II and English III, each of which include one writing prompt. The Winter/Trimester 2011-12 and Spring 2012 OSTP-ACE EOI Algebra I, Algebra II, Geometry, Biology I, English II, English III, and U.S. History assessments were developed by Pearson in collaboration with the Oklahoma State Department of Education (SDE) and were administered by SDE.

Pearson scored, equated, and scaled the assessments. There was one form administered in Winter/Trimester 2011-12 for each subject. In the Spring 2012 administration, there were two core operational forms with 12 field test forms for English III, Algebra I, Algebra II, Geometry, Biology I, and U.S. History and 9 field test forms for English II. Each test form was embedded with field test items to add to the item pool. For Winter /Trimester 2011-12, a Braille test was built for each subject using the Winter/Trimester 2010-11 test forms. The Braille test for Spring 2012 was built using the Core form A of the Spring 2012 operational test forms. For each administration, an equivalent form from one of the previous administrations was designated as a breach form. A student could receive an equivalent form for various reasons, including becoming ill during test administration or experiencing some kind of security breach. The State Department of Education Office of Accountability and Assessments determines eligibility for an equivalent form on a case-by-case basis. These students' responses were scored and reported using the scoring tables from the form's previous administration.

1.1.a Purpose

Pearson developed the 2011-12 OSTP-ACE EOI assessments to measure the Oklahoma *PASS* content standards, as listed in the following section. The objectives associated with content and/or process standards tested are provided in Appendix A.

1.1.b *PASS* Content Standards

The Oklahoma Content Standards are shown in Table 1.1.

Table 1.1. Oklahoma Content Standards by Subject

Algebra I	
Standard 1.	Number Sense and Algebraic Operations
Standard 2.	Relations and Functions
Standard 3.	Data Analysis, Probability & Statistics
Algebra II	
Standard 1.	Number Sense and Algebraic Operations
Standard 2.	Relations and Functions
Standard 3.	Data Analysis, Probability, & Statistics
Geometry	
Standard 1.	Logical Reasoning
Standard 2.	Properties of 2-Dimensional Figures
Standard 3.	Triangles and Trigonometric Ratios
Standard 4.	Properties of 3-Dimensional Figures
Standard 5.	Coordinate Geometry
Biology I	
PASS Process/Inquiry Standards and Objectives	
Process 1.	Observe and Measure
Process 2.	Classify
Process 3.	Experiment
Process 4.	Interpret and Communicate
Process 5.	Model
PASS Content Standards and Objectives	
Standard 1.	The Cell
Standard 2.	The Molecular Basis of Heredity
Standard 3.	Biological Diversity
Standard 4.	The Interdependence of Organisms
Standard 5.	Matter/Energy/Organization in Living Systems
Standard 6.	The Behavior of Organisms
English II	
Reading/Literature:	
Standard 1.	Vocabulary
Standard 2.	Comprehension
Standard 3.	Literature
Standard 4.	Research and Information
Writing/Grammar/Usage and Mechanics:	
Standard 1/2.	Writing
Standard 3.	Grammar/Usage and Mechanics

Table 1.1. Oklahoma Content Standards by Subject (cont.)

English III	
Reading/Literature:	
Standard 1.	Vocabulary
Standard 2.	Comprehension
Standard 3.	Literature
Standard 4.	Research and Information
Writing/Grammar/Usage and Mechanics:	
Standard 1/2.	Writing
Standard 3.	Grammar/Usage and Mechanics
U.S. History	
Standard 1.	Civil War/Reconstruction Era
Standard 2.	Impact of Immigration and Industrialization
Standard 3.	Imperialism, World War I, and Isolationism
Standard 4.	United States During the 1920s and 1930s
Standard 5.	World War II
Standard 6.	United States Since World War II

1.2 Summary of Test Development and Content Validity

To ensure content validity of the Oklahoma ACE EOI tests, Pearson content experts closely study the Oklahoma *Priority Academic Student Skills (PASS)* and work with Oklahoma content area specialists, teachers, and assessment experts to develop a pool of items that measure Oklahoma's Assessment Frameworks (i.e., *PASS*) for each subject. Once the need for field test items was determined, based on the availability of items for future test construction, a pool of items that measured Oklahoma's *PASS* in each subject was developed. These items were developed under universal design guidelines set by the SDE and carefully reviewed and discussed by Content and Bias/Sensitivity Review Committees to evaluate not only content validity, but also plain language and the quality and appropriateness of the items. These committees were comprised of Oklahoma teachers and SDE staff. The committees' recommendations were used to select and/or revise items from the item pool used to construct the field test portions of the Winter/Trimester 2011-12 and the Spring 2012 assessments.

1.2.a Aligning Test to *PASS* Content Standards

In addition to the test Blueprints provided by SDE, Table 1.2 describes four criteria for test alignment with the *PASS* Standards and Objectives.

Table 1.2. Criteria for Aligning the Test with *PASS* Standards and Objectives.

1. Categorical Concurrence	The test is constructed so that there are at least six items measuring each *PASS* standard with the content category consistent with the related standard. The number of items, six, is based on estimating the number of items that could produce a reasonably reliable estimate of a student's mastery of the content measured.
2. Range-of-Knowledge	The test is constructed so that at least 50% of the objectives for a *PASS* standard have at least one corresponding assessment item.
3. Balance-of-Representation	The test is constructed according to the alignment blueprint, which reflects the degree of representation given on the test to each *PASS* standard and objective in terms of the percent of total test items measuring each standard and the number of test items measuring each objective.
4. Source-of-Challenge	Each test item is constructed in such a way that the major cognitive demand comes directly from the targeted *PASS* skill or concept being assessed, not from specialized knowledge or cultural background that the test-taker may bring to the testing situation.

1.2.b Item Pool Development and Selection

The source of the operational items included a pool of previously field-tested or operationally-administered items ranging from the Spring 2005 through the Spring 2011 administrations for Algebra I, Biology I, English II, and U.S. History and from the census Spring 2007 field test through the Spring 2011 embedded field test for Algebra II, Geometry, and English III. Note that the items were calibrated live using data from the operational administrations to estimate parameters for these items.

The ACE EOI tests for the Winter/Trimester 2011-12 and Spring 2012 cycle were built by including previously field-tested and operational items. To equate the forms across years, the entire set of operational items served as anchors or links to the base scale. Equating is necessary to account for slight year-to-year differences in form difficulty and to maintain comparability across years. Details of the equating procedures applied are provided in a subsequent section in this document. Content experts also targeted the percentage of items measuring various Depth of Knowledge (DOK) levels for assembling the tests. Table 1.3 provides the DOK level percentages for the Winter/Trimester 2011-12 and Spring 2012 operational assessments. During test construction, effort was made to construct test forms that meet the target percentages as close as possible.

Table 1.3. Percentage of Items by Depth of Knowledge Levels

Test Session	DOK Level	Target DOK %	Actual %			
			Algebra I	Algebra II	Geometry	Biology I[1]
Winter/ Trimester 2011-12	1	10-15	12.73	9.09	16.36	11.67
	2	60-70	69.09	72.73	63.64	65.00
	3/4	15-25	18.18	18.18	20.00	23.33
Spring 2012 Core A	1	10-15	12.73	14.55	14.55	15.00
	2	60-70	67.27	69.09	69.09	45.00
	3/4	15-25	20.00	16.36	16.36	40.00
Spring 2012 Core B	1	10-15	12.73	14.55	14.55	13.33
	2	60-70	67.27	69.09	69.09	48.33
	3/4	15-25	20.00	16.36	16.36	38.33

Note 1: For Biology I, the target DOK percentages are 10 - 15 for DOK level 1, 55 - 65 for DOK level 2, and 25 - 35 for DOK level 3 for the school year of 2011-2012.

Table 1.3. Percentage of Items by Depth of Knowledge Levels (cont.)

Test Session	DOK Level	Target DOK %	Actual %		
			English II	English III	U.S. History
Winter/ Trimester 2011-12	1	10-15	11.48	11.11	18.33
	2	60-70	72.13	69.84	66.67
	3/4	15-25	16.39	19.05	15.00
Spring 2012 Core A	1	10-15	6.56	12.70	10.00
	2	60-70	70.49	68.25	65.00
	3/4	15-25	22.95	19.05	25.00
Spring 2012 Core B	1	10-15	8.20	12.70	10.00
	2	60-70	73.77	66.67	66.67
	3/4	15-25	18.03	20.63	23.33

1.2.c Configuration of the Seven Tests

Table 1.4 and Table 1.5 provide overviews of the number of operational and field test items for the Winter/Trimester 2011-12 and Spring 2012 OSTP-ACE EOI assessments. The Spring 2012 test was comprised of two dual core, operationally-scored forms for each subject. While most items were unique to each form, there were at least 20 items in common across the core forms for use during calibration, scaling, and equating. The number of common linking items per subject is presented in Table 1.6. Field test items were embedded in the operational test forms for all content areas to build the item bank for future use. The forms in the Spring 2012 assessments were randomly assigned within classrooms to obtain randomly-equivalent samples of examinees for the field test items.

Table 1.4. Configuration of the OSTP-ACE EOI Tests for Winter/Trimester 2011-12

					Maximum Possible Points on Test Items (Per Form)			
		Item Counts (Per Form)			OP		FT	
Subject	Forms	OP	FT	Test	MC	OE	MC	OE
Algebra I	1	55	10	65	55	0	10	0
Algebra II	1	55	10	65	55	0	10	0
Biology I	1	60	10	70	60	0	10	0
English II	1	60/1*	10	70/1*	60	6	10	0
English III	1	62/1*	10	72/1*	62	10	10	0
Geometry	1	55	10	65	55	0	10	0
U.S. History	1	60	10	70	60	0	10	0

Note: OP = Operational; FT = Field Test; MC = Multiple Choice; OE = Open-ended; * = multiple choice/open-ended.

Table 1.5. Configuration of the OSTP-ACE/EOI Tests for Spring 2012

					Maximum Possible Points on Test Items (Per Form)			
		Item Counts (Per Form)			OP		FT	
Subject	Forms	OP**	FT	Test	MC	OE	MC	OE
Algebra I	12	55	10	65	55	0	10	0
Algebra II	12	55	10	65	55	0	10	0
Biology I	12	60	15	75	60	0	15	0
English II	9	60/1*	15	75/1*	60	6	15	0
English III	12	62/1*	15	77/1*	62	10	15	0
Geometry	12	55	10	65	55	0	10	0
U.S. History	12	60	10	70	60	0	10	0

Note: OP = Operational; FT = Field Test; MC = Multiple Choice; OE = Open-ended; * = multiple choice/open-ended; **=by Core Form (some items were common across forms).

Table 1.6. Number of Common Linking Items per Subject for Spring 2012

Subject	No. of CL Items	Total No. of Items*
Algebra I	20	90
Algebra II	20	90
Biology I	21	99
English II	20	102
English III	20	106
Geometry	20	90
U.S. History	20	100

Note: No. = Number; CL = common linking items; *= Number of unique operational items.

1.2.d Operational and Field Test Items by Content Area

Algebra I. The Winter/Trimester 2011-12 Algebra I administration was comprised of one form with 55 operational items and 10 field test items. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained 55 operational items and 10 field test items, totaling 65 items per form. The number of items and maximum points possible by content standard is shown in Table 1.7. Algebra I scores were reported by content standard and at the objective level. There were nine or more operational items in each

reported category. Each item was mapped to one content standard and one objective per content standard.

Table 1.7. Number of Items and Points by Content Standard for Algebra I

	Content Standard							
	1		2		3		Total	
Form	Items	Points	Items	Points	Items	Points	Items	Points
Winter 2011-12								
Operational	15	15	31	31	9	9	55	55
FT Form 1	3	3	5	5	2	2	10	10
Spring 2012								
Core A	15	15	31	31	9	9	55	55
Core B	15	15	31	31	9	9	55	55
FT Form 1	2	2	6	6	2	2	10	10
FT Form 2	2	2	6	6	2	2	10	10
FT Form 3	2	2	6	6	2	2	10	10
FT Form 4	2	2	5	5	3	3	10	10
FT Form 5	2	2	5	5	3	3	10	10
FT Form 6	3	3	5	5	2	2	10	10
FT Form 7	2	2	6	6	2	2	10	10
FT Form 8	3	3	5	5	2	2	10	10
FT Form 9	2	2	6	6	2	2	10	10
FT Form 10	2	2	6	6	2	2	10	10
FT Form 11	2	2	7	7	1	1	10	10
FT Form 12	2	2	6	6	2	2	10	10

Note: FT = Field Test.

Algebra II. The Winter/Trimester 2011-12 Algebra II administration was comprised of one form with 55 operational items and 10 field test items. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained 55 operational items and 10 field test items, totaling 65 items per form. The number of items and maximum points possible by content standard is shown in Table 1.8. Algebra II scores were reported by content standard and at the objective level. There were nine or more operational items in each reported category. Each item was mapped to one content standard and one objective per content standard.

Table 1.8. Number of Items and Points by Content Standard for Algebra II

	Content Standard							
	1		2		3		Total	
Form	Items	Points	Items	Points	Items	Points	Items	Points
Winter 2011-12								
Operational	15	15	31	31	9	9	55	55
FT Form 1	3	3	6	6	1	1	10	10
Spring 2012								
Core A	15	15	31	31	9	9	55	55
Core B	15	15	31	31	9	9	55	55
FT Form 1	2	2	6	6	2	2	10	10
FT Form 2	3	3	6	6	1	1	10	10
FT Form 3	3	3	6	6	1	1	10	10
FT Form 4	2	2	6	6	2	2	10	10
FT Form 5	3	3	6	6	1	1	10	10
FT Form 6	2	2	6	6	2	2	10	10
FT Form 7	3	3	6	6	1	1	10	10
FT Form 8	2	2	6	6	2	2	10	10
FT Form 9	2	2	7	7	1	1	10	10
FT Form 10	2	2	6	6	2	2	10	10
FT Form 11	2	2	6	6	2	2	10	10
FT Form 12	3	3	6	6	1	1	10	10

Note: FT = Field Test.

Geometry. The Winter/Trimester 2011-12 Geometry administration was comprised of one form with 55 operational items and 10 field test items. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained 55 operational items and 10 field test items, totaling 65 items per form. The number of items and maximum points possible by content standard is shown in Table 1.9. Geometry scores were reported by content standard and at the objective level. There were six or more items in each reported category. Each item was mapped to one content standard and one objective per content standard.

Table 1.9. Number of Items and Points by Content Standard for Geometry

	Content Standard											
	1		2		3		4		5		Total	
Form	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts
Winter 2011-12												
Operational	6	6	20	20	12	12	10	10	7	7	55	55
FT Form 1	1	1	4	4	2	2	2	2	1	1	10	10
Spring 2012												
Core A	6	6	20	20	12	12	10	10	7	7	55	55
Core B	6	6	20	20	12	12	10	10	7	7	55	55
FT Form 1	1	1	3	3	2	2	3	3	1	1	10	10
FT Form 2	0	0	3	3	1	1	5	5	1	1	10	10
FT Form 3	1	1	4	4	2	2	3	3	0	0	10	10
FT Form 4	1	1	2	2	1	1	4	4	2	2	10	10
FT Form 5	1	1	2	2	2	2	3	3	2	2	10	10
FT Form 6	1	1	2	2	3	3	4	4	0	0	10	10
FT Form 7	1	1	2	2	2	2	4	4	1	1	10	10
FT Form 8	1	1	4	4	2	2	2	2	1	1	10	10
FT Form 9	2	2	1	1	2	2	4	4	1	1	10	10
FT Form 10	1	1	4	4	0	0	4	4	1	1	10	10
FT Form 11	1	1	1	1	3	3	4	4	1	1	10	10
FT Form 12	2	2	2	2	2	2	3	3	1	1	10	10

Note: Its = Number of Items; Pts = Number of Points; FT = Field Test.

Biology I. The Winter/Trimester 2011-12 Biology I administration was comprised of one form with 60 operational items and 10 field test items. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained 60 operational items and 15 field test items, totaling 75 items per form. The number of items and the maximum number points possible by content standard is shown in Table 1.10. Biology I scores were reported for content and process standards at the standard level. Each reported process standard has eight or more items and each content standard has eight or more items. Unlike other subjects, all items in Biology I were primarily mapped to process standards. All items (except safety items) were also mapped to content standards.

Table 1.10. Number of Items and Points by Content Standard for Biology I

	Content Standard													
	1		2		3		4		5		6		Total*	
Form	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts
Winter 2011-12														
Operational	7	7	10	10	9	9	12	12	10	10	8	8	56	56
FT Form 1	2	2	1	1	2	2	2	2	1	1	2	2	10	10
Spring 2012														
Core A	8	8	8	8	8	8	13	13	10	10	9	9	56	56
Core B	8	8	9	9	8	8	13	13	10	10	8	8	56	56
FT Form 1	4	4	2	2	3	3	1	1	3	3	1	1	14	14
FT Form 2	5	5	2	2	3	3	2	2	2	2	0	0	14	14
FT Form 3	3	3	1	1	3	3	3	3	4	4	0	0	14	14
FT Form 4	3	3	1	1	1	1	2	2	4	4	2	2	13	13
FT Form 5	3	3	4	4	1	1	3	3	1	1	1	1	13	13
FT Form 6	1	1	3	3	4	4	3	3	3	3	0	0	14	14
FT Form 7	4	4	2	2	4	4	3	3	1	1	0	0	14	14
FT Form 8	3	3	2	2	3	3	1	1	4	4	1	1	14	14
FT Form 9	2	2	3	3	0	0	4	4	4	4	1	1	14	14
FT Form 10	2	2	2	2	2	2	5	5	3	3	0	0	14	14
FT Form 11	2	2	2	2	3	3	4	4	3	3	0	0	14	14
FT Form 12	2	2	3	3	4	4	3	3	3	3	0	0	15	15

Note: Its = Number of Items; Pts = Number of Points; FT = Field Test; Some totals for OP forms and FT forms are less than 60 (for OP) and 15 (for FT) due to dual item alignment – an item does not map to a content standard, but maps to a process.

English II. The Winter/Trimester 2011-12 English II administration was comprised of one form with 60 operational MC items, 1 open-ended writing prompt, and 10 field test MC items. All multiple-choice operational items were considered anchor items on this form, selected from available items in the item bank. There were two core forms and 9 field test sets in the Spring 2012 administration. Each of the forms contained 60 operational MC items, 1 operational open-ended writing prompt, and 15 field test MC items, totaling 76 items per form. Table 1.11 lists the number of items and the maximum possible number of points by content standard in the Winter/Trimester 2011-12 and Spring 2012 forms. English II scores were reported at the content standard level. Each item was mapped to one content standard and one objective. The writing prompts in English II were scored analytically on five traits with a maximum of four score points per trait. The scores in the analytic traits were reported in the Writing report. The trait scores were weighted differentially to derive a composite score that ranged from 1 to 6. The composite scores contributed to the English II total score.

Table 1.11. Number of Items and Points by Content Standard for English II

	Content Standard													
	R1		R2		R3		R4		W1/W2		W3		Total	
Form	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts
Winter 2011-12														
Operational	6	6	19	19	18	18	5	5	1	6	12	12	61	66
FT Form 1	0	0	1	1	0	0	0	0	0	0	9	9	10	10
Spring 2012														
Core A	6	6	18	18	18	18	6	6	1	6	12	12	61	66
Core B	6	6	18	18	17	17	7	7	1	6	12	12	61	66
FT Form 1	1	1	4	4	4	4	1	1	-	-	5	5	15	15
FT Form 2	1	1	6	6	6	6	2	2	-	-	0	0	15	15
FT Form 3	1	1	5	5	3	3	1	1	-	-	5	5	15	15
FT Form 4	1	1	8	8	5	5	1	1	-	-	0	0	15	15
FT Form 5	2	2	7	7	4	4	2	2	-	-	0	0	15	15
FT Form 6	2	2	6	6	5	5	2	2	-	-	0	0	15	15
FT Form 7	1	1	6	6	8	8	0	0	-	-	0	0	15	15
FT Form 8	2	2	6	6	5	5	2	2	-	-	0	0	15	15
FT Form 9	1	1	7	7	6	6	1	1	-	-	0	0	15	15

Note: Its = Number of Items; Pts = Number of Points; FT = Field Test.

English III. The Winter/Trimester 2011-12 English III administration was comprised of one form with 62 operational MC items, 1 open-ended writing prompt, and 10 field test MC items. All multiple-choice operational items were considered anchor items on this form, selected from available items in the item bank. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained a set of 62 operational MC items, 1 operational open-ended writing prompt, and 15 field test MC items, totaling 78 items per form. Table 1.12 lists the number of items and the maximum possible number of points by content standard in the Winter/Trimester 2011-12 and Spring 2012 tests. English III scores were reported at the content standard level. Each item was mapped to one content standard and one objective. The writing prompts in English III were scored analytically on five traits with a maximum of four score points for each trait. The scores in the analytic traits were reported in the Writing report. The trait scores were weighted differentially to derive a composite score that ranged from 1 to 10. The composite scores contributed to the English III total score.

Table 1.12. Number of Items and Points by Content Standard for English III

	Content Standard												Total	
	R1		R2		R3		R4		W1/W2		W3			
Form	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts
Winter 2011-12														
Operational	6	6	17	17	19	19	6	6	1	10	14	14	63	72
FT Form 1	0	0	0	0	0	0	0	0	0	0	10	10	10	10
Spring 2012														
Core A	6	6	18	18	17	17	6	6	1	10	15	15	63	72
Core B	6	6	16	16	18	18	7	7	1	10	15	15	63	72
FT Form 1	1	1	5	5	3	3	1	1	-	-	5	5	15	15
FT Form 2	1	1	5	5	6	6	3	3	-	-	0	0	15	15
FT Form 3	2	2	4	4	2	2	2	2	-	-	5	5	15	15
FT Form 4	3	3	3	3	7	7	2	2	-	-	0	0	15	15
FT Form 5	1	1	5	5	3	3	1	1	-	-	5	5	15	15
FT Form 6	2	2	5	5	6	6	2	2	-	-	0	0	15	15
FT Form 7	1	1	7	7	5	5	2	2	-	-	0	0	15	15
FT Form 8	4	4	4	4	4	4	3	3	-	-	0	0	15	15
FT Form 9	2	2	5	5	5	5	3	3	-	-	0	0	15	15
FT Form 10	0	0	9	9	3	3	3	3	-	-	0	0	15	15
FT Form 11	3	3	6	6	6	6	0	0	-	-	0	0	15	15
FT Form 12	1	1	9	9	3	3	2	2	-	-	0	0	15	15

Note: Its = Number of Items; Pts = Number of Points; FT = Field Test.

U.S. History. The Winter/Trimester 2011-12 U.S. History administration was comprised of one form with 60 operational items and 10 field test items. There were two core forms and 12 field test sets in the Spring 2012 administration. Each of the forms contained a set of 60 operational items and 10 field test items, totaling 70 items per form. The number of items and maximum points possible by content standard in Winter/Trimester 2011-12 and Spring 2012 are shown in Table 1.13. U.S. History scores were reported only at the content standard level and each reported standard had six or more items.

Table 1.13. Number of Items and Points by Content Standard for U.S. History

	Content Standard													
	1		2		3		4		5		6		Total	
Form	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts	Its	Pts
Winter 2011-12														
Operational	6	6	9	9	9	9	12	12	9	9	15	15	60	60
FT Form 1	1	1	2	2	1	1	1	1	1	1	4	4	10	10
Spring 2012														
Core A	6	6	9	9	9	9	12	12	9	9	15	15	60	60
Core B	6	6	9	9	9	9	12	12	9	9	15	15	60	60
FT Form 1	2	2	2	2	0	0	1	1	0	0	5	5	10	10
FT Form 2	1	1	1	1	2	2	2	2	1	1	3	3	10	10
FT Form 3	1	1	1	1	2	2	0	0	2	2	4	4	10	10
FT Form 4	3	3	2	2	1	1	2	2	1	1	1	1	10	10
FT Form 5	3	3	1	1	1	1	1	1	1	1	3	3	10	10
FT Form 6	1	1	1	1	2	2	2	2	0	0	4	4	10	10
FT Form 7	1	1	1	1	0	0	3	3	2	2	3	3	10	10
FT Form 8	0	0	0	0	1	1	3	3	2	2	4	4	10	10
FT Form 9	0	0	1	1	3	3	1	1	1	1	4	4	10	10
FT Form 10	2	2	0	0	1	1	2	2	0	0	5	5	10	10
FT Form 11	2	2	1	1	1	1	1	1	1	1	4	4	10	10
FT Form 12	1	1	4	4	2	2	2	2	0	0	1	1	10	10

Note: Its = Number of Items; Pts = Number of Points; FT = Field Test.

Section 2

Administration of the ACE EOI Assessments

Valid and reliable assessment requires that assessments are first constructed in alignment with the Oklahoma content standards and then administered and scored according to sound measurement principles. Sound assessment practices require that schools administer all assessments in a consistent manner across the state so that all students have a fair and equitable opportunity for a score that accurately reflects their achievement in each subject.

The schools play a key role in administering the OSTP-ACE EOI assessments in a manner consistent with established procedures, monitoring the fair administration of the assessment, and working with the SDE office to address deviations from established assessment administration procedures. The role that district and school faculty members play is essential in the fair and equitable administration of successful ACE EOI assessments. The test forms are administered consistent with the State of Oklahoma's law requiring that 95% of students complete the tests online. The tests are administered through the secure PearsonAccess™ website. For the remaining students, paper-and-pencil test is administered. The following sections apply to the administration of paper-and-pencil test.

2.1 Packaging and Shipping

To provide Oklahoma with secure and dependable services for the shipping of assessment materials, Pearson's Warehousing and Transportation Department maintains the quality and security of material distribution and return by using such methods as sealed trailers and hiring reputable carriers with the ability to immediately trace shipments. Pearson uses all available tracking capabilities to provide status information and early opportunities for corrective action when necessary.

Materials are packaged by school and delivered to the district coordinators. Each shipment to a district contains a shipping document set that includes a packing list for each school's materials and a pallet map that shows the identity and pallet assignment of each carton.

Materials are packaged using information provided by the Assessment Coordinators through the PearsonAccess™ website, and optionally with data received directly from Oklahoma. Oklahoma educators also use the PearsonAccess™ site to provide Pearson with the pre-identification information needed to print the student identification section on answer documents. Bar-coding of all secure materials during the pre-packaging effort allows for accurate tracking of these materials through the entire packing, delivery, and return process. It also permits Pearson to inventory all materials throughout the packaging and delivery process along with the ability to provide the customer with status updates at any time. Use of handheld radio-frequency scanners in the packaging process help to eliminate the possibility of packing the wrong materials. The proprietary "pick-and-pack" process prompts packaging personnel as to what materials are to go in which shipping box. If the packer tries to pack the wrong item (or number of items into a shipping carton), the system signals an alert.

2.2 Materials Return

Test administration handbooks provide clear instructions on how to assemble, box, label, and return testing materials after test administration. Because of the criticality of used test materials and quantities often involved, safety is also a major concern, not only for the materials but for the people moving them. Only single-column boxes are used to distribute and collect test materials, so the weight of each carton is kept to a reasonable and manageable limit.

Paper bands are provided to group and secure used student response booklets for scoring. Color-coded return mailing labels with detailed return information (district address and code number, receipt address, box *x* of *y*, shipper's tracking number, etc.) are also provided. These labels facilitate accurate and efficient sorting of each carton and its contents upon receipt at Pearson.

2.3 Materials Discrepancies Process

The image scanning process enables Pearson to concurrently capture optical mark read (OMR) responses, images, and security information electronically. All scorable material discrepancies are captured, investigated by Pearson's Oklahoma Call Center team, reported, and resolved prior to a batch passing through a clean post edit and images being released for scoring.

As scanning of materials progresses, any discrepancies in materials received versus shipped are reported immediately to the SDE and scoring will begin. This system allows Pearson to proceed in scoring clean batches while any discrepant material issues are being resolved. As discrepant materials are received, they will be processed. Data from discrepant material receipts are captured in the same database as all other material receipts resulting in a complete record of materials for each school. As batches clear the clean post edit, clipped images are prepared and distributed for scoring. The Oklahoma Call Center Team notifies the SDE regarding unresolved material discrepancies within 24 hours after Pearson's initial attempt to contact the school principal. Within one week after materials are returned, Pearson's Service Center Team also notifies the SDE of any missing or incomplete shipments from schools that received testing materials.

Resolution of missing secure test materials and used answer booklets. Pearson provides updates on a daily basis to the initial discrepancy reports, in response to SDE specifications and requests. The Oklahoma Call Center team makes every attempt to resolve all discrepancies involving secure test books and used answer booklets in a timely manner. Using daily, updated discrepancy reports, Pearson is in constant contact with the respective districts/schools. Pearson and the SDE work out details on specific approaches to resolution of material return discrepancies, and what steps will be taken if unaccounted for secure test books and/or used answer documents are not found and remain unreturned to Pearson.

2.4 Processing Assessment Materials Returned by Schools

Pearson's receipt system provides for the logging of materials within 24 hours of receipt and the readiness of materials for scanning within 72 hours of receipt. District status is available from a web-based system accessible by SDE. In addition, the Oklahoma Call Center is able to provide receipt status information if required. The receipt notification website's database is updated daily to allow for accurate information being presented to inquiring district/school personnel. As with initial shipping, the secure and accurate receipt of test materials is a

priority with Pearson. Quality assurance procedures provide that all materials are checked in using pre-defined procedures. Materials are handled in a highly secure manner from the time of receipt until final storage and shredding. The receipt of all secure materials is verified through the scanning of barcodes and the comparison of this data to that in security files established during the initial shipment of Oklahoma test materials to the district assessment coordinators.

Section 3

Classical Item Analysis and Results

3.1 Sampling Plan and Field Test Design

3.1.a Sampling Plan

Population data were used for classical analyses for all Winter/Trimester 2011-12 tests and for Algebra I, Algebra II, Biology I, Geometry, and U.S. History for Spring 2012. A sample of 15,000 students was used for English II and for English III in Spring 2012 administration. Using stratified random sampling, the samples were similar to the Spring 2011 equating sample for these two tests in terms of gender and ethnicity representation. Additionally, the proportions of students from identified key school districts were represented proportionally in the samples.

3.1.b Field Test Design

New items are field-tested to build up the item bank for future high stakes administrations. The overall field test design used by Pearson was an embedded field test design where newly-developed field test items were embedded throughout the test. The advantage of an embedded field test design is that test-takers do not know where the field test items are located and therefore will treat each item as a scored item. Ten to fifteen multiple choice field test items per form (Winter/Trimester 2011-12 and Spring 2012) were placed in common positions across forms and administrations. Field test items were prioritized for inclusion on forms based on current item bank analyses.

3.1.c Data Receipt Activities

After all tests were scored, a data file was provided for item analyses and calibration. A data clean-up process that removed invalid cases, ineligible responses, absent students, and second-time test takers was completed. A statistical key check was also performed at this time. This 'cleaned' sample was used for classical item analyses, calibration, and equating. Upon receipt of data, a research scientist inspected several data fields to determine if the data met expectations, including:

- Student ID
- Demographic fields
- Form identification fields
- Raw response fields
- Scored response fields
- Total score and subscore fields
- Fields used to implement exclusion from analysis rules

Exclusion Rules. Following data inspection and clean-up, exclusionary rules were applied to form the final sample that was used for classical item analyses, calibration, and equating. Any student who had attempted at least five responses was included in the data analyses. The demographic breakdowns of the students in the Winter/Trimester 2011-12 and Spring 2012 item analysis and calibration sample appear in Table 3.1 and Table 3.2, respectively.

Table 3.1. Demographic Characteristics of Student Sample for Winter/Trimester 2011-12

Subject	Total	Male	Female	African American	Native American	Hispanic	Asian	Pacific Islander	White	Other
Algebra I	1,249	636	594	134	207	176	12	2	676	42
Algebra II	1,425	709	709	141	219	110	27	1	872	55
Biology I	1,502	756	728	171	238	147	22	0	838	86
English II	1,543	795	726	149	200	175	25	1	902	91
English III	1,794	908	865	181	255	150	46	3	1,059	100
Geometry	1,757	875	849	158	276	145	20	2	1,045	111
U.S. History	1,531	743	777	171	226	135	10	1	921	67

Note: Gender and Ethnicity values may not add to the total due to missing responses.

Table 3.2. Demographic Characteristics of Student Sample for Spring 2012

Subject	Total	Male	Female	African American	Native American	Hispanic	Asian	Pacific Islander	White	Other
Algebra I	38,294	18,704	19,589	3,715	6,171	4,460	925	92	21,331	1,600
Algebra II	31,847	15,381	16,453	2,842	4,794	3,311	854	64	18,798	1,184
Biology I	37,862	18,741	19,118	3,756	5,820	4,194	873	97	21,575	1,547
English II	36,451	18,109	18,341	3,354	5,678	4,204	856	87	20,850	1,422
English III	36,883	18,467	18,403	3,614	5,967	3,777	786	70	21,420	1,249
Geometry	37,220	18,607	18,608	3,599	5,786	4,233	840	82	21,242	1,438
U.S. History	34,035	16,743	17,283	3,138	5,304	3,561	841	60	19,929	1,202

Note: Gender and Ethnicity values may not add to the total due to missing responses.

Statistical Key Check. Administering items that have only one correct key and are correctly scored is critical for accurate assessment of student performance. To screen for potentially problematic items, a statistical key check was conducted, and items were flagged that met any of the following criteria:

- Less than 200 students responded to the item
- Correct response *p*-value less than 0.20
- Correct response uncorrected point-biserial correlation less than 0.20
- Distractor *p*-value greater than or equal to 0.40
- Distractor point-biserial correlation greater than or equal to 0.05

Any flagged operational items are submitted for key review by the appropriate Pearson content specialist. Any flagged items that are identified by content experts as having key issues are submitted to SDE for review before dropping the item from the operational scoring. There were no items identified in Winter/Trimester 2011-12 and Spring 2012 administrations as having a key issue. Once the keys were verified, classical item analyses were conducted.

3.2 Classical Item Analyses

Following completion of the data receipt activities and statistical key check, the following classical item analyses were conducted for operational and field test items:

- Total case count
- Summary demographic statistics (e.g., males, females, African American, White, Hispanic, Asian, Pacific Islander, Native American, and Other)
- Frequency distributions for all multiple choice items and frequency distributions of score ratings and condition codes for writing prompts
    - Percentage of students in different multiple choice categories and, for the writing prompt, in different score categories (overall and broken down by gender and ethnicity)
- Item *p*-value
    - Mean item *p*-value
- Item-test point-biserial correlation
    - Mean item-test point-biserial correlation
    - Point-biserial correlation by response option (overall and broken down by gender and ethnicity)
- Omit percentage per item
    - Not reached analysis results per item
- Mean score by response option (overall and broken down by gender and ethnicity)

Once the keys were verified and the item analysis results reviewed, the data were used for calibration and equating.

3.2.a Test-Level Summaries of Classical Item Analyses

The test-level raw score descriptive statistics for the calibration samples are shown in Table 3.3. Note that students whose tests were invalidated and those students taking the test for a second time were excluded. The operational test results indicate that the omit rates were smaller than 1% for all subjects. The mean raw score and the mean percent of the maximum raw scores were relatively similar for both administrations. As indicated in the test configuration section, there were multiple forms with a duplicate set of operational items

and a unique set of field test items in the Winter/Trimester 2011-12 and Spring 2012 tests. A separate item analysis by test form indicated that, in both administrations, the omit rates were below 1% for all content areas. The mean percent of the maximum possible raw score across forms indicates that the forms were relatively similar in difficulty for all content areas except Algebra I, where the Winter/Trimester 2011-12 form appeared to be more difficult than the Spring 2012 forms.

Table 3.3. Test-Level Summaries of Classical Item Analyses for Winter/Trimester 2011-12 and Spring 2012

Subject and Administration	Sample Size	Mean	Mean % of Max	Items / Points	Mean p	Mean r_{pb}	Omit Min	Omit Max
Algebra I-W11	1,249	29.16	0.53	55	0.53	0.39	0.00	0.10
Algebra I-S12 CA	19,469	36.30	0.66	55	0.65	0.42	0.00	0.09
Algebra I-S12 CB	18,825	36.76	0.67	55	0.65	0.42	0.00	0.09
Algebra II-W11	1,425	31.98	0.58	55	0.57	0.46	0.00	0.48
Algebra II-S12 CA	16,250	33.60	0.61	55	0.61	0.40	0.00	0.14
Algebra II-S12 CB	15,597	33.72	0.61	55	0.61	0.40	0.00	0.14
Biology I-W11	1,502	37.88	0.63	60	0.64	0.40	0.00	0.23
Biology I-S12 CA	19,311	38.80	0.65	60	0.64	0.37	0.01	0.13
Biology I-S12 CB	18,551	38.14	0.64	60	0.64	0.37	0.01	0.13
English II-W11	1,543	47.62	0.72	61/66	0.72	0.39	0.00	0.19
English II-S12 CAA	10,427	48.36	0.73	61/66	0.74	0.34	0.00	0.08
English II-S12 CAB	10,399	48.58	0.74	61/66	0.74	0.34	0.00	0.08
English II-S12 CBA	7,661	48.02	0.73	61/66	0.73	0.32	0.00	0.08
English II-S12 CBB	7,747	48.52	0.74	61/66	0.74	0.32	0.00	0.08
English III-W11	1,794	47.00	0.65	63/72	0.64	0.42	0.00	0.16
English III-S12 CAA	9,845	46.12	0.64	63/72	0.65	0.34	0.00	0.13
English III-S12 CAB	9,715	45.94	0.64	63/72	0.65	0.34	0.00	0.13
English III-S12 CBA	8,488	46.96	0.65	63/72	0.65	0.36	0.00	0.14
English III-S12 CBB	8,616	47.16	0.66	63/72	0.65	0.36	0.00	0.14
Geometry-W11	1,757	35.50	0.65	55	0.64	0.42	0.00	0.23
Geometry-S12 CA	19,276	38.14	0.69	55	0.70	0.43	0.00	0.09
Geometry-S12 CA	17,944	38.30	0.70	55	0.70	0.43	0.00	0.09
U.S. History-W11	1,531	38.72	0.65	60	0.65	0.39	0.00	0.15
U.S. History-S12 CA	17,261	38.34	0.64	60	0.64	0.37	0.00	0.09
U.S. History-S12 CB	16,774	38.96	0.65	60	0.64	0.37	0.00	0.09

Note: W11 = Winter/Trimester 2011-12; S12 CA = Spring 2012 Core A; S12 CB = Spring 2012 Core B; S12 CAA=Spring 12 MC form A +OE form A; S12 CAB=Spring 12 MC form A +OE form B; S12 CBA=Spring 12 MC form B +OE form A; S12 CBB=Spring 12 MC form B +OE form B; r_{pb} = point biserial correlation.

3.3 Procedures for Detecting Item Bias

One of the goals of the OSTP-ACE EOI assessments is to assemble a set of items that provides a measure of a student's ability that is as fair and accurate as possible for all subgroups within the population. Differential item functioning (DIF) analysis refers to statistical procedures that assess whether items are differentially difficult for different groups of examinees of matched achievement levels. DIF procedures typically control for overall between-group differences on a criterion, usually total test scores. Between-group performance on each item is then compared within sets of examinees having the same total

test scores. If the item is differentially more difficult for an identifiable subgroup when conditioned on ability, the item may be measuring something different from the intended construct. However, it is important to recognize that DIF-flagged items might be related to actual differences in relevant knowledge or skills or statistical Type I error. As a result, DIF statistics are used only to identify potential sources of item bias. Subsequent review by content experts and bias committees are required to determine the source and meaning of performance differences. For the OSTP-ACE EOI test DIF analyses, DIF statistics were estimated for all major subgroups of students with sufficient sample size: African American, Hispanic, Asian, Native American, and Female. Field test items with statistically-significant differences in performance were flagged so that items could be carefully examined for possible biased or unfair content that was undetected in earlier fairness and bias content review meetings held prior to form construction.

Pearson used the Mantel-Haenszel (MH) chi-square approach for detecting DIF in multiple choice and open-ended items. Pearson calculated the Mantel-Haenszel statistic (MH D-DIF; Holland & Thayer 1988) to measure the degree and magnitude of DIF. The student group of interest is the *focal* group, and the group to which performance on the item is being compared is the *reference* group. The reference groups for these DIF analyses were White for race and male for gender. The focal groups were females and minority race groups.

Items were separated into one of three categories on the basis of DIF statistics (Holland and Thayer 1988; Dorans and Holland 1993): negligible DIF (category A), intermediate DIF (category B), and large DIF (category C). The items in category C, which exhibit significant DIF, are of primary concern. The item classifications are based on the Mantel-Haenszel chi-square and the MH delta (Δ) value. Positive values of delta indicate that the item is easier for the focal group, and a negative value of delta indicates that the item is more difficult for the focal group. The item classifications are made as follows (Michaelides, 2008):

- The item is classified as C category if the MH D-DIF is significantly different from zero ($p < 0.05$) and its absolute value is greater than 1.5.
- The item is classified as B category if the MH D-DIF is significantly different from zero ($p < 0.05$) and its absolute value is between 1.0 and 1.5.
- The item is classified as A category if the MH D-DIF is not significantly different from zero ($p \geq 0.05$) or if its absolute value is less than 1.0.

3.3.a Differential Item Functioning Results

The data in Table 3.4 summarize the number of items in DIF categories for the seven subjects for the Winter/Trimester 2011-12 and Spring 2012 administrations. The results presented in this table are for field test items only. Items flagged for DIF were placed before expert content specialists during the Spring 2012 field test data review as described in the Section 3.4. Field test items that exhibit bias as a result of the content of the item were flagged in the item bank, excluding them from future use.

Table 3.4. DIF Flag Incidence Across All OSTP-ACE EOI Field Test Items for Winter/Trimester 2011-12 and Spring 2012

Subject	Total FT Items	Native American	Asian	African American	Hispanic	Female
Winter 2011-12						
Algebra I	10	0	0	0	0	1
Algebra II	10	0	0	1	0	0
Biology I	10	0	0	0	1	0
English II	10	0	0	4	0	0
English III	10	0	0	0	2	0
Geometry	10	0	0	0	1	0
U.S. History	10	0	0	0	0	1
Spring 2012						
Algebra I	120	1	11	7	7	6
Algebra II	120	1	11	7	7	6
Biology I	160	0	8	12	5	8
English II	103	0	12	9	5	10
English III	143	0	14	15	11	11
Geometry	120	2	3	9	5	7
U.S. History	119*	0	5	11	8	7

Note: One item in U.S. History was excluded from further analysis due to content reasons.

3.4 Data Review

Data review represents a critical step in the test development cycle. At the data review meeting, SDE and Pearson staff had the opportunity to review actual student performance on the newly-developed and field-tested multiple choice items across the seven subjects based on the Winter/Trimester 2011-12 and Spring 2012 field test administrations. The data review focused on the content validity, curricular alignment, and statistical functioning of field-tested items prior to selection for operational test forms. The field test results used in the data review provided evidence that the items were designed to yield valid results and were accessible for use by the widest possible range of students. The review of student performance should provide evidence regarding the fulfillment of requirement 200.2(b)(2)of NCLB. The purpose of the review meeting was to ensure that psychometrically-sound, fair, and aligned items are used in the construction of the ACE EOI assessments and entered into the respective item banks. Pearson provided technical and psychometric expertise to provide a clear explanation about the content of the items, the field test process, the scoring process, and the resulting field test data to ensure the success of these meetings and the defensibility of the program.

Data review meetings were a collaborative effort between SDE and Pearson. SDE administrators and content specialists attended the meeting facilitated by Pearson content specialists and research scientists who trained the SDE staff on how to interpret and review the field test data. Meeting materials included a document explaining the flagging criteria, a document containing flagged items, and the item images. Pearson discussed with SDE the analyses performed and the criteria for flagging the items. Flagged items were then reviewed, and decisions were made as to whether to accept the item, accept the item for future re-field-testing with revisions, or reject the item. Review of the data included presentation of *p*-value, point-biserial correlation, point-biserial correlation by response

option, response distributions, mean overall score by response option, and indications of item DIF and IRT misfit. Items failing to meet the requirements of sound technical data were carefully considered for rejection by the review panel, thereby enhancing the reliability and improving the validity of the items left in the bank for future use. While the panel used the data as a tool to inform their judgments, the panel (and not the data alone) made the final determination as to the appropriateness or fairness of the assessment items. The flagging criteria for the ACE EOI assessments are as follows:

- *p*-value < .25 or > .90
- point-biserial correlation < .15
- distractor point-biserial correlation > .05
- differential item functioning (DIF): test item biases for subgroups
- IRT misfit as flagged by the Q_1 index (see section 4.3)

Bias Review. One aspect of the data review meetings was to assess potential bias based on DIF results and item content. Although bias in the items had been avoided through writer training and review processes, there is always the potential for bias to be detected through statistical analysis. It is important to include this step in the development cycle because SDE and Pearson wish to avoid inclusion of an item that is biased in some way against a group, because the item may lead to inequitable test results. As described earlier, all field test items were analyzed statistically for DIF using the field test data. A Pearson research scientist explained the meaning, in terms of level, and the direction of the DIF flags. The data review panel reviewed the item content, the percentage of students selecting each response option, and the point-biserial correlation for each response option by gender and ethnicity for all items flagged for DIF. The data review panel was then asked if there was context (for example, cultural barriers) or language in an item that might result in bias (i.e., an explanation for the existence of the statistical DIF flag).

3.4.a Results of Data Review

The number of items inspected during data review that met the statistical flagging criteria for the classical item analyses, DIF, and IRT procedures is presented in Table 3.5.

Table 3.5. Number of Items Per Subject Flagged and Rejected During Winter/Trimester 2011–2012 and Spring 2012 Field Test Data Review

Subject	No. of FT Items	No. Flagged	Rejected	Accepted	Accepted with Edits
Winter 2011-12					
Algebra I	10	8	1	7	2
Algebra II	10	8	0	9	1
Biology I	10[1]	3	0	10	0
English II	10	7	3	7	0
English III	10	3	0	10	0
Geometry	10	6	1	5	4
U.S. History	9[2]	3	0	8	1
Spring 2012					
Algebra I	120	46	12	93	15
Algebra II	120	46	11	96	13
Biology I	160	64	10	134	16
English II	103	47	19	84	0
English III	143	63	16	127	0
Geometry	120	46	9	100	11
U.S. History	108[2]	51	19	86	3

Note 1: The 10 Biology items from winter 2011 administration were re-field tested in the Spring 2012 administration. The total number of unique field test items for the two administrations is 160.
Note 2: In U.S. History, some items were excluded from field test data review after standards realignment.

3.5 Test Reliability

The reliability of a test provides an estimate of the extent to which an assessment will yield the same results when administered in different times, locations, or samples, when the two administrations do not differ in relevant variables. The reliability coefficient is an index of consistency of test results. Reliability coefficients are usually forms of correlation coefficients and must be interpreted within the context and design of the assessment and of the reliability study. Cronbach's alpha is a commonly-used internal consistency measure, which is derived from analysis of the consistency of the performance of individuals on items in a test administration. Cronbach's alpha is calculated as shown in equation (1). In this formula, s_i^2 denotes the estimated variance for each item, with items indexed $i = 1, 2, \ldots k$, and s^2_{sum} denotes the variance for the sum of all k items:

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^{k} s_i^2}{s_{sum}^2}\right). \quad (1)$$

Cronbach's alpha was estimated for each of the content areas for the operational portion of the test.

Table 3.6 presents Cronbach's alpha for the operational tests by subject area for the Winter/Trimester 2011-12 and Spring 2012 ACE EOI administrations. These reliability

coefficients indicate that the OSTP-ACE EOI assessments had strong internal consistency and that the tests produce relatively stable scores.

Table 3.6. Cronbach's Alpha for Winter/Trimester 2011-12 and Spring 2012 Administrations by Subject

Subject	Administration and Form	Alpha
Algebra I	Winter 2011-12	0.90
	Spring 2012 – Core A	0.91
	Spring 2012 – Core B	0.91
Algebra II	Winter 2011-12	0.93
	Spring 2012 – Core A	0.91
	Spring 2012 – Core B	0.91
Biology I	Winter 2011-12	0.91
	Spring 2012 – Core A	0.89
	Spring 2012 – Core B	0.89
English II	Winter 2011-12	0.90
	Spring 2012 – Core AA	0.86
	Spring 2012 – Core AB	0.86
	Spring 2012 – Core BA	0.84
	Spring 2012 – Core BB	0.84
English III	Winter 2011-12	0.91
	Spring 2012 – Core AA	0.88
	Spring 2012 – Core AB	0.88
	Spring 2012 – Core BA	0.88
	Spring 2012 – Core BB	0.88
Geometry	Winter 2011-12	0.92
	Spring 2012 – Core A	0.92
	Spring 2012 – Core B	0.91
U.S. History	Winter 2011-12	0.91
	Spring 2012 – Core A	0.89
	Spring 2012 – Core B	0.90

Note: Core AA=Core MC form A+OE form A; Core AB=Core MC form A+OE form B; Core BA=Core MC form B+OE form A; Core BB=Core MC form B+OE form B.

3.6 Test Reliability by Subgroup

Table 3.7 addresses the reliability analysis results by the different reporting subgroups for the OSTP-ACE EOI assessments for Spring 2012 for each core form. Table 3.7 illustrates the subject, the subgroups, the number of students used in the analyses and the associated Cronbach's Alpha for each subject and subgroup. In all instances, the reliability coefficients are well above the accepted lower limit of .70.

Table 3.7. Test Reliability by Subgroup for Spring 2012

Subject	Core	Male	Female	African-American	Native American	Hispanic	Asian	White
Algebra I	A	0.91	0.91	0.90	0.90	0.90	0.92	0.91
	B	0.91	0.91	0.90	0.90	0.91	0.91	0.91
Algebra II	A	0.91	0.90	0.88	0.89	0.90	0.92	0.90
	B	0.91	0.90	0.89	0.90	0.90	0.92	0.90
Biology I	A	0.89	0.88	0.86	0.87	0.88	0.90	0.88
	B	0.89	0.89	0.87	0.87	0.87	0.92	0.88
English II	AA	0.87	0.86	0.86	0.84	0.88	0.89	0.85
	AB	0.86	0.86	0.85	0.84	0.87	0.91	0.85
	BA	0.84	0.84	0.84	0.82	0.87	0.89	0.81
	BB	0.84	0.84	0.85	0.83	0.86	0.88	0.81
English III	AA	0.88	0.87	0.86	0.87	0.86	0.89	0.88
	AB	0.89	0.88	0.87	0.87	0.87	0.90	0.88
	BA	0.88	0.88	0.87	0.87	0.86	0.89	0.87
	BB	0.88	0.88	0.85	0.87	0.86	0.90	0.88
Geometry	A	0.93	0.92	0.92	0.91	0.91	0.92	0.92
	B	0.91	0.91	0.91	0.90	0.90	0.93	0.90
U.S. History	A	0.90	0.88	0.88	0.88	0.88	0.89	0.89
	B	0.90	0.89	0.88	0.89	0.89	0.91	0.89

Note: Core AA=Core MC form A+OE form A; Core AB=Core MC form A+OE form B; Core BA=Core MC form B+OE form A; Core BB=Core MC form B+OE form B.

Table 3.7. Test Reliability by Subgroup for Spring 201 (cont.)

Subject	Core	English Language Learner	Individual Education Plan	Economically Disadvantaged
Algebra I	A	0.90	0.90	0.90
	B	0.90	0.89	0.90
Algebra II	A	0.89	0.87	0.89
	B	0.90	0.88	0.90
Biology I	A	0.83	0.88	0.87
	B	0.85	0.88	0.88
English II	AA	0.85	0.86	0.86
	AB	0.83	0.86	0.85
	BA	0.84	0.86	0.84
	BB	0.82	0.79	0.85
English III	AA	0.82	0.83	0.87
	AB	0.81	0.84	0.87
	BA	0.82	0.86	0.87
	BB	0.80	0.83	0.86
Geometry	A	0.92	0.90	0.92
	B	0.91	0.90	0.90
U.S. History	A	0.86	0.89	0.88
	B	0.86	0.90	0.89

Note: Core AA=Core MC form A+OE form A; Core AB=Core MC form A+OE form B; Core BA=Core MC form B+OE form A; Core BB=Core MC form B+OE form B.

3.7 Inter-rater Reliability

Inter-rater reliability is referred to as the degree of agreement among scorers that allows for the scores to be interpreted as reasonably intended by the test developer (AERA, APA and NCME, 1999). The Winter/Trimester 2011-12 English II and English III tests contained one operational writing prompt each and the Spring 2012 tests contained one writing prompt per core form. Raters were trained to implement the scoring rubrics, anchor papers, check sets, and resolution reading. The items were analytically scored by two raters on five traits in both administrations. The final writing score for a student on a given trait is the average of the two scores. The inter-rater reliability coefficients for the operational prompt are presented in Table 3.8 for English II and Table 3.9 for English III. The results show that exact and adjacent rater agreement on trait scores for both the Winter/Trimester 2011-12 and Spring 2012 operational writing prompts were reasonably high. The weighted Kappa statistic (Kraemer, 1982) is an indication of inter-rater reliability after correcting for chance. The Kappa values for the OSTP-ACE EOI Winter/Trimester 2011-12 and Spring 2012 operational writing prompts are within the fair range for English II and close to or within the moderate range for English III.

Table 3.8.Inter-rater Reliability for English II Operational Writing Prompts for Winter/Trimester 2011-12 and Spring 2012

			Point Discrepancy Percentages							Agreement Percentages			
Trait	Max Points	Valid N	-3	-2	-1	0	1	2	3	Exact	Adjacent	+/- 2 or more	Kappa
Winter/Trimester 2011-12													
1	4	1,448	0.01	0.49	18.00	62.90	17.97	0.62	0.01	62.90	35.97	1.13	0.39
2	4	1,448	0.00	0.57	18.41	62.31	18.00	0.71	0.00	62.31	36.41	1.28	0.39
3	4	1,448	0.00	0.46	17.68	64.18	17.20	0.48	0.01	64.18	34.88	0.94	0.37
4	4	1,448	0.00	0.75	18.85	61.36	18.29	0.73	0.01	61.36	37.15	1.50	0.38
5	4	1,448	0.00	0.73	19.46	59.44	19.57	0.79	0.01	59.44	39.03	1.53	0.37
Spring 2012 Core Form A													
1	4	17,937	0.00	0.69	18.18	62.29	18.19	0.65	0.00	62.29	36.37	1.34	0.31
2	4	17,937	0.00	0.73	18.88	61.28	18.45	0.66	0.00	61.28	37.33	1.39	0.31
3	4	17,937	0.00	0.70	18.65	61.11	18.95	0.58	0.01	61.11	37.60	1.29	0.31
4	4	17,937	0.01	0.63	19.25	60.63	18.84	0.64	0.01	60.63	38.09	1.28	0.33
5	4	17,937	0.01	0.68	19.59	59.60	19.53	0.58	0.02	59.60	39.11	1.28	0.32
Spring 2012 Core Form B													
1	4	17,990	0.01	0.49	18.00	62.90	17.97	0.62	0.01	62.90	35.97	1.13	0.33
2	4	17,990	0.00	0.57	18.41	62.31	18.00	0.71	0.00	62.31	36.41	1.28	0.33
3	4	17,990	0.00	0.46	17.68	64.18	17.20	0.48	0.01	64.18	34.88	0.94	0.33
4	4	17,990	0.00	0.75	18.85	61.36	18.29	0.73	0.01	61.36	37.15	1.50	0.35
5	4	17,990	0.00	0.73	19.46	59.44	19.57	0.79	0.01	59.44	39.03	1.53	0.32

Table 3.9. Inter-rater Reliability for English III Operational Writing Prompts for Winter/Trimester 2011-12 and Spring 2012

			Point Discrepancy Percentages							Agreement Percentages			
Trait	Max Points	Valid N	-3	-2	-1	0	1	2	3	Exact	Adjacent	+/- 2 or more	Kappa
Winter/Trimester 2011-12													
1	4	1,721	0.00	0.99	19.64	61.07	17.49	0.81	0.00	61.07	37.13	1.80	0.45
2	4	1,721	0.00	1.39	19.17	61.53	16.97	0.93	0.00	61.53	36.14	2.32	0.45
3	4	1,721	0.00	0.76	18.54	62.46	17.72	0.52	0.00	62.46	36.26	1.28	0.47
4	4	1,721	0.00	0.81	19.52	62.46	16.27	0.87	0.06	62.46	35.79	1.74	0.48
5	4	1,721	0.00	1.28	19.12	60.20	18.71	0.70	0.00	60.20	37.83	1.98	0.47
Spring 2012 Core Form A													
1	4	18,059	0.02	0.86	17.80	62.30	18.42	0.58	0.02	62.30	36.22	1.48	0.41
2	4	18,059	0.01	0.79	17.76	62.37	18.35	0.71	0.01	62.37	36.11	1.52	0.41
3	4	18,059	0.01	0.61	17.75	63.21	17.92	0.49	0.01	63.21	35.67	1.12	0.41
4	4	18,059	0.01	0.61	18.23	62.00	18.65	0.48	0.02	62.00	36.88	1.12	0.41
5	4	18,059	0.01	0.56	19.00	60.97	18.96	0.48	0.01	60.97	37.96	1.06	0.41
Spring 2012 Core Form B													
1	4	18,121	0.01	0.44	15.66	67.72	15.78	0.39	0.01	67.72	31.44	0.84	0.39
2	4	18,121	0.01	0.39	15.59	67.89	15.77	0.36	0.00	67.89	31.36	0.76	0.39
3	4	18,121	0.02	0.40	15.44	67.83	15.97	0.34	0.00	67.83	31.41	0.76	0.39
4	4	18,121	0.01	0.51	15.92	66.77	16.30	0.49	0.00	66.77	32.22	1.00	0.39
5	4	18,121	0.01	0.48	16.73	65.66	16.61	0.51	0.00	65.66	33.34	1.00	0.38

Section 4

Calibration, Equating, and Scaling

This section introduces the item response theory (IRT) models, methods, and processes that were used to calibrate, equate, and scale the OCCT EOI tests. The three-parameter logistic (3-PL) IRT model (Lord & Novick, 1968) was used for dichotomously-scored test items and the Generalized Partial Credit (GPC; Muraki, 1997) model was used for polytomously-scored test items. For Winter/Trimester 2011-12 and Spring 2012, pre-equating procedures were applied to the subjects of Algebra I, Algebra II, Biology I, Geometry, and U.S. History, and post-equating procedures for the subjects of English II and English III.

4.1 Item Response Theory Models

Dichotomous Item Response Theory Model. The 3-PL IRT model was used for calibrating the dichotomously-scored multiple choice items. In the 3-PL model (Lord, 1980), the probability that a student with an achievement level of θ responds correctly to item *i* is

$$P_i(\theta) = c_i + (1 - c_i)\frac{1}{1 + e^{-Da_i(\theta - b_i)}}, \quad (2)$$

where a_i is the item discrimination parameter, b_i is the item difficulty parameter, c_i is the lower asymptote parameter, and D is a scaling constant, which is equal to 1.7. With multiple-choice items it is assumed that, due to guessing, examinees with very low ability levels have a probability greater than zero of responding correctly to an item. This probability is represented in the 3-PL model by the c_i parameter.

Polytomous Item Response Theory Model. For calibrating the polytomously-scored open-ended (OE) writing prompt items, the Generalized Partial Credit model was used. In the GPC model, the probability that a student with ability level θ will have a score in the k^{th} category of the i^{th} item is

$$P_{ik}(\theta) = \frac{\exp\left[\sum_{v=1}^{k} Da_i(\theta - b_{iv})\right]}{\sum_{c=1}^{m_i} \exp\left[\sum_{v=1}^{c} Da_i(\theta - b_{iv})\right]}, \quad (3)$$

where m_i is the total score levels for item *i* for $k = v$ category responses, a_i is the slope parameter, D is a scaling constant with the value of 1.7, and b_{iv} is the category intersection parameters (or $b_i - d_{iv}$) where b_i is location/difficulty and d_{iv} is the threshold parameters representing category boundaries relative to the item location parameter).

The IRT models were calibrated using MULTILOG 7.03 (Thissen, Chen, & Bock, 2003). MULTILOG estimates parameters simultaneously for dichotomous and polytomous items via marginal maximum likelihood procedures and implements the GPC model with the appropriate parameter coding. All item and student ability calibrations were independently conducted and verified by at least two Pearson research scientists.

4.2 Pre-Equating

Pre-equating procedures were applied to OCCT ACE EOI tests consisting entirely of dichotomously-scored multiple-choice items. These subjects included Algebra I, Algebra II, Biology I, Geometry, and U.S. History. ACE EOI tests English II and English III remained post-equated. All pre-equated forms were constructed using only previously-administered operational items and a set of unscored field-test items. Pearson Psychometric & Research Services staff created raw score to scale score (RSSS) tables using the freely-available program, POLYEQUATE (Kolen, 2004). Banked item parameter estimates for the forms' operational items were imported into POLYEQUATE as both the "new" and "old" forms to create a table of raw score to true score equivalents.

Scaling constants provided in Table 4.2 (M1 and M2) were used to rescale true score equivalents to the reported scale score metric. The lowest obtainable scale score (LOSS) and highest obtainable scale score (HOSS) for each subject also appear in Table 4.2.

Performance level cut scores appear in Table 4.3. Because the scale cut score may not always be present in the RSSS table, the scale scores that were closest to, but below the scale scores (thetas) set in standard setting were used as the "effective" cut scores. In addition, a conditional standard error of measurement (CSEM; please see Section 6.3 for computation of CSEM) was computed for each of the raw score points. The resulting raw score to scale score conversions, CSEMs, as well as the performance levels for the pre-equated tests, are shown in Table 4.4 and Table 4.5, respectively, for the Winter/Trimester 2011-12 and Spring 2012 administrations. The following section outlines post-equating work completed for the ACE EOI English II and English III tests.

4.3 Assessment of Fit to the IRT Model

For post-equated tests, item fit was assessed using the Yen's (1981, 1984) Q_1 item fit index, which approximately follows a χ^2 distribution:

$$Q_{1i} = \sum_{r=1}^{10} \frac{N_r (O_{ir} - E_{ir})^2}{E_{ir}(1 - E_{ir})}, \tag{4}$$

where Q_{1i} is the fit of the ith item, N_r is the number of examinees per cell, O_{ir} is the observed proportion of examinees in cell r that correctly answered item i, and E_{ir} is the expected portion of examinees in cell r that correctly answered item i. The expected proportions are computed using ability- and item parameter estimates in Equations (2) and (3) and summing over examinees in cell r:

$$E_{ir} = \frac{1}{N_{ir}} \sum_{k \varepsilon r}^{N_{ir}} P_i(\hat{\theta}_k). \tag{5}$$

Because chi-square statistics are affected by sample size and associated degrees of freedom, the following standardization of the Q_1 statistic was used:

$$Z_j = \frac{Q_{1i} - df}{\sqrt{(2df)}}. \quad (6)$$

The *Z*-statistic is an index of the degree to which observed proportions of item scores are similar to the proportions that would be expected, given the estimated ability- and item parameters. Large differences between expected and observed item performance may indicate poor item fit. To assess item fit, a critical *Z*-value is determined. Items with *Z*-values that are larger than this critical *Z*-value have poor item fit. The item characteristic curves, classical item statistics, and item content were reviewed for items flagged by Q_1. An internally-developed software program, Q1Static, was used to compute the Q_1 item fit index.

Operational items flagged by Q_1 that were not flagged by the classical item statistics and had reasonable IRT parameter estimates were not reviewed further. If any operational items were also flagged by classical item statistics and/or had poor IRT parameter estimates (e.g., low *a* parameter), the items were reviewed by Pearson content specialists. Any item that was potentially mis-keyed was presented to SDE to make a decision regarding whether to keep or remove the item. No such incidences occurred for operational items administered in Winter/Trimester 2011-12 or Spring 2012.

4.3.a Calibration and IRT Fit Results for Post-Equated Tests

4.3.a.i Winter/Trimester 2011-12

English II. For the Winter/Trimester 2011-12 English II assessment, based on the calibration sample, the Z-statistics for most operational items were smaller than the critical Z-statistic. Four English II items were flagged for further review based on their fit statistics.

English III. For the Winter/Trimester 2011-12 English III assessment, based on the calibration sample, the Z-statistics for most operational items were smaller than the critical Z-statistic. Two English III items were flagged for further review based on their fit statistics.

For each item that was flagged based on its model fit index, a careful review of both CTT and IRT item statistics was conducted to determine whether the item should be dropped from calibration, equating, or scoring. No items were dropped from any of the Winter/Trimester 2011-12 ACE EOI assessments for calibration, equating, or scoring as a result of their Q_1 statistics.

4.3.a.ii Spring 2012

English II. For the Spring 2012 English II assessment, based on the calibration sample, the Z-statistics for most operational items were smaller than the critical Z-statistic. One English II item was flagged for further review based on its fit statistics.

English III. For the Spring 2012 English III assessment, based on the calibration sample, the Z-statistics for most operational items were smaller than the critical Z-statistic. Two English III items were flagged for further review based on their fit statistics.

For each item that was flagged based on its model fit indices, a careful review of both CTT and IRT item statistics was conducted to determine whether the item should be dropped from

calibration, equating, or scoring. No items were dropped from any of the Spring 2012 ACE EOI assessments for calibration, equating, or scoring as a result of their Q_1 statistics.

Field Test Items. The field test items across all subjects were evaluated using the Q_1 statistic to evaluate the extent to which the obtained proportions of item scores are close to the proportions that would be expected based on the estimated thetas and item parameters. Any field test items flagged by Q_1 were included in the data review for review by content specialists from Pearson and SDE (for more on data review, please see Section 3.4).

4.4 Calibration and Equating

The 3-PL model was used exclusively for calibration and equating of all items for the purposes of rescaling field test items to the bank metric for Algebra I, Algebra II, Geometry, Biology I, and U.S. History, all of which consist entirely of multiple choice items. Because English II and English III have multiple choice and open-ended items, a simultaneous calibration with the 3-PL and GPC models was implemented for the calibration and equating of the operational test forms and field test items for those assessments.

A common item, non-equivalent groups (CINEG) design was used for ACE EOI English II and English III tests to link the current test forms (i.e., Winter/Trimester 2011-12 and Spring 2012) to the base scale. For the CINEG design, common anchor items are selected to be representative of the test content in terms of difficulty and the test blueprint. For the ACE EOI English II and English III Winter/Trimester 2011-12 and Spring 2012 tests, all operational items were used as common or anchor items to link to the base scale. The Stocking and Lord (1983) procedure, which estimates the equating transformation constants by minimizing the distance between the test characteristic curves of the common items, was used to equate the tests to the base year.

Equating was conducted using freely-available software, STUIRT (Kim & Kolen, 2004). Prior to conducting the equating, anchor stability checks were performed to eliminate the impact of item drift on equating.

4.4.a Common Linking Items for Spring 2012

Table 4.1 presents the number and percentage of common linking items for all post-equated subject for the Spring 2012 administration. The common linking items were necessary as a result of two core operational forms being in use during the Spring 2012 administration. The common linking items were used for simultaneous calibration during the IRT item parameter estimation to keep the items on the same scale. For each test, the common linking set was comprised of approximately 20 items, or greater than 30% of all operational items, and counts may vary by subject. In addition, the common linking set was proportionally representative of the total test in terms of content assessed and mimicked the difficulty of the overall test as well.

Table 4.1. Number of Common Linking Items Per Subject for Spring 2012

Subject	Number of Items on Test	Number of Linking Items	Percent of Test
English II	61	20	33%
English III	63	20	32%

4.5 Item Stability Evaluation Methods

Despite the careful selection and placement of the operational items, it is possible for these items to perform differentially across administrations. Dramatic changes in item parameter values can result in systematic errors in equating results (Kolen & Brennan, 2004). As a result, prior to finalizing the equating constants, Pearson evaluated changes in the item parameters from the item bank to the Winter/Trimester 2011-12 and Spring 2012 administrations. The process used in this evaluation is called an item parameter stability check[1].

The item parameter stability check that Pearson performed is an iterative approach, which uses a method that is similar to the one used to check for differential item functioning. This method is called the d^2 procedure. The steps taken were as follows:

1) Use a theoretically-weighted posterior θ distribution, $g(\theta_k)$, with 40 quadrature points.
2) Place the current linking item parameters on the baseline scale by computing Stocking & Lord (SL) constants using STUIRT and all (k) linking items.
3) Apply the SL linking constants to the current item parameters and compute the current raw score to scale score table. The results based on all k linking items will comprise the original table.
4) For each linking item, calculate the weighted sum of the squared deviation (d^2) between the item characteristic curves.
    a) Apply the SL constants to the estimated ability levels ($\hat{\theta}$) associated with the standard normal θ distribution used to generate the SL constants.
    b) For each anchor item, calculate a weighted sum of the squared deviations between the ICCs (d^2) based on the old (x) and new (y) parameter estimates at each point in the θ distribution multiplied by the theoretically-weighted distribution.

$$d_i^{\,2} = \sum^{k} \left[P_{ix}(\theta_k) - P_{iy}(\theta_k)\right]^2 \bullet g(\theta_k) \qquad (7)$$

    c) Review and sort the items in descending (largest to smallest) order according to the d^2 estimate.
    d) Step 4c) results in the item with the largest area at the top.
        i) Drop the item with the largest d^2 from the linking set.
        ii) Repeat steps 2) through 4c) until 10 items are dropped computing 11 raw score to scale score tables for comparative purposes.
5) e) Review the raw score to scale score tables and keep the raw score to scale score table where the raw to scale tables across iterations do not differ at all of the cut score points. The raw score to scale score table before the last iteration becomes the final table.

Before removing any item from the item parameter stability check, the following additional characteristics were examined: 1) prior and current year p-values and point-biserial correlations, 2) prior and current year IRT parameter estimates, 3) prior and current year item sequence, 4) standard and objective/skill of the item, 5) impact on blueprint representation, 6) passage ID/title for items linked to a stimulus, and 7) content review of the actual item. Decisions about whether to keep or remove an item were evaluated on a per

[1] Note that the item stability check was applied only to post-equated tests.

item basis. If an item (note, only one item can be removed at a time) was removed from the, the process (beginning at the equating step) was be repeated until there were no further items to be removed (the raw score to scale score table has stabilized or the item is judged that it should be included in the equating set; for example, a portion of the blueprint is not represented if the item is removed).

4.5.a Results of the Item Parameter Item Stability Check

Once the anchor set was finalized, the equating constants obtained from the final Stocking and Lord (1983) run were applied to the non-anchor operational items for computation of raw score to scale score tables. For both Winter/Trimester 2011-12 and Spring 2012 administrations, no anchor items were dropped for English II or English III.

4.6 Scaling and Scoring Results

The Lowest Obtainable Scale Score (LOSS), Highest Obtainable Scale Score (HOSS), and final scaling constants for each of the subjects are shown in Table 4.2. The scaling constants, *M*1 (multiplicative) and *M*2 (additive), place the true scores associated with each raw score point onto the reporting or operational scale using a straightforward linear transformation:

$$\text{Scale Score} = \left(\hat{\tau} \times M1\right) + M2 \tag{8}$$

where $\hat{\tau}$ = estimated true score.

The true score-equivalent values were generated from equated parameter estimates using a freely-available software program, POLYEQUATE (Kolen, 2004). Each scale score on the assessment is associated with a performance level that describes the types of behavior, knowledge, and skill a student in this score level is likely to be able to do. For the ACE EOI assessments, there are three cut scores that divide scores into four performance levels: Unsatisfactory, Limited Knowledge, Proficient, and Advanced. The cut scores for each of the tests appear in Table 4.3. In addition, a conditional standard error of measurement (CSEM; please see Section 6.3 for computation of CSEM) was computed for each of the raw score points. The resulting raw score to scale score conversions, CSEMs, as well as the performance levels for English II and English III are shown in Table 4.4 and Table 4.5 for Winter/Trimester 2011-12 and Spring 2012, respectively.

Table 4.2. LOSS, HOSS, and Scaling Constants by Subject

Subject	LOSS	HOSS	*M*1	*M*2
Algebra I	490	999	58.0000	723.8000
Algebra II	440	999	77.1164	692.2381
Biology I	440	999	76.49429	716.76173
English II	440	999	84.80517	734.90335
English III	440	999	74.32896	736.1256
Geometry	440	999	75.51595	721.9844
US History	440	999	77.92698	722.20515

Table 4.3. Performance-Level Cut Scores by Subject

	Cut Scores		
Subject	Limited Knowledge	Proficient	Advanced
Algebra I	662	700	762
Algebra II	654	700	783
Biology I	634	700	794
English II	609	700	817
English III	670	700	802
Geometry	635	700	777
U.S. History	627	700	773

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12

Raw Score	Algebra I			Algebra II			Biology I			English II		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	490	52	1	440	67	1	440	46	1	440	39	1
1	490	52	1	440	67	1	440	46	1	440	39	1
2	490	52	1	440	67	1	440	46	1	440	39	1
3	490	52	1	440	67	1	440	46	1	440	39	1
4	490	52	1	440	67	1	440	46	1	440	39	1
5	490	52	1	440	67	1	440	46	1	440	39	1
6	490	52	1	440	67	1	440	46	1	440	39	1
7	490	52	1	440	67	1	440	46	1	440	39	1
8	490	52	1	440	67	1	440	46	1	440	39	1
9	490	52	1	440	67	1	440	46	1	440	39	1
10	490	52	1	440	67	1	440	46	1	440	39	1
11	490	52	1	440	67	1	440	46	1	440	39	1
12	528	55	1	515	72	1	440	46	1	440	39	1
13	569	58	1	554	74	1	440	46	1	440	39	1
14	593	58	1	580	73	1	472	51	1	440	39	1
15	610	55	1	599	68	1	503	54	1	440	39	1
16	624	51	1	614	61	1	526	56	1	454	41	1
17	635	46	1	627	54	1	545	55	1	482	45	1
18	645	40	1	638	47	1	560	53	1	503	48	1
19	654	35	1	654	41	2	574	50	1	521	48	1
20	662	31	2	657	36	2	586	46	1	536	48	1
21	669	27	2	666	32	2	597	43	1	548	46	1
22	675	24	2	673	29	2	606	39	1	559	43	1
23	681	22	2	680	27	2	616	36	1	569	40	1
24	687	20	2	687	25	2	624	33	1	578	37	1
25	692	19	2	694	23	2	634	31	2	587	35	1
26	700	18	3	700	22	3	640	29	2	595	32	1
27	702	17	3	706	21	3	647	28	2	602	30	1
28	706	16	3	711	20	3	654	26	2	609	29	2

Note: CSEM = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12 (cont.)

Raw Score	Algebra I			Algebra II			Biology I			English II		
	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level
29	711	15	3	717	20	3	661	25	2	616	27	2
30	715	15	3	722	19	3	667	24	2	623	26	2
31	719	14	3	727	18	3	674	24	2	629	25	2
32	723	14	3	733	18	3	680	23	2	636	25	2
33	727	14	3	738	18	3	686	22	2	642	24	2
34	731	13	3	743	18	3	692	22	2	648	24	2
35	735	13	3	748	17	3	700	22	3	654	23	2
36	739	13	3	753	17	3	704	21	3	660	23	2
37	743	13	3	758	17	3	710	21	3	666	23	2
38	746	13	3	764	17	3	716	21	3	672	23	2
39	750	13	3	769	17	3	721	21	3	679	23	2
40	755	13	3	774	17	3	727	21	3	685	22	2
41	762	13	4	783	18	4	733	21	3	691	22	2
42	763	13	4	786	18	4	739	21	3	700	22	3
43	767	14	4	792	18	4	746	21	3	703	22	3
44	772	14	4	798	18	4	752	21	3	710	22	3
45	777	14	4	805	19	4	758	21	3	716	22	3
46	782	15	4	812	20	4	765	22	3	723	23	3
47	788	16	4	819	21	4	772	22	3	729	23	3
48	794	18	4	827	22	4	779	23	3	736	23	3
49	801	20	4	836	25	4	794	24	4	743	24	3
50	809	24	4	847	28	4	795	25	4	751	24	3
51	819	30	4	859	33	4	804	27	4	758	25	3
52	831	40	4	875	38	4	814	29	4	766	26	3
53	848	54	4	898	44	4	825	31	4	775	26	3
54	877	67	4	938	43	4	837	35	4	784	27	3
55	999	35	4	999	33	4	852	39	4	794	29	3
56	-	-	-	-	-	-	870	44	4	804	30	3

Note: CSEM = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12 (cont.)

Raw Score	Algebra I			Algebra II			Biology I			English II		
	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level	Scale Score	CSEM	Perf. Level
57	-	-	-	-	-	-	893	48	4	817	33	4
58	-	-	-	-	-	-	926	48	4	828	35	4
59	-	-	-	-	-	-	987	36	4	842	38	4
60	-	-	-	-	-	-	999	33	4	859	42	4
61	-	-	-	-	-	-	-	-	-	878	46	4
62	-	-	-	-	-	-	-	-	-	903	48	4
63	-	-	-	-	-	-	-	-	-	934	46	4
64	-	-	-	-	-	-	-	-	-	979	37	4
65	-	-	-	-	-	-	-	-	-	999	32	4
66	-	-	-	-	-	-	-	-	-	999	32	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12 (cont.)

Raw Score	English III			Geometry			U.S. History		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	440	53	1	440	59	1	440	47	1
1	440	53	1	440	59	1	440	47	1
2	440	53	1	440	59	1	440	47	1
3	440	53	1	440	59	1	440	47	1
4	440	53	1	440	59	1	440	47	1
5	440	53	1	440	59	1	440	47	1
6	440	53	1	440	59	1	440	47	1
7	440	53	1	440	59	1	440	47	1
8	440	53	1	440	59	1	440	47	1
9	440	53	1	440	59	1	440	47	1
10	440	53	1	440	59	1	440	47	1
11	440	53	1	440	59	1	440	47	1
12	440	53	1	443	59	1	440	47	1
13	440	53	1	501	65	1	440	47	1
14	476	56	1	537	68	1	440	47	1
15	514	60	1	562	68	1	477	52	1
16	538	62	1	582	65	1	506	56	1
17	556	61	1	598	60	1	528	57	1
18	572	58	1	612	54	1	546	56	1
19	585	54	1	624	48	1	562	54	1
20	596	50	1	635	43	2	575	51	1
21	607	45	1	645	38	2	588	47	1
22	616	41	1	654	34	2	599	43	1
23	624	37	1	662	31	2	609	40	1
24	632	34	1	670	28	2	627	37	2
25	640	31	1	677	26	2	628	34	2
26	646	29	1	684	24	2	636	32	2
27	653	27	1	690	23	2	644	30	2
28	659	25	1	700	22	3	652	28	2

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12 (cont.)

Raw Score	English III			Geometry			U.S. History		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
29	665	24	1	702	21	3	659	27	2
30	670	22	2	708	20	3	666	26	2
31	675	21	2	713	19	3	673	24	2
32	680	21	2	718	18	3	679	24	2
33	685	20	2	724	18	3	685	23	2
34	690	19	2	729	17	3	691	22	2
35	694	19	2	734	17	3	700	22	3
36	700	18	3	739	17	3	703	21	3
37	703	18	3	743	17	3	709	21	3
38	708	17	3	748	17	3	715	20	3
39	712	17	3	753	17	3	720	20	3
40	716	17	3	759	17	3	726	20	3
41	720	17	3	764	17	3	732	20	3
42	725	16	3	770	18	3	738	20	3
43	729	16	3	777	18	4	744	20	3
44	733	16	3	782	19	4	750	20	3
45	737	16	3	788	20	4	756	20	3
46	741	16	3	796	21	4	762	20	3
47	745	16	3	804	23	4	773	21	4
48	750	16	3	813	25	4	776	21	4
49	754	16	3	823	28	4	783	22	4
50	758	16	3	835	32	4	791	23	4
51	762	16	3	850	37	4	799	24	4
52	767	16	3	869	43	4	808	26	4
53	771	16	3	896	47	4	818	28	4
54	776	16	3	946	44	4	829	32	4
55	781	17	3	999	35	4	842	36	4
56	786	17	3	-	-	-	859	42	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.4. Raw Score to Scale Score Conversion Tables for Winter/Trimester 2011-12 (cont.)

Raw Score	English III			Geometry			U.S. History		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
57	791	18	3	-	-	-	880	47	4
58	796	18	3	-	-	-	911	48	4
59	802	19	4	-	-	-	968	39	4
60	808	20	4	-	-	-	999	33	4
61	814	21	4	-	-	-	-	-	-
62	821	22	4	-	-	-	-	-	-
63	829	24	4	-	-	-	-	-	-
64	837	26	4	-	-	-	-	-	-
65	846	28	4	-	-	-	-	-	-
66	857	32	4	-	-	-	-	-	-
67	870	36	4	-	-	-	-	-	-
68	885	40	4	-	-	-	-	-	-
69	905	44	4	-	-	-	-	-	-
70	934	43	4	-	-	-	-	-	-
71	986	32	4	-	-	-	-	-	-
72	999	29	4	-	-	-	-	-	-

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012

Raw Score	Algebra I Core A			Algebra I Core B			Algebra II Core A			Algebra II Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	490	60	1	490	61	1	440	69	1	440	68	1
1	490	60	1	490	61	1	440	69	1	440	68	1
2	490	60	1	490	61	1	440	69	1	440	68	1
3	490	60	1	490	61	1	440	69	1	440	68	1
4	490	60	1	490	61	1	440	69	1	440	68	1
5	490	60	1	490	61	1	440	69	1	440	68	1
6	490	60	1	490	61	1	440	69	1	440	68	1
7	490	60	1	490	61	1	440	69	1	440	68	1
8	490	60	1	490	61	1	440	69	1	440	68	1
9	490	60	1	490	61	1	440	69	1	440	68	1
10	490	60	1	490	61	1	440	69	1	440	68	1
11	490	60	1	490	61	1	440	69	1	440	68	1
12	565	63	1	560	64	1	440	69	1	440	68	1
13	597	64	1	597	65	1	459	70	1	516	74	1
14	617	61	1	617	62	1	525	75	1	555	77	1
15	630	56	1	631	57	1	562	77	1	581	75	1
16	641	49	1	642	50	1	587	75	1	601	71	1
17	650	42	1	651	43	1	607	70	1	617	65	1
18	662	36	2	662	36	2	623	64	1	631	58	1
19	664	30	2	665	31	2	636	57	1	643	51	1
20	670	26	2	671	26	2	654	50	2	654	44	2
21	676	22	2	677	23	2	657	44	2	662	39	2
22	681	20	2	682	20	2	666	38	2	671	34	2
23	686	18	2	687	18	2	674	34	2	679	31	2
24	691	17	2	691	17	2	682	30	2	686	28	2
25	695	16	2	696	16	2	689	28	2	693	26	2
26	700	15	3	700	15	3	700	26	3	700	24	3
27	703	15	3	704	14	3	702	24	3	705	23	3
28	707	14	3	708	14	3	708	23	3	711	22	3

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Algebra I Core A			Algebra I Core B			Algebra II Core A			Algebra II Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
29	711	14	3	711	13	3	714	22	3	717	21	3
30	715	13	3	715	13	3	720	21	3	722	20	3
31	719	13	3	719	13	3	726	20	3	728	19	3
32	723	13	3	722	13	3	731	20	3	733	19	3
33	726	13	3	726	12	3	737	20	3	738	18	3
34	730	12	3	729	12	3	742	19	3	743	18	3
35	734	12	3	733	12	3	747	19	3	748	18	3
36	737	12	3	737	12	3	753	19	3	753	18	3
37	741	12	3	740	12	3	758	19	3	758	18	3
38	745	12	3	744	12	3	764	19	3	763	18	3
39	748	12	3	747	12	3	769	19	3	769	18	3
40	752	12	3	751	12	3	775	19	3	774	18	3
41	756	12	3	755	12	3	783	19	4	783	18	4
42	762	12	4	762	12	4	787	20	4	785	18	4
43	764	12	4	763	13	4	793	20	4	791	19	4
44	768	13	4	767	13	4	800	21	4	798	20	4
45	772	13	4	771	13	4	807	22	4	804	20	4
46	777	14	4	776	14	4	814	23	4	812	21	4
47	782	15	4	781	15	4	823	24	4	819	23	4
48	788	16	4	787	17	4	832	27	4	828	25	4
49	794	19	4	793	19	4	842	30	4	838	27	4
50	801	23	4	801	24	4	855	33	4	849	31	4
51	810	30	4	810	30	4	870	38	4	863	35	4
52	821	41	4	821	42	4	889	42	4	880	40	4
53	837	57	4	838	57	4	917	44	4	904	44	4
54	865	72	4	868	71	4	967	37	4	948	41	4
55	999	35	4	999	35	4	999	30	4	999	32	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Biology I Core A			Biology I Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	440	52	1	440	54	1
1	440	52	1	440	54	1
2	440	52	1	440	54	1
3	440	52	1	440	54	1
4	440	52	1	440	54	1
5	440	52	1	440	54	1
6	440	52	1	440	54	1
7	440	52	1	440	54	1
8	440	52	1	440	54	1
9	440	52	1	440	54	1
10	440	52	1	440	54	1
11	440	52	1	440	54	1
12	440	52	1	440	54	1
13	440	52	1	440	54	1
14	440	52	1	472	58	1
15	481	57	1	510	63	1
16	513	61	1	538	65	1
17	537	63	1	560	64	1
18	557	62	1	578	61	1
19	574	59	1	593	57	1
20	589	56	1	607	53	1
21	602	51	1	619	48	1
22	614	47	1	634	44	2
23	634	43	2	640	40	2
24	635	40	2	650	36	2
25	644	37	2	658	34	2
26	653	34	2	667	31	2
27	662	32	2	675	30	2
28	670	31	2	682	28	2

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Biology I Core A			Biology I Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
29	678	29	2	690	27	2
30	685	28	2	700	26	3
31	693	27	2	704	25	3
32	700	26	3	710	24	3
33	707	25	3	717	23	3
34	714	25	3	724	23	3
35	720	24	3	730	22	3
36	727	23	3	736	22	3
37	734	23	3	742	21	3
38	740	23	3	748	21	3
39	747	22	3	754	21	3
40	753	22	3	760	20	3
41	760	22	3	766	20	3
42	767	22	3	773	20	3
43	773	21	3	779	20	3
44	780	21	3	785	20	3
45	787	21	3	794	20	4
46	794	21	4	797	20	4
47	800	22	4	804	20	4
48	807	22	4	810	21	4
49	815	23	4	817	21	4
50	823	23	4	825	22	4
51	831	25	4	833	23	4
52	840	26	4	841	25	4
53	849	29	4	850	27	4
54	861	33	4	861	31	4
55	874	37	4	873	35	4
56	891	41	4	889	40	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Biology I Core A			Biology I Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
57	914	44	4	909	44	4
58	950	42	4	940	44	4
59	999	33	4	999	32	4
60	999	33	4	999	32	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	English II Core A Prompt A			English II Core A Prompt B			English II Core B Prompt A			English II Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	440	42	1	440	40	1	440	40	1	440	38	1
1	440	42	1	440	40	1	440	40	1	440	38	1
2	440	42	1	440	40	1	440	40	1	440	38	1
3	440	42	1	440	40	1	440	40	1	440	38	1
4	440	42	1	440	40	1	440	40	1	440	38	1
5	440	42	1	440	40	1	440	40	1	440	38	1
6	440	42	1	440	40	1	440	40	1	440	38	1
7	440	42	1	440	40	1	440	40	1	440	38	1
8	440	42	1	440	40	1	440	40	1	440	38	1
9	440	42	1	440	40	1	440	40	1	440	38	1
10	440	42	1	440	40	1	440	40	1	440	38	1
11	440	42	1	440	40	1	440	40	1	440	38	1
12	440	42	1	440	40	1	440	40	1	440	38	1
13	440	42	1	440	40	1	440	40	1	440	38	1
14	440	42	1	440	40	1	440	40	1	440	38	1
15	440	42	1	440	40	1	440	40	1	440	38	1
16	444	43	1	451	42	1	442	40	1	449	40	1
17	477	48	1	480	47	1	472	45	1	476	45	1
18	502	51	1	503	50	1	496	49	1	498	48	1
19	522	52	1	522	51	1	515	50	1	516	49	1
20	538	52	1	538	51	1	532	50	1	532	49	1
21	553	50	1	552	49	1	547	49	1	546	48	1
22	566	47	1	565	46	1	560	47	1	559	46	1
23	577	44	1	576	44	1	571	44	1	570	43	1
24	588	41	1	586	41	1	582	41	1	581	41	1
25	597	38	1	596	38	1	592	39	1	591	38	1

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	English II Core A Prompt A			English II Core A Prompt B			English II Core B Prompt A			English II Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
26	609	36	2	609	35	2	609	36	2	600	36	1
27	615	34	2	614	33	2	610	34	2	609	34	2
28	623	32	2	622	32	2	618	32	2	617	32	2
29	631	30	2	629	30	2	626	31	2	625	31	2
30	638	29	2	637	29	2	634	30	2	633	30	2
31	646	28	2	644	28	2	642	29	2	640	29	2
32	653	27	2	651	27	2	649	28	2	647	28	2
33	659	26	2	658	26	2	656	27	2	655	27	2
34	666	25	2	665	26	2	663	26	2	662	26	2
35	673	25	2	672	25	2	670	26	2	669	26	2
36	679	24	2	678	24	2	677	26	2	675	26	2
37	686	24	2	685	24	2	684	25	2	682	25	2
38	692	24	2	691	24	2	690	25	2	689	25	2
39	700	23	3	700	23	3	700	25	3	700	25	3
40	705	23	3	704	23	3	704	24	3	703	25	3
41	711	23	3	710	23	3	711	24	3	709	24	3
42	717	23	3	716	23	3	717	24	3	716	24	3
43	724	22	3	723	22	3	724	24	3	723	24	3
44	730	22	3	729	22	3	731	24	3	730	24	3
45	736	22	3	735	22	3	738	24	3	737	24	3
46	743	22	3	742	22	3	745	24	3	744	24	3
47	749	22	3	748	22	3	752	24	3	751	24	3
48	756	22	3	755	22	3	759	25	3	758	25	3
49	763	23	3	762	23	3	767	25	3	766	25	3
50	770	23	3	768	23	3	775	25	3	773	25	3
51	777	23	3	776	23	3	782	26	3	781	26	3
52	784	24	3	783	24	3	791	26	3	789	26	3
53	792	24	3	791	24	3	799	27	3	798	27	3

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	English II Core A Prompt A			English II Core A Prompt B			English II Core B Prompt A			English II Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
54	800	25	3	799	25	3	817	28	4	807	28	3
55	817	26	4	808	26	3	818	29	4	817	29	4
56	818	27	4	817	27	4	828	31	4	826	31	4
57	828	29	4	827	29	4	839	33	4	837	33	4
58	839	31	4	838	31	4	851	35	4	850	36	4
59	851	33	4	850	33	4	865	38	4	863	39	4
60	865	36	4	864	36	4	880	42	4	879	42	4
61	881	39	4	879	39	4	899	45	4	898	45	4
62	899	42	4	898	42	4	922	46	4	921	46	4
63	923	43	4	923	43	4	954	42	4	953	43	4
64	958	39	4	958	39	4	999	32	4	999	33	4
65	999	30	4	999	30	4	999	32	4	999	33	4
66	999	30	4	999	30	4	999	32	4	999	33	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	English III Core A Prompt A			English III Core A Prompt B			English III Core B Prompt A			English III Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	440	54	1	440	52	1	440	59	1	440	57	1
1	440	54	1	440	52	1	440	59	1	440	57	1
2	440	54	1	440	52	1	440	59	1	440	57	1
3	440	54	1	440	52	1	440	59	1	440	57	1
4	440	54	1	440	52	1	440	59	1	440	57	1
5	440	54	1	440	52	1	440	59	1	440	57	1
6	440	54	1	440	52	1	440	59	1	440	57	1
7	440	54	1	440	52	1	440	59	1	440	57	1
8	440	54	1	440	52	1	440	59	1	440	57	1
9	440	54	1	440	52	1	440	59	1	440	57	1
10	440	54	1	440	52	1	440	59	1	440	57	1
11	440	54	1	440	52	1	440	59	1	440	57	1
12	440	54	1	440	52	1	440	59	1	440	57	1
13	440	54	1	440	52	1	442	59	1	442	57	1
14	496	59	1	494	58	1	511	64	1	508	62	1
15	528	62	1	525	60	1	542	66	1	538	65	1
16	551	62	1	546	61	1	563	66	1	558	64	1
17	568	60	1	563	59	1	578	63	1	573	61	1
18	581	57	1	576	56	1	591	58	1	586	57	1
19	593	52	1	588	52	1	602	53	1	597	52	1
20	603	47	1	599	47	1	611	47	1	607	47	1
21	612	43	1	608	43	1	620	42	1	616	42	1
22	621	38	1	617	38	1	628	37	1	624	37	1
23	628	35	1	625	35	1	635	33	1	632	34	1
24	635	32	1	633	32	1	642	30	1	639	31	1
25	642	29	1	640	30	1	648	28	1	646	28	1

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 201 (cont.)

Raw Score	English III Core A Prompt A			English III Core A Prompt B			English III Core B Prompt A			English III Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
26	649	27	1	646	28	1	654	26	1	652	27	1
27	655	26	1	653	26	1	660	25	1	658	25	1
28	661	24	1	659	25	1	670	23	2	664	24	1
29	670	23	2	664	24	1	671	23	2	670	23	2
30	672	22	2	670	23	2	677	22	2	675	22	2
31	677	22	2	676	22	2	682	21	2	680	21	2
32	682	21	2	681	21	2	687	20	2	686	21	2
33	687	21	2	686	21	2	692	20	2	691	20	2
34	692	20	2	691	20	2	700	19	3	696	20	2
35	700	20	3	700	20	3	702	19	3	700	19	3
36	702	20	3	701	20	3	706	19	3	705	19	3
37	707	20	3	706	20	3	711	18	3	710	19	3
38	712	19	3	711	19	3	716	18	3	715	18	3
39	717	19	3	716	19	3	720	18	3	720	18	3
40	722	19	3	721	19	3	725	18	3	724	18	3
41	727	19	3	726	19	3	730	17	3	729	18	3
42	732	19	3	731	19	3	734	17	3	734	17	3
43	737	19	3	736	19	3	739	17	3	738	17	3
44	741	19	3	741	19	3	743	17	3	743	17	3
45	746	18	3	746	19	3	748	17	3	748	17	3
46	752	18	3	752	19	3	752	17	3	752	17	3
47	757	18	3	757	19	3	757	17	3	757	17	3
48	762	18	3	762	19	3	762	17	3	762	17	3
49	767	18	3	767	19	3	766	17	3	767	17	3
50	772	19	3	773	19	3	771	17	3	772	17	3
51	778	19	3	778	19	3	776	17	3	776	17	3
52	783	19	3	784	19	3	781	17	3	781	17	3
53	789	19	3	790	19	3	786	17	3	787	17	3

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 201 (cont.)

Raw Score	English III Core A Prompt A			English III Core A Prompt B			English III Core B Prompt A			English III Core B Prompt B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
54	794	19	3	796	19	3	791	17	3	792	17	3
55	802	19	4	802	19	4	796	17	3	802	17	4
56	806	20	4	808	20	4	802	17	4	803	18	4
57	812	20	4	814	20	4	807	18	4	808	18	4
58	819	20	4	821	21	4	812	18	4	814	18	4
59	825	21	4	828	21	4	818	19	4	821	19	4
60	832	22	4	835	22	4	825	19	4	827	19	4
61	839	23	4	843	23	4	831	20	4	834	20	4
62	847	24	4	851	24	4	838	21	4	841	21	4
63	855	25	4	859	26	4	845	22	4	849	22	4
64	864	27	4	868	28	4	853	24	4	857	24	4
65	874	30	4	879	30	4	861	26	4	866	27	4
66	885	33	4	890	33	4	871	29	4	876	29	4
67	898	36	4	904	36	4	882	33	4	888	33	4
68	915	38	4	920	38	4	896	36	4	901	37	4
69	937	38	4	941	37	4	913	39	4	919	39	4
70	971	33	4	974	31	4	938	39	4	943	38	4
71	999	27	4	999	26	4	984	30	4	987	28	4
72	999	27	4	999	26	4	999	26	4	999	25	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 201 (cont.)

Raw Score	Geometry Core A			Geometry Core B			U.S. History Core A			U.S. History Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
0	440	57	1	440	56	1	440	58	1	440	59	1
1	440	57	1	440	56	1	440	58	1	440	59	1
2	440	57	1	440	56	1	440	58	1	440	59	1
3	440	57	1	440	56	1	440	58	1	440	59	1
4	440	57	1	440	56	1	440	58	1	440	59	1
5	440	57	1	440	56	1	440	58	1	440	59	1
6	440	57	1	440	56	1	440	58	1	440	59	1
7	440	57	1	440	56	1	440	58	1	440	59	1
8	440	57	1	440	56	1	440	58	1	440	59	1
9	440	57	1	440	56	1	440	58	1	440	59	1
10	440	57	1	440	56	1	440	58	1	440	59	1
11	487	61	1	475	59	1	440	58	1	440	59	1
12	528	64	1	521	64	1	440	58	1	440	59	1
13	555	64	1	550	64	1	440	58	1	440	59	1
14	574	61	1	571	62	1	475	61	1	473	61	1
15	590	56	1	587	58	1	518	65	1	519	66	1
16	603	51	1	601	53	1	547	66	1	548	67	1
17	615	45	1	613	47	1	568	64	1	569	65	1
18	625	40	1	624	42	1	584	61	1	586	62	1
19	635	35	2	635	37	2	598	56	1	600	57	1
20	642	32	2	642	33	2	610	51	1	612	51	1
21	650	29	2	650	30	2	627	46	2	627	46	2
22	658	27	2	658	28	2	630	41	2	632	41	2
23	664	25	2	665	26	2	639	37	2	641	36	2
24	671	24	2	672	24	2	647	33	2	649	33	2
25	677	22	2	678	23	2	654	31	2	656	30	2
26	684	21	2	684	22	2	661	29	2	663	28	2
27	689	21	2	690	21	2	668	27	2	670	26	2
28	700	20	3	700	20	3	675	25	2	676	25	2

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Geometry Core A			Geometry Core B			U.S. History Core A			U.S. History Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
29	701	19	3	701	19	3	681	24	2	682	23	2
30	706	18	3	707	19	3	687	24	2	688	23	2
31	711	18	3	712	18	3	693	23	2	694	22	2
32	716	18	3	717	18	3	700	22	3	700	21	3
33	721	17	3	722	18	3	705	22	3	705	21	3
34	726	17	3	727	17	3	711	21	3	711	20	3
35	731	17	3	732	17	3	716	21	3	716	20	3
36	736	17	3	737	17	3	722	21	3	722	20	3
37	741	17	3	743	17	3	728	21	3	727	20	3
38	746	17	3	748	17	3	733	21	3	733	20	3
39	751	16	3	753	17	3	739	20	3	738	20	3
40	757	16	3	758	17	3	745	20	3	744	20	3
41	762	17	3	763	17	3	751	20	3	750	20	3
42	767	17	3	769	17	3	757	20	3	755	20	3
43	777	17	4	777	18	4	763	21	3	761	20	3
44	778	17	4	781	18	4	773	21	4	773	20	4
45	784	18	4	787	19	4	775	21	4	774	20	4
46	791	19	4	794	20	4	782	21	4	780	20	4
47	798	20	4	801	21	4	789	22	4	787	21	4
48	805	22	4	809	23	4	796	22	4	794	21	4
49	814	25	4	818	26	4	804	23	4	801	22	4
50	824	29	4	829	30	4	812	24	4	808	23	4
51	836	34	4	842	36	4	820	26	4	816	24	4
52	852	42	4	859	43	4	830	27	4	825	26	4
53	875	50	4	884	49	4	840	30	4	835	29	4
54	918	53	4	931	49	4	852	33	4	846	33	4
55	999	41	4	999	39	4	866	38	4	859	38	4
56	-	-	-	-	-	-	883	43	4	876	44	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Table 4.5. Raw Score to Scale Score Conversion Tables for Spring 2012 (cont.)

Raw Score	Geometry Core A			Geometry Core B			U.S. History Core A			U.S. History Core B		
	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level	Scale Score	*CSEM*	Perf. Level
57	-	-	-	-	-	-	905	47	4	899	48	4
58	-	-	-	-	-	-	938	46	4	934	48	4
59	-	-	-	-	-	-	999	33	4	999	35	4
60	-	-	-	-	-	-	999	33	4	999	35	4

Note: *CSEM* = Conditional Standard Error of Measure; Perf. Level = Performance Level; 1 = Unsatisfactory, 2 = Limited Knowledge, 3 = Proficient, 4 = Advanced

Section 5

Classification Consistency and Accuracy Studies

5.1 Classification Consistency and Accuracy

Every test administration will result in some error in classifying examinees. The concept of the standard error of measurement (SEM) has implications for the interpretation of cut scores used to classify students into different performance levels. For example, a given student may have a true performance level greater than a cut score; however, due to random variations (measurement error), the student's observed test score may be below the cut score. As a result, the student may be classified as having a lower performance level. As discussed in Section 6.4, a student's observed score is most likely to fall within a standard error band around his or her true score. Thus, the classification of students into different performance levels can be imperfect; especially for the borderline students whose true scores lie close to the performance level cut scores.

According to Livingston and Lewis (1995, p. 180), the accuracy of a classification is "the extent to which the actual classifications of the test takers… agree with those that would be made on the basis of their true score" and are calculated from cross-tabulations between "classifications based on an observable variable and classifications based on an unobservable variable." Since the unobservable variable—the true score—is not available, Livingston and Lewis provide a method to estimate the true score distribution of a test and create the cross-tabulation of the true score and observed variable (raw score) classifications. Consistency is "the agreement between classifications based on two non-overlapping, equally-difficult forms of the test" (p. 180). Consistency is estimated using actual response data from a test and the test's reliability to statistically model two parallel forms of the test and compare the classifications on those alternate forms. There are three types of accuracy and consistency indices that can be generated using Livingston and Lewis' approach: overall, conditional on level, and by cut score.

The overall accuracy of performance level classifications is computed as a sum of the proportions on the diagonal of the joint distribution of true score- and observed score levels. Essentially, overall accuracy is the proportion of correct classifications across all levels. The overall consistency index is computed as the sum of the diagonal cells in a consistency table. Another way to express overall consistency is to use the Kappa coefficient, as used in the inter-rater reliability studies in Section 3.7. Like the inter-rater reliability studies, Kappa provides an estimate of agreement or the proportion of consistent classifications between two different tests after taking into account chance.

Consistency conditional on performance level is computed as the ratio between the proportion of correct classifications at the selected performance level (for example, proficient students who were classified as proficient) and the proportion of all the students classified into that level (total proportion of students who were considered proficient). Accuracy conditional on performance level is computed in a similar manner except that in the consistency table where both row and column marginal sums are the same, the accuracy table uses the sum based on estimated status as the total for computing accuracy conditional on performance level.

To evaluate decisions at specific cut scores, the joint distribution of all the performance levels are collapsed into dichotomized distributions around that specific cut score (for example collapsing Unsatisfactory and Limited Knowledge and then Proficient and Advanced to assess decisions at the Proficient cut score). The accuracy index at the cut score is computed as the sum of the proportions of correct classifications around the selected cut score. The consistency at a specific cut score is obtained in a similar way, but by dichotomizing the distributions at the cut score performance level and between all other performance levels combined. Table 5.1 for Winter/Trimester 2011-12 and Table 5.2 for Spring 2012 present the overall estimated accuracy and consistency indices for all of the ACE EOI tests.

Table 5.1. Estimates of Accuracy and Consistency of Performance Classification for Winter/Trimester 2011-12

Subject	Accuracy	Consistency	Kappa	False Positives	False Negatives
Algebra I	0.74	0.67	0.54	0.09	0.17
Algebra II	0.80	0.73	0.63	0.10	0.10
Biology I	0.77	0.71	0.59	0.11	0.11
English II	0.73	0.70	0.51	0.22	0.05
English III	0.80	0.75	0.58	0.06	0.14
Geometry	0.79	0.74	0.62	0.11	0.09
U.S. History	0.78	0.71	0.59	0.08	0.14

Table 5.2. Estimates of Accuracy and Consistency of Performance Classification for Spring 2012

Subject	Core	Accuracy	Consistency	Kappa	False Positives	False Negatives
Algebra I	A	0.79	0.75	0.61	0.16	0.05
	B	0.80	0.76	0.62	0.04	0.16
Algebra II	A	0.78	0.72	0.59	0.06	0.16
	B	0.75	0.72	0.58	0.15	0.11
Biology I	A	0.76	0.72	0.57	0.15	0.09
	B	0.79	0.72	0.56	0.08	0.13
English II	AA	0.86	0.80	0.53	0.08	0.06
	AB	0.87	0.82	0.56	0.05	0.08
	BA	0.88	0.82	0.56	0.06	0.07
	BB	0.88	0.84	0.58	0.04	0.07
English III	AA	0.77	0.73	0.53	0.04	0.19
	AB	0.75	0.73	0.54	0.21	0.04
	BA	0.79	0.76	0.56	0.12	0.09
	BB	0.79	0.75	0.56	0.03	0.18
Geometry	A	0.79	0.75	0.62	0.16	0.05
	B	0.80	0.76	0.63	0.03	0.16
U.S. History	A	0.79	0.72	0.59	0.14	0.07
	B	0.80	0.72	0.59	0.08	0.12

Note: Core AA=Core MC form A+OE form A; Core AB=Core MC form A+OE form B; Core BA=Core MC form B+OE form A; Core BB=Core MC form B+OE form B.

As shown in Table 5.1 and Table 5.2, the overall accuracy indices range between 73 and 80 percent for Winter/Trimester 2011-12 and 75 and 88 percent for Spring 2012, and overall consistency ranged between 67 and 75 percent for Winter/Trimester 2011-12 and 72 and 84 percent for Spring 2012. Kappa coefficients range from 0.51 and 0.63 for Winter/Trimester 2011-12 and 0.53 and 0.63 for Spring 2012. The rate of estimated false positives range from 6 to 22 percent for Winter/Trimester 2011-12 and 3 to 21 percent for Spring 2012. The estimated false negative rates range from 5 to 17 percent for Winter/Trimester 2011-12 and 4 to 19 percent for Spring 2012.

Table 5.3 and Table 5.4 provide the accuracy-, consistency-, false positive-, and false negative rates by cut score for Winter/Trimester 2011-12 and Spring 2012, respectively. The data in these tables reveal that the level of agreement for both accuracy and consistency is above 80 percent in all cases, with most above 90 percent. In general, the high rates of accuracy and consistency support the cut decisions made using these assessments. Similar to Table 5.1 and Table 5.2, the false positive and false negative rates were comparable for the Winter/Trimester 2011-12 and Spring 2012 administrations and are quite low.

The importance of the dichotomous categorization is particularly notable when they map onto pass/fail decisions for the assessments. For the EOI tests, the U+L/P+A is the important dichotomization, because it directly translates to the pass/fail decision point. Similar to other dichotomization distinctions, there are three main scenarios at this cut point: 1) observed performance is accurately reflective of the true ability level (i.e., the examinee passed and should have passed); 2) the true ability level is below the standard, but the observed test score is above the standard (i.e., a false positive); and 3) the true ability level is above the standard, but the observed test score is below the standard (i.e., a false negative). For example, as shown in Table 5.3, 90 percent of Winter/Trimester 2011-12 Algebra I students are estimated to have been correctly classified as pass or fail based on their performance (scenario 1), an estimated 3 percent passed but their true performance is below the standard (scenario 2), and an estimated 7 percent failed although their true performance is above the standard (scenario 3). Overall, the estimated accuracy rates are above 80% for the Winter/Trimester and Spring administrations for all subjects.

Table 5.3. Accuracy and Consistency Estimates by Cut Score: False Positive- and False Negative Rates for Winter/Trimester 2011-12

	Accuracy			Consistency			False Positives			False Negatives		
Subject	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A
Algebra I	0.89	0.90	0.94	0.85	0.86	0.93	0.04	0.03	0.02	0.06	0.07	0.04
Algebra II	0.94	0.93	0.93	0.92	0.90	0.90	0.05	0.03	0.03	0.02	0.04	0.04
Biology I	0.94	0.91	0.92	0.92	0.88	0.91	0.03	0.06	0.02	0.03	0.03	0.06
English II	0.98	0.93	0.82	0.97	0.90	0.83	0.01	0.04	0.17	0.02	0.03	0.00
English III	0.95	0.93	0.92	0.94	0.91	0.88	0.01	0.01	0.04	0.04	0.06	0.04
Geometry	0.95	0.93	0.91	0.94	0.90	0.89	0.01	0.04	0.07	0.05	0.03	0.02
U.S. History	0.95	0.92	0.90	0.94	0.89	0.88	0.03	0.04	0.02	0.02	0.04	0.08

Note: U =Unsatisfactory; L = Limited Knowledge; P = Proficient; and A = Advanced.

Note: U / L+P+A = Unsatisfactory divided by Limited Knowledge plus Proficient plus Advanced; U+L / P+A = Unsatisfactory plus Limited Knowledge divided by Proficient plus Advanced; U+L+P / A = Unsatisfactory plus Limited Knowledge plus Proficient divided by Advanced.

Table 5.4. Accuracy and Consistency Estimates by Cut Score: False Positive- and False Negative Rates for Spring 2012

		Accuracy			Consistency			False Positives			False Negatives		
Subject	Core	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A	U / L+P+A	U+L / P+A	U+L+P / A
Algebra I	A	0.97	0.92	0.89	0.96	0.91	0.88	0.01	0.06	0.10	0.02	0.02	0.01
	B	0.97	0.93	0.89	0.96	0.91	0.88	0.02	0.01	0.02	0.01	0.06	0.09
Algebra II	A	0.94	0.91	0.92	0.92	0.89	0.90	0.02	0.02	0.02	0.04	0.07	0.06
	B	0.92	0.91	0.91	0.92	0.89	0.90	0.06	0.07	0.02	0.01	0.02	0.07
Biology I	A	0.96	0.92	0.88	0.95	0.88	0.88	0.00	0.04	0.11	0.04	0.05	0.01
	B	0.96	0.91	0.91	0.95	0.89	0.88	0.03	0.02	0.04	0.01	0.07	0.05
English II	AA	0.98	0.91	0.97	0.97	0.87	0.95	0.00	0.04	0.03	0.02	0.05	0.00
	AB	0.98	0.91	0.98	0.98	0.87	0.97	0.00	0.04	0.01	0.02	0.05	0.01
	BA	0.98	0.91	0.98	0.98	0.88	0.96	0.00	0.03	0.02	0.02	0.05	0.00
	BB	0.98	0.91	0.99	0.98	0.88	0.98	0.01	0.02	0.01	0.01	0.07	0.00
English III	AA	0.96	0.93	0.87	0.95	0.91	0.85	0.00	0.01	0.02	0.04	0.06	0.11
	AB	0.96	0.92	0.87	0.94	0.91	0.86	0.03	0.06	0.12	0.02	0.02	0.01
	BA	0.96	0.94	0.89	0.96	0.92	0.87	0.00	0.01	0.11	0.03	0.06	0.01
	BB	0.96	0.94	0.88	0.96	0.92	0.86	0.00	0.01	0.02	0.03	0.05	0.10
Geometry	A	0.97	0.93	0.89	0.96	0.92	0.87	0.02	0.05	0.10	0.01	0.02	0.02
	B	0.98	0.94	0.89	0.97	0.92	0.87	0.00	0.01	0.02	0.02	0.05	0.09
U.S. History	A	0.97	0.91	0.91	0.96	0.89	0.87	0.02	0.06	0.05	0.01	0.03	0.04
	B	0.97	0.92	0.90	0.96	0.89	0.87	0.01	0.03	0.04	0.02	0.04	0.06

Note: U =Unsatisfactory; L = Limited Knowledge; P = Proficient; and A = Advanced.

Note: U / L+P+A = Unsatisfactory divided by Limited Knowledge plus Proficient plus Advanced; U+L / P+A = Unsatisfactory plus Limited Knowledge divided by Proficient plus Advanced; U+L+P / A = Unsatisfactory plus Limited Knowledge plus Proficient divided by Advanced.

Section 6

Summary Statistics

6.1 Descriptive Statistics

The summary descriptive statistics of the scale scores for Winter/Trimester 2011-12 and Spring 2012 appear in Table 6.1 through Table 6.8. The scales scores presented exclude invalid student cases and second-time testers.

Table 6.1. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 - Overall

	Total			
Subject	*N*	**Mean**	*SD*	**Med.**
Algebra I	1,249	702.3	60.8	702
Algebra II	1,425	722.0	97.9	738
Biology I	1,502	715.0	84.2	721
English II	1,543	744.2	83.1	751
English III	1,794	746.7	72.6	754
Geometry	1,757	734.3	81.0	743
U.S. History	1,531	718.0	80.8	726

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.2. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 by Gender

	Female				Male			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Algebra I	594	704.3	56.4	702	636	703.1	62.9	706
Algebra II	709	722.7	93.6	733	709	722.8	100.9	743
Biology I	728	709.6	76.5	710	756	723.6	88.2	733
English II	726	755.1	75.3	758	795	739.4	83.7	743
English III	865	759.0	65.2	762	908	737.6	75.7	745
Geometry	849	738.7	73.1	739	875	735.8	83.1	743
U.S. History	777	709.7	73.7	715	743	728.8	84.7	738

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.3. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 by Race/Ethnicity

	African-American				Native American			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Algebra I	134	666.7	59.2	675	207	699.9	55.4	702
Algebra II	141	645.9	98.9	657	219	721.2	90.6	738
Biology I	171	656.1	84.9	661	238	708.3	74.9	716
English II	149	709.7	78.4	703	200	735.1	76.5	736
English III	181	705.6	77.8	708	255	737.5	78.1	745
Geometry	158	672.5	83.1	687	276	741.0	77.4	743
U.S. History	171	657.6	83.1	659	226	719.6	76.6	732

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.3. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 by Race/Ethnicity (cont.)

	Hispanic				Asian			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Algebra I	176	688.1	67.7	700	12	757.4	71.4	769
Algebra II	110	698.6	88.8	703	27	794.4	65.6	805
Biology I	147	670.1	75.6	674	22	747.3	103.3	725
English II	175	706.1	80.5	710	25	726.5	87.6	729
English III	150	725.6	66.9	729	46	790.6	62.7	791
Geometry	145	720.3	72.9	724	20	799.2	93.4	804
U.S. History	135	684.7	74.9	685	10	724.1	68.7	744

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.3. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 by Race/Ethnicity (cont.)

	White			
Subject	*N*	**Mean**	*SD*	**Med.**
Algebra I	676	716.0	54.1	715
Algebra II	872	736.3	92.1	748
Biology I	838	738.8	75.4	746
English II	902	763.6	75.6	766
English III	1,059	759.3	65.1	762
Geometry	1,045	747.7	71.8	753
U.S. History	921	736.1	73.5	744

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.4. Descriptive Statistics of the Scale Scores for Winter/Trimester 2011-12 by Free/Reduced Lunch Status

	Free/Reduced Lunch = Yes				Free/Reduced Lunch = No			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Algebra I	391	703.1	58.6	706	858	702.0	61.8	702
Algebra II	442	696.4	95.1	711	983	733.4	97.0	748
Biology I	463	703.2	77.3	716	1,039	720.2	86.6	727
English II	500	730.1	76.9	736	1,043	750.9	85.1	758
English III	557	730.7	71.5	737	1,237	753.9	72.0	758
Geometry	627	723.9	74.2	729	1,130	740.1	84.0	748
U.S. History	499	701.6	77.5	709	1,032	725.9	81.2	738

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.5. Descriptive Statistics of the Scale Scores for Spring 2012 - Overall

	Total			
Subject	*N*	**Mean**	*SD*	**Med.**
Core A				
Algebra I	19,469	740.3	54.3	741
Algebra II	16,250	735.6	85.0	742
Biology I	19,311	744.3	77.6	747
English II – OE A	10,427	765.9	71.9	770
English II – OE B	10,399	766.3	71.1	768
English III – OE A	9,845	754.3	63.5	757
English III – OE B	9,715	753.4	65.1	757
Geometry	19,276	751.1	74.6	757
U.S. History	17,261	736.6	73.2	739
Core B				
Algebra I	18,825	742.5	54.2	744
Algebra II	15,597	738.2	80.6	743
Biology I	18,551	747.7	74.2	748
English II – OE A	7,661	766.7	71.1	767
English II – OE B	7,747	769.3	71.2	773
English III – OE A	8,488	758.9	59.7	762
English III – OE B	8,616	760.2	58.8	762
Geometry	17,944	754.0	69.0	758
U.S. History	16,774	739.8	73.8	744

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.6. Descriptive Statistics of the Scale Scores for Spring 2012 by Gender

	Female				Male			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Core A								
Algebra I	9,919	741.5	52.5	741	9,550	739.2	56.1	741
Algebra II	8,305	737.9	80.5	742	7,938	733.3	89.1	742
Biology I	9,746	738.1	75.3	740	9,564	750.7	79.3	760
English II – OE A	5,166	770.8	70.1	770	5,261	761.1	73.3	763
English II – OE B	5,273	769.0	70.8	768	5,125	763.6	71.2	768
English III – OE A	4,871	761.9	59.6	767	4,970	746.9	66.3	752
English III – OE B	4,873	762.5	61.0	767	4,838	744.2	67.8	752
Geometry	9,528	752.5	73.2	757	9,745	749.8	75.8	757
U.S. History	8,780	724.8	69.7	728	8,477	748.8	74.7	751
Core B								
Algebra I	9,670	743.7	52.4	744	9,154	741.4	56.1	744
Algebra II	8,148	739.4	77.4	743	7,443	736.9	83.9	743
Biology I	9,372	743.3	72.8	748	9,177	752.3	75.3	754
English II – OE A	3,862	773.7	71.6	775	3,799	759.6	69.8	759
English II – OE B	3,937	775.8	71.1	781	3,810	762.6	70.7	766
English III – OE A	4,235	764.4	57.4	766	4,250	753.6	61.3	757
English III – OE B	4,317	766.6	56.5	767	4,297	753.9	60.2	757
Geometry	9,080	753.8	67.2	758	8,862	754.4	70.7	758
U.S. History	8,503	728.2	70.4	733	8,266	751.9	75.2	755

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.7. Descriptive Statistics of the Scale Scores for Spring 2012 by Race/Ethnicity

	African-American				Native American			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Core A								
Algebra I	1,864	715.7	55.2	723	3,122	733.2	51.4	734
Algebra II	1,476	692.3	87.8	702	2,449	720.6	81.3	726
Biology I	1,901	696.2	80.7	700	2,944	737.4	71.8	740
English II – OE A	968	729.1	69.7	730	1,617	757.5	65.1	756
English II – OE B	981	731.8	66.4	735	1,632	760.0	64.7	762
English III – OE A	956	726.1	62.7	732	1,616	746.9	61.0	752
English III – OE B	1,021	725.6	65.5	731	1,568	745.5	61.4	752
Geometry	1,887	708.9	77.5	716	3,006	741.2	69.6	746
U.S. History	1,639	702.7	74.9	711	2,708	729.7	69.7	733
Core B								
Algebra I	1,851	719.0	51.1	719	3,049	735.9	49.4	737
Algebra II	1,366	697.8	84.6	711	2,345	723.8	79.4	728
Biology I	1,855	705.1	75.4	710	2,876	739.9	69.1	742
English II – OE A	690	732.1	67.1	735	1,184	760.6	65.4	767
English II – OE B	684	733.6	72.0	737	1,225	759.8	67.5	766
English III – OE A	833	728.4	59.9	730	1,342	750.2	56.8	752
English III – OE B	772	729.9	56.7	734	1,395	753.6	56.2	757
Geometry	1,712	715.3	72.4	722	2,780	745.2	65.4	748
U.S. History	1,499	694.3	79.5	700	2,596	732.0	71.8	733

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.7. Descriptive Statistics of the Scale Scores for Spring 2012 by Race/Ethnicity

	Hispanic				Asian			
Subject	*N*	**Mean**	*SD*	**Med.**	*N*	**Mean**	*SD*	**Med.**
Core A								
Algebra I	2,342	727.5	53.6	730	475	777.2	63.0	772
Algebra II	1,702	712.0	85.9	720	456	803.9	82.4	800
Biology I	2,152	711.5	80.9	720	455	774.6	79.7	780
English II – OE A	1,150	732.6	76.3	736	250	788.2	82.9	792
English II – OE B	1,215	736.2	74.3	742	250	779.8	95.9	780
English III – OE A	996	732.9	61.0	737	234	776.6	67.9	783
English III – OE B	1,013	734.9	62.3	741	186	766.0	67.6	776
Geometry	2,121	730.0	70.9	736	448	802.4	76.3	805
U.S. History	1,822	711.7	74.1	716	472	755.2	72.5	757
Core B								
Algebra I	2,118	727.7	55.1	729	450	781.0	67.0	771
Algebra II	1,609	716.1	81.5	722	398	801.2	82.9	798
Biology I	2,042	718.6	74.2	724	418	774.3	87.6	785
English II – OE A	902	732.5	76.9	738	180	791.4	93.2	791
English II – OE B	904	733.9	75.9	737	173	777.4	84.3	773
English III – OE A	874	740.4	57.8	743	176	762.5	64.6	766
English III – OE B	872	739.7	55.9	743	188	764.0	65.3	767
Geometry	2,112	734.5	66.8	737	392	801.6	79.7	809
U.S. History	1,739	715.9	77.6	722	369	748.5	81.0	755

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.7. Descriptive Statistics of the Scale Scores for Spring 2012 by Race/Ethnicity (cont.)

	White			
Subject	*N*	**Mean**	*SD*	**Med.**
Core A				
Algebra I	10,822	747.9	52.1	748
Algebra II	9,518	747.0	81.0	753
Biology I	11,039	759.1	71.9	760
English II – OE A	6,014	778.8	68.5	777
English II – OE B	5,897	779.3	67.8	776
English III – OE A	5,710	764.0	61.8	767
English III – OE B	5,581	763.6	63.6	767
Geometry	10,980	763.0	71.5	767
U.S. History	9,947	747.7	70.7	751
Core B				
Algebra I	10,509	750.0	53.2	751
Algebra II	9,280	748.4	76.0	753
Biology I	10,536	761.8	69.7	760
English II – OE A	4,379	780.0	65.7	782
English II – OE B	4,435	784.1	65.8	781
English III – OE A	4,945	770.0	57.3	771
English III – OE B	5,078	770.2	57.0	772
Geometry	10,262	765.1	65.3	769
U.S. History	9,982	752.4	68.6	755

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

Table 6.8. Descriptive Statistics of the Scale Scores for Spring 2012 by Free/Reduced Lunch Status

	Free/Reduced Lunch = Yes				Free/Reduced Lunch = No			
Subject	**N**	**Mean**	**SD**	**Med.**	**N**	**Mean**	**SD**	**Med.**
Core A								
Algebra I	8,655	727.7	51.1	730	10,814	750.4	54.7	752
Algebra II	6,318	712.4	86.1	720	9,932	750.3	80.8	753
Biology I	8,356	722.7	76.5	727	10,955	760.8	74.2	767
English II – OE A	4,435	745.7	70.1	749	5,992	780.9	69.5	777
English II – OE B	4,488	745.7	69.2	748	5,911	782.0	68.4	783
English III – OE A	4,123	736.4	62.0	741	5,722	767.1	61.5	772
English III – OE B	4,104	734.9	64.4	741	5,611	766.9	62.2	773
Geometry	8,356	730.3	73.5	736	10,920	767.1	71.4	777
U.S. History	6,936	717.7	71.4	722	10,325	749.2	71.7	751
Core B								
Algebra I	8,515	730.5	51.8	733	10,310	752.4	54.2	751
Algebra II	6,138	715.1	81.7	722	9,459	753.2	76.2	758
Biology I	8,104	726.5	72.6	730	10,447	764.2	71.2	766
English II – OE A	3,322	745.0	70.4	752	4,339	783.4	66.9	782
English II – OE B	3,332	746.6	71.1	751	4,415	786.5	66.3	789
English III – OE A	3,513	740.1	58.5	743	4,975	772.3	56.8	771
English III – OE B	3,505	740.4	56.2	743	5,111	773.8	56.6	776
Geometry	7,824	734.8	66.8	737	10,120	768.9	66.9	769
U.S. History	6,676	719.5	74.1	722	10,098	753.3	70.5	755

Note: N = Sample size; SD = Standard Deviation; Med. = Median.

6.2 Performance Level Distribution

The distributions of students in the four performance levels based on student performance in the Winter/Trimester 2011-12 and Spring 2012 administration are presented in Table 6.9 (please see Appendix B and Appendix C for distributions by scale score for Winter/Trimester 2011-12 and Spring 2012, respectively). As above, these percentages exclude invalid student data and second-time test-takers. The percentage distributions for each of the content areas are comparable to previous administrations (e.g., Winter/Trimester 2010-11 and Spring 2011).

Table 6.9. Percentage of Students by Performance Level for Winter/Trimester 2011-12 and Spring 2012

Subject	*N*	Unsatisfactory	Limited Knowledge	Proficient	Advanced
Winter 2011-12					
Algebra I	1,249	15.3%	23.4%	43.8%	17.5%
Algebra II	1,425	23.6%	12.1%	34.0%	30.3%
Biology I	1,502	14.2%	23.4%	42.0%	20.4%
English II	1,543	5.2%	16.7%	48.6%	29.6%
English III	1,794	14.3%	8.1%	47.4%	30.2%
Geometry	1,757	7.6%	18.6%	38.0%	35.8%
U.S. History	1,531	10.2%	24.3%	37.8%	27.7%
Spring 2012 Core A					
Algebra I	19,469	4.2%	13.4%	47.3%	35.2%
Algebra II	16,250	11.0%	14.3%	45.2%	29.5%
Biology I	19,311	5.8%	18.2%	48.0%	28.0%
English II – OE A	10,427	1.9%	12.4%	57.6%	28.2%
English II – OE B	10,399	1.5%	12.3%	62.0%	24.2%
English III – OE A	9,845	8.0%	7.3%	60.5%	24.2%
English III – OE B	9,715	9.4%	6.4%	60.3%	23.9%
Geometry	19,276	6.0%	12.5%	40.0%	41.5%
U.S. History	17,261	5.1%	20.2%	40.8%	33.9%
Spring 2012 Core B					
Algebra I	18,825	3.9%	12.2%	47.1%	36.8%
Algebra II	15,597	10.8%	14.4%	44.5%	30.3%
Biology I	18,551	5.0%	16.2%	49.6%	29.2%
English II – OE A	7,661	1.7%	12.1%	56.9%	29.3%
English II – OE B	7,747	1.7%	10.8%	60.3%	27.2%
English III – OE A	8,488	5.5%	6.9%	64.2%	23.4%
English III – OE B	8,616	5.8%	7.0%	60.1%	27.1%
Geometry	17,944	4.2%	11.9%	43.8%	40.0%
U.S. History	16,774	4.9%	19.9%	37.5%	37.6%

6.3 Conditional Standard Error of Measurement

The conditional standard error of measurement (*CSEM*) was computed for each reported scale score. *CSEM* was computed using an IRT-based approach based on the following formula:

$$CSEM\ (O_X \mid \theta) = \sqrt{\left[\sum_{X=0}^{MaxX} O_X^2\, p(X \mid \theta)\right] - \left[\sum_{X=0}^{MaxX} O_X \cdot p(X \mid \theta)\right]^2} \quad (9)$$

where O_X is the observed scaled score for a particular number-correct score X, θ is the IRT ability scale value conditioned on, and $p(\bullet)$ is the probability function. Pearson has implemented a computational approach for estimating $CSEM(O_x \mid \theta)$ in which $p(X \mid \theta)$ is computed using a recursive algorithm given by Thissen, Pommerich, Billeaud, and Williams (1995). This algorithm is a polytomous generalization of the algorithm for dichotomous items given by Lord and Wingersky (1984). The values of θ used with the algorithm are obtained through the true score equating process (i.e., by solving for θ through the test characteristic curve for each number-correct score, X). There is one *CSEM* per number-correct score. The CSEMs by subject appear Table 4.4 and Table 4.5 for the Winter/Trimester 2011-12 and Spring 2012, respectively.

6.4 Standard Error of Measurement

Measurement error is associated with every test score. A student's true score is the hypothetical average score that would result if the student took the test repeatedly under similar conditions. The standard error of measurement (SEM), as an overall test-level measure of error, can be used to construct a range around any given observed test score that likely includes the student's true score. *SEM* is computed by taking the square root of the average value of the variances of the error of measurement associated with each of the raw score or scales scores:

$$SEM = \sqrt{\frac{\sum_j (CSEM_j^{\,2} \cdot N_j)}{N_T}} \quad (10)$$

where,

SEM = Standard Error of Measurement
CSEM = Conditional Standard of Measurement
N_j = number of examinees obtaining score j in the population
N_T = total number of students in test sample

SEM was computed for each of the content areas. Table 6.10 presents the overall estimates of *SEM* for each of the content areas for the Winter/Trimester 2011-12 and Spring 2012 administrations.

Table 6.10. Overall Estimates of *SEM* by Subject

Subject	SEM*
Winter 2011-12	
Algebra I	26.97
Algebra II	35.41
Biology I	29.22
English II	29.26
English III	23.50
Geometry	29.44
U.S. History	28.50
Spring 2012	
Algebra I – A	22.71
Algebra I – B	22.80
Algebra II – A	33.52
Algebra II – B	31.71
Biology I – A	28.76
Biology I – B	27.68
English II – AA	26.86
English II – AB	26.85
English II – BA	28.68
English II – BB	29.09
English III – AA	22.28
English III – AB	22.40
English III – BA	20.70
English III – BB	20.25
Geometry – A	26.79
Geometry – B	25.67
U.S. History - A	27.85
U.S. History - B	27.50

Note: *SEM = Standard Error of Measurement; SEM values are on the reportable scale metric; AA=Core MC form A+OE form A; AB=Core MC form A+OE form B; BA=Core MC form B+OE form A; BB=Core MC form B+OE form B.

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Appendix A

Standards, Objectives/Skills, and Processes Assessed by Subject

Algebra I	
Standard 1: Number Sense and Algebraic Operations	
Standard 1.1	Equations and Formulas
	1.1a Translate
	1.1b Literal Equations
	1.1c Problem Solving with Formulas
	1.1d Problem Solving
Standard 1.2	Expressions
	1.2a Simplify expressions…
	1.2b Compute with polynomials…
	1.2c Factor polynomials
Standard 2: Relations and Functions	
Standard 2.1	Relations/Functions
	2.1a Distinguish linear and nonlinear
	2.1b Distinguish between relations…
	2.1c Dependent, Independ, Domain, Range
	2.1d Evaluate a function…
Standard 2.2	Linear Equations and Graphs
	2.2a Solve linear equations
	2.2b Graph Transformations
	2.2c Slope
	2.2d Equation of a Line
	2.2e Match to a graph, table, etc.
Standard 2.3	Linear Inequalities and Graphs
	2.3a Solve linear inequalities
	2.3b Match to a table, graph, etc.
Standard 2.4	Systems of Equations
Standard 3: Data Analysis, Probability & Statistics	
Standard 3.1	Data Analysis
	3.1a Data Representations
	3.1b Data Predictions
	3.1c Problem Solving
Standard 3.2	Line of Best Fit

Algebra II	
Standard 1: Number Sense and Algebraic Operations	
Standard 1.1	Rational Exponents
	1.1a Convert expressions from radical notations to rational exponents and vice versa.
	1.1b Add, subtract, multiply, divide, and simplify radical expressions and expressions containing rational exponents.
Standard 1.2	Polynomial and Rational Expressions
	1.2a Divide polynomial expressions by lower degree polynomials.
	1.2b Add, subtract, multiply, divide, and simplify rational expressions, including complex fractions.
Standard 1.3	Complex Numbers
	1.3b Add, subtract, multiply, divide, and simplify expressions involving complex numbers.
Standard 2: Relations and Functions	
Standard 2.1	Functions and Function Notation
	2.1a Recognize the parent graphs of polynomial, exponential, and logarithmic functions and predict the effects of transformations on the parent graphs, using various methods and tools which may include graphing calculators.
	2.1b Use function notation to add, subtract, multiply, and divide functions.
	2.1c Combine functions by composition.
	2.1d Use algebraic, interval, and set notations to specify the domain and range of functions of various types.
	2.1e Find and graph the inverse of a function, if it exists.
Standard 2.2	Systems of Equations
	2.2a Model a situation that can be described by a system of equations and inequalities and use the model to answer questions about the situation.
	2.2b Solve systems of linear equations and inequalities using various methods and tools which may include substitution, elimination, matrices, graphing, and graphing calculators.
	2.2c Use either one quadratic equation and one linear equation or two quadratic equations to solve problems.
Standard 2.3	Quadratic Equations and Functions
	2.3a Solve quadratic equations by graphing, factoring, completing the square and quadratic formula.
	2.3b Graph a quadratic function and identify the x- and y-intercepts and maximum or minimum value, using various methods and tools which may include a graphing calculator.
	2.3c Model a situation that can be described by a quadratic function and use the model to answer questions about the situation.

Algebra II continued	
Standard 2.4	Identify, graph, and write the equations of the conic sections (circle, ellipse, parabola, and hyperbola).
Standard 2.5	Exponential and Logarithmic Functions
	2.5a Graph exponential and logarithmic functions.
	2.5b Apply the inverse relationship between exponential and logarithmic functions to convert from one form to another.
	2.5c Model a situation that can be described by an exponential or logarithmic function and use the model to answer questions about the situation.
Standard 2.6	Polynomial Equations and Functions
	2.6a Solve polynomial equations using various methods and tools which may include factoring and synthetic division.
	2.6b Sketch the graph of a polynomial function.
	2.6c Given the graph of a polynomial function, identify the x- and y-intercepts, relative maximums and relative minimums, using various methods and tools which may include a graphing calculator.
	2.6d Model a situation that can be described by a polynomial function and use the model to answer questions about the situation.
Standard 2.7	Rational Equations and Functions
	2.7a Solve rational equations.
	2.7b Sketch the graph of a rational function.
	2.7c Given the graph of a rational function, identify the x- and y-intercepts, asymptotes, using various methods and tools which may include a graphing calculator.
	2.7d Model a situation that can be described by a rational function and use the model to answer questions about the situation.
Standard 3: Data Analysis, Probability, & Statistics	
Standard 3.1	Analysis of Collected Data …
	3.1a Display data on a scatter plot.
	3.1b Interpret results using a linear, exponential or quadratic model/equation.
	3.1c Identify whether the model/equation is a curve of best fit for the data, using various methods and tools which may include a graphing calculator.
Standard 3.3	Identify and use arithmetic and geometric sequences

Geometry	
Standard 1: Logical Reasoning	
Standard 1.1	Identify and use logical reasoning skills (inductive and deductive) to make and test conjectures, formulate counter examples, and follow logical arguments.
Standard 1.2	State, use, and examine the validity of the converse, inverse, and contrapositive of "if-then" statements.
Standard 2: Properties of 2-Dimensional Figures	
Standard 2.2	Line and Angle Relationships
	2.2a Use the angle relationships formed by parallel lines cut by a transversal to solve problems.
	2.2b Use the angle relationships formed by two lines cut by a transversal to determine if the two lines are parallel and verify, using algebraic and deductive proofs.
	2.2c Use relationships between pairs of angles (for example, adjacent, complementary, vertical) to solve problems.
Standard 2.3	Polygons and Other Plane Figures
	2.3a Identify, describe, and analyze polygons (for example, convex, concave, regular, pentagonal, hexagonal, n-gonal).
	2.3b Apply the interior and exterior angle sum of convex polygons to solve problems, and verify using algebraic and deductive proofs.
	2.3c Develop and apply the properties of quadrilaterals to solve problems (for example, rectangles, parallelograms, rhombi, trapezoids, kites).
	2.3d Use properties of 2-dimensional figures and side length, perimeter or circumference, and area to determine unknown values and correctly identify the appropriate unit of measure of each.
Standard 2.4	Similarity
	2.4a Determine and verify the relationships of similarity of triangles, using algebraic and deductive proofs.
	2.4b Use ratios of similar 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.
Standard 2.5	Congruence
	2.5a Determine and verify the relationships of congruency of triangles, using algebraic and deductive proofs.
	2.5b Use the relationships of congruency of 2-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference, and area.
Standard 2.6	Circles
	2.6a Find angle measures and arc measures related to circles.
	2.6b Find angle measures and segment lengths using the relationships among radii, chords, secants, and tangents of a circle.

Geometry continued	
Standard 3: Triangles and Trigonometric Ratios	
Standard 3.1	Use the Pythagorean Theorem and its converse to find missing side lengths and to determine acute, right, and obtuse triangles, and verify using algebraic and deductive proofs.
Standard 3.2	Apply the 45-45-90 and 30-60-90 right triangle relationships to solve problems, and verify using algebraic and deductive proofs.
Standard 3.3	Express the trigonometric functions as ratios and use sine, cosine, and tangent ratios to solve real-world problems.
Standard 4: Properties of 3-Dimensional Figures	
Standard 4.1	Polyhedra and Other Solids
	4.1a Identify, describe, and analyze polyhedra (for example, regular, decahedral).
	4.1b Use properties of 3-dimensional figures; side lengths, perimeter or circumference, and area of a face; and volume, lateral area, and surface area to determine unknown values and correctly identify the appropriate unit of measure of each.
Standard 4.2	Similarity and Congruence
	4.2a Use ratios of similar 3-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.
	4.2b Use the relationships of congruency of 3-dimensional figures to determine unknown values, such as angles, side lengths, perimeter or circumference of a face, area of a face, and volume.
4.3	Create a model of a 3-dimensional figure from a 2-dimensional drawing and make a 2-dimensional representation of a 3-dimensional object (for example, nets, blueprints, perspective drawings).
Standard 5: Coordinate Geometry	
Standard 5.1	Use coordinate geometry to find the distance between two points; the midpoint of a segment; and to calculate the slopes of a parallel, perpendicular, horizontal, and vertical lines.
Standard 5.2	Properties of Figures
	5.2a Given a set of points determine the type of figure formed based on its properties.
	5.2b Use transformations (reflection, rotation, translation)on geometric figures to solve problems within coordinate geometry.

Biology I	
PASS **Process/Inquiry Standards and Objectives**	
Process 1 Observe and Measure	
P1.1	Qualitative/quantitative observations and changes
P1.2 P1.3	Use appropriate System International (SI) units and tools
Process 2 Classify	
P2.1	Use observable properties to classify
P2.2	Identify properties of a classification system
Process 3 Experiment	
P3.1	Evaluate the design of investigations
P3.2 P3.4	Identify a testable hypothesis, variables, and control in an experiment
P3.3	Use mathematics to show relationships
P3.5	Identify potential hazards and practice safety procedures in all science activities
Process 4 Interpret and Communicate	
P4.1	Select predictions based on observed patterns of evidence
P4.3	Interpret line, bar, trend, and circle graphs
P4.4	Accept or reject a hypothesis
P4.5	Make logical conclusions based on experimental data
P4.8	Identify an appropriate graph or chart
Process 5 Model	
P5.1	Interpret a model which explains a given set of observations
P5.2	Select predictions based on models
PASS **Content Standards**	
Standard 1 The Cell	
1.1	Cell structures and functions
1.2	Differentiation of cells
Standard 2 The Molecular Basis of Heredity	
2.1	DNA structure and function in heredity
2.2	Sorting and recombination of genes
Standard 3 Biological Diversity	
3.1	Variation among organisms
3.2	Natural selection and biological adaptations
Standard 4 The Interdependence of Organisms	
4.1	Earth cycles including abiotic and biotic factors
4.2	Organisms both cooperate and compete
4.3	Population dynamics
Standard 5 Matter/Energy/Organization in Living Systems	
5.1	Complexity and organization used for survival
5.2	Matter and energy flow in living and nonliving systems

Biology I continued	
Standard 6 The Behavior of Organisms	
6.1	Specialized cells
6.2	Behavior patterns can be used to ensure reproductive success

English II	
Reading/Literature	
Standard 1 Vocabulary	
Standard 2 Comprehension	
2.1	Literal Understanding
2.2	Inferences and Interpretation
2.3	Summary and Generalization
2.4	Analysis and Evaluation
Standard 3 Literature	
3.1	Literary Genres
3.2	Literary Elements
3.3	Figurative Language
3.4	Literary Works
Standard 4 Research and Information	
Writing/Grammar/Usage and Mechanics	
Standard 1/2 Writing	
	Writing Prompt
Standard 3 Grammar/Usage and Mechanics	
3.1	Standard Usage
3.2	Mechanics and Spelling
3.3	Sentence Structure

English III	
Reading/Literature	
Standard 1 Vocabulary	
Standard 2 Comprehension	
2.1	Literal Understanding
2.2	Inference and Interpretation
2.3	Summary and Generalization
2.4	Analysis and Evaluation
Standard 3 Literature	
3.1	Literary Genres
3.2	Literary Elements
3.3	Figurative Language
3.4	Literary Works
Standard 4 Research and Information	
Writing/Grammar/Usage and Mechanics	
Standard 1/2 Writing	
	Writing Prompt
Standard 3 Grammar/Usage and Mechanics	
3.1	Standard English Usage
3.2	Mechanics and Spelling
3.3	Sentence Structure
3.4	Manuscript Conventions

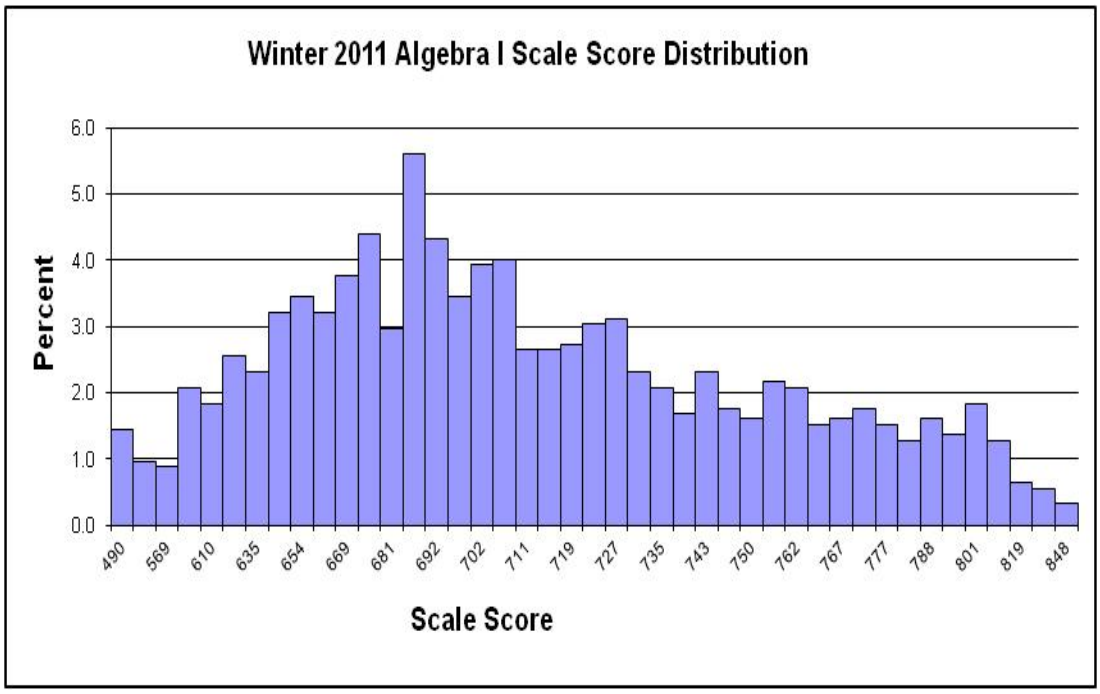
U.S. History	
Standard 1 Civil War/Reconstruction Era	
Standard 2 Impact of Immigration and Industrialization	
2.1	Immigration and Impact on Native Americans
2.2	Industrialization
Standard 3 Imperialism, World War I, and Isolationism	
3.1	American Imperialism
3.2	World War I and Isolationism
Standard 4 United States During the 1920s and 1930s	
4.1	Cultural Life Between the Wars
4.2	Economic Destabilization
4.3	The Great Depression, the Dust Bowl, and the New Deal
Standard 5 World War II	
5.1	Preparing for War
5.2	World War II
Standard 6 United States Since World War II	
6.1	Post War Foreign Policies and Events
6.2	Events Changing Domestic and Foreign Policies and Events
6.3	Post War Domestic Policies and Events

Appendix B

Scale Score Distributions for Winter/Trimester 2011-12

Algebra I Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
490	18	1.4	18	1.4
528	12	1.0	30	2.4
569	11	0.9	41	3.3
593	26	2.1	67	5.4
610	23	1.8	90	7.2
624	32	2.6	122	9.8
635	29	2.3	151	12.1
645	40	3.2	191	15.3
654	43	3.4	234	18.7
662	40	3.2	274	21.9
669	47	3.8	321	25.7
675	55	4.4	376	30.1
681	37	3.0	413	33.1
687	70	5.6	483	38.7
692	54	4.3	537	43.0
700	43	3.4	580	46.4
702	49	3.9	629	50.4
706	50	4.0	679	54.4
711	33	2.6	712	57.0
715	33	2.6	745	59.6
719	34	2.7	779	62.4
723	38	3.0	817	65.4
727	39	3.1	856	68.5
731	29	2.3	885	70.9
735	26	2.1	911	72.9
739	21	1.7	932	74.6
743	29	2.3	961	76.9
746	22	1.8	983	78.7
750	20	1.6	1003	80.3
755	27	2.2	1030	82.5
762	26	2.1	1056	84.5
763	19	1.5	1075	86.1
767	20	1.6	1095	87.7
772	22	1.8	1117	89.4
777	19	1.5	1136	91.0
782	16	1.3	1152	92.2
788	20	1.6	1172	93.8
794	17	1.4	1189	95.2
801	23	1.8	1212	97.0
809	16	1.3	1228	98.3
819	8	0.6	1236	99.0
831	7	0.6	1243	99.5
848	4	0.3	1247	99.8
877	2	0.2	1249	100.0

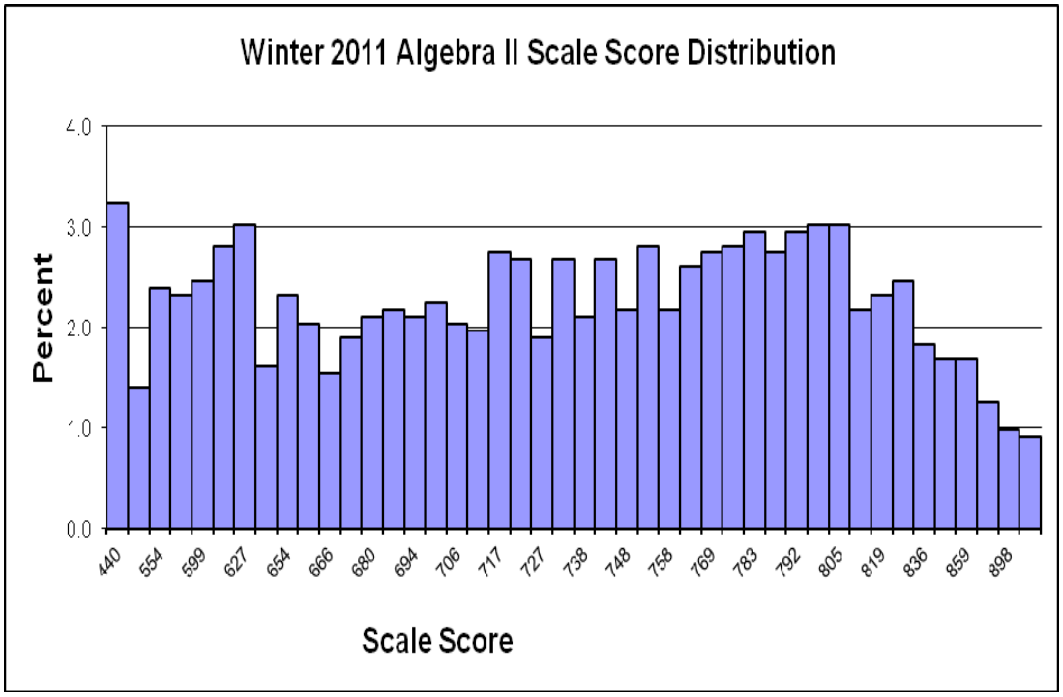

Winter 2011 Algebra I Scale Score Distribution
Percent
6.0
5.0
4.0
3.0
2.0
1.0
0.0
490
569
610
635
654
669
681
692
702
711
719
727
735
743
750
762
767
777
788
801
819
848
Scale Score

Algebra II Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	46	3.2	46	3.2
515	20	1.4	66	4.6
554	34	2.4	100	7.0
580	33	2.3	133	9.3
599	35	2.5	168	11.8
614	40	2.8	208	14.6
627	43	3.0	251	17.6
638	23	1.6	274	19.2
654	33	2.3	307	21.5
657	29	2.0	336	23.6
666	22	1.5	358	25.1
673	27	1.9	385	27.0
680	30	2.1	415	29.1
687	31	2.2	446	31.3
694	30	2.1	476	33.4
700	32	2.2	508	35.6
706	29	2.0	537	37.7
711	28	2.0	565	39.6
717	39	2.7	604	42.4
722	38	2.7	642	45.1
727	27	1.9	669	46.9
733	38	2.7	707	49.6
738	30	2.1	737	51.7
743	38	2.7	775	54.4
748	31	2.2	806	56.6
753	40	2.8	846	59.4
758	31	2.2	877	61.5
764	37	2.6	914	64.1
769	39	2.7	953	66.9
774	40	2.8	993	69.7
783	42	2.9	1035	72.6
786	39	2.7	1074	75.4
792	42	2.9	1116	78.3
798	43	3.0	1159	81.3
805	43	3.0	1202	84.4
812	31	2.2	1233	86.5
819	33	2.3	1266	88.8
827	35	2.5	1301	91.3
836	26	1.8	1327	93.1
847	24	1.7	1351	94.8
859	24	1.7	1375	96.5
875	18	1.3	1393	97.8

Algebra II Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
898	14	1.0	1407	98.7
938	13	0.9	1420	99.6
999	5	0.4	1425	100.0

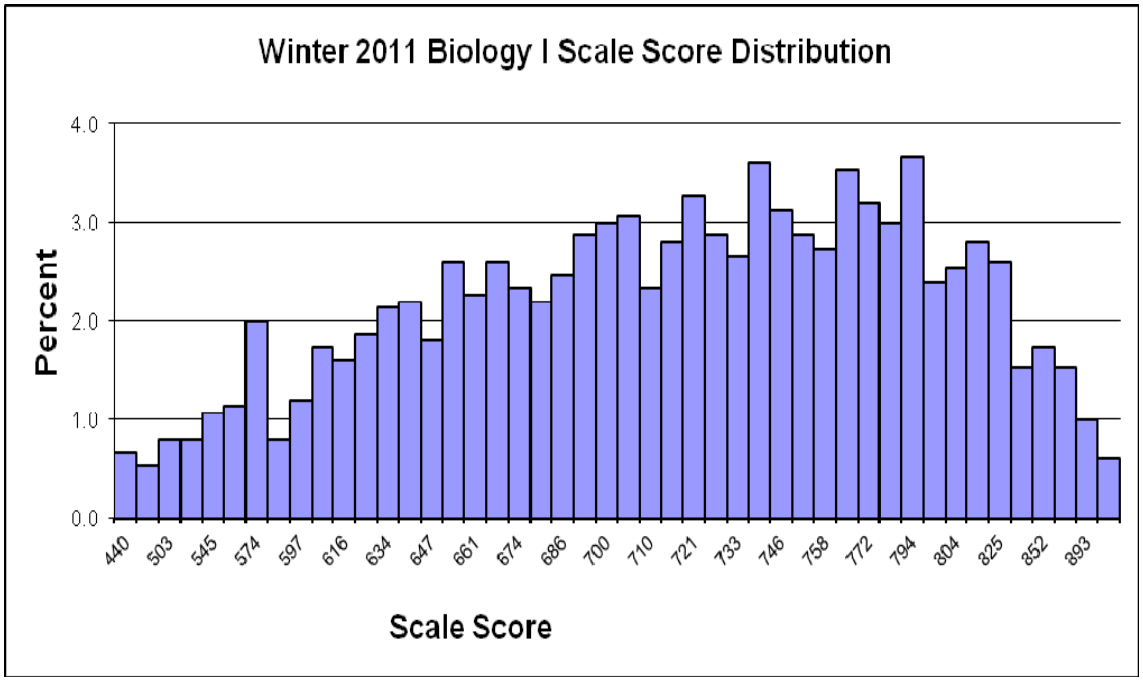


Biology I Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	10	0.7	10	0.7
472	8	0.5	18	1.2
503	12	0.8	30	2.0
526	12	0.8	42	2.8
545	16	1.1	58	3.9
560	17	1.1	75	5.0
574	30	2.0	105	7.0
586	12	0.8	117	7.8
597	18	1.2	135	9.0
606	26	1.7	161	10.7
616	24	1.6	185	12.3
624	28	1.9	213	14.2
634	32	2.1	245	16.3
640	33	2.2	278	18.5
647	27	1.8	305	20.3
654	39	2.6	344	22.9
661	34	2.3	378	25.2
667	39	2.6	417	27.8
674	35	2.3	452	30.1
680	33	2.2	485	32.3
686	37	2.5	522	34.8
692	43	2.9	565	37.6
700	45	3.0	610	40.6
704	46	3.1	656	43.7
710	35	2.3	691	46.0
716	42	2.8	733	48.8
721	49	3.3	782	52.1
727	43	2.9	825	54.9
733	40	2.7	865	57.6
739	54	3.6	919	61.2
746	47	3.1	966	64.3
752	43	2.9	1009	67.2
758	41	2.7	1050	69.9
765	53	3.5	1103	73.4
772	48	3.2	1151	76.6
779	45	3.0	1196	79.6
794	55	3.7	1251	83.3
795	36	2.4	1287	85.7
804	38	2.5	1325	88.2
814	42	2.8	1367	91.0
825	39	2.6	1406	93.6
837	23	1.5	1429	95.1
852	26	1.7	1455	96.9

Biology I Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
870	23	1.5	1478	98.4
893	15	1.0	1493	99.4
926	9	0.6	1502	100.0

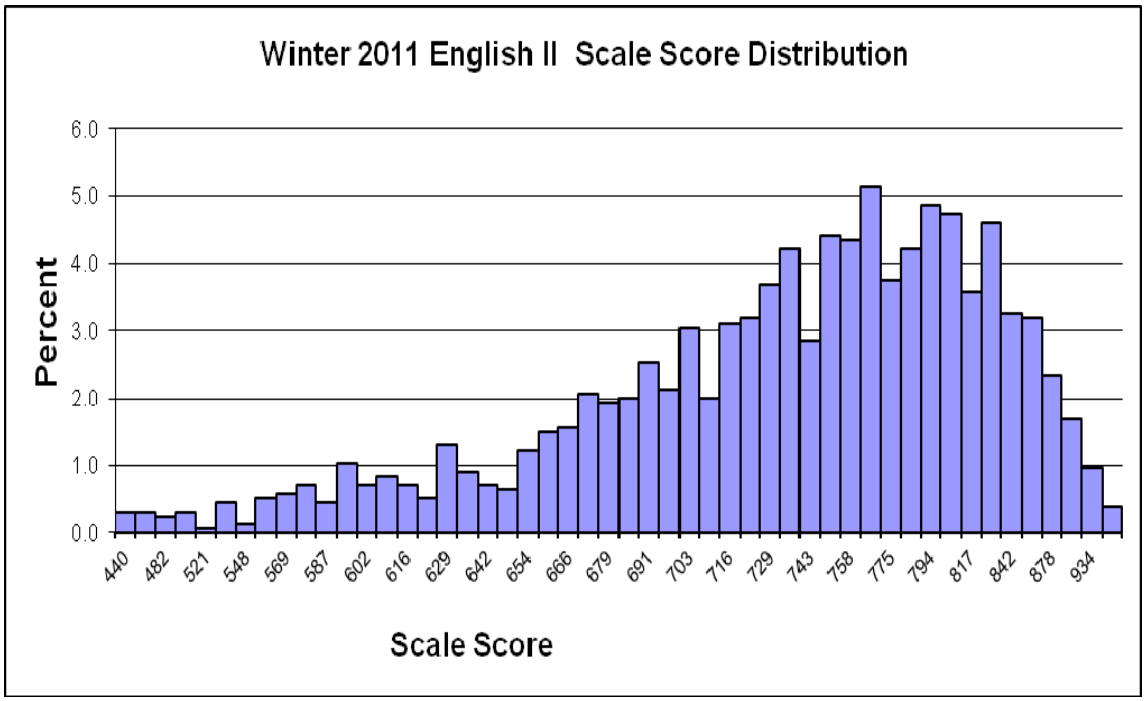


English II Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	5	0.3	5	0.3
454	5	0.3	10	0.6
482	4	0.3	14	0.9
503	5	0.3	19	1.2
521	1	0.1	20	1.3
536	7	0.5	27	1.7
548	2	0.1	29	1.9
559	8	0.5	37	2.4
569	9	0.6	46	3.0
578	11	0.7	57	3.7
587	7	0.5	64	4.1
595	16	1.0	80	5.2
602	11	0.7	91	5.9
609	13	0.8	104	6.7
616	11	0.7	115	7.5
623	8	0.5	123	8.0
629	20	1.3	143	9.3
636	14	0.9	157	10.2
642	11	0.7	168	10.9
648	10	0.6	178	11.5
654	19	1.2	197	12.8
660	23	1.5	220	14.3
666	24	1.6	244	15.8
672	32	2.1	276	17.9
679	30	1.9	306	19.8
685	31	2.0	337	21.8
691	39	2.5	376	24.4
700	33	2.1	409	26.5
703	47	3.0	456	29.6
710	31	2.0	487	31.6
716	48	3.1	535	34.7
723	49	3.2	584	37.8
729	57	3.7	641	41.5
736	65	4.2	706	45.8
743	44	2.9	750	48.6
751	68	4.4	818	53.0
758	67	4.3	885	57.4
766	79	5.1	964	62.5
775	58	3.8	1022	66.2
784	65	4.2	1087	70.4
794	75	4.9	1162	75.3
804	73	4.7	1235	80.0
817	55	3.6	1290	83.6

English II Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
828	71	4.6	1361	88.2
842	50	3.2	1411	91.4
859	49	3.2	1460	94.6
878	36	2.3	1496	97.0
903	26	1.7	1522	98.6
934	15	1.0	1537	99.6
979	6	0.4	1543	100.0

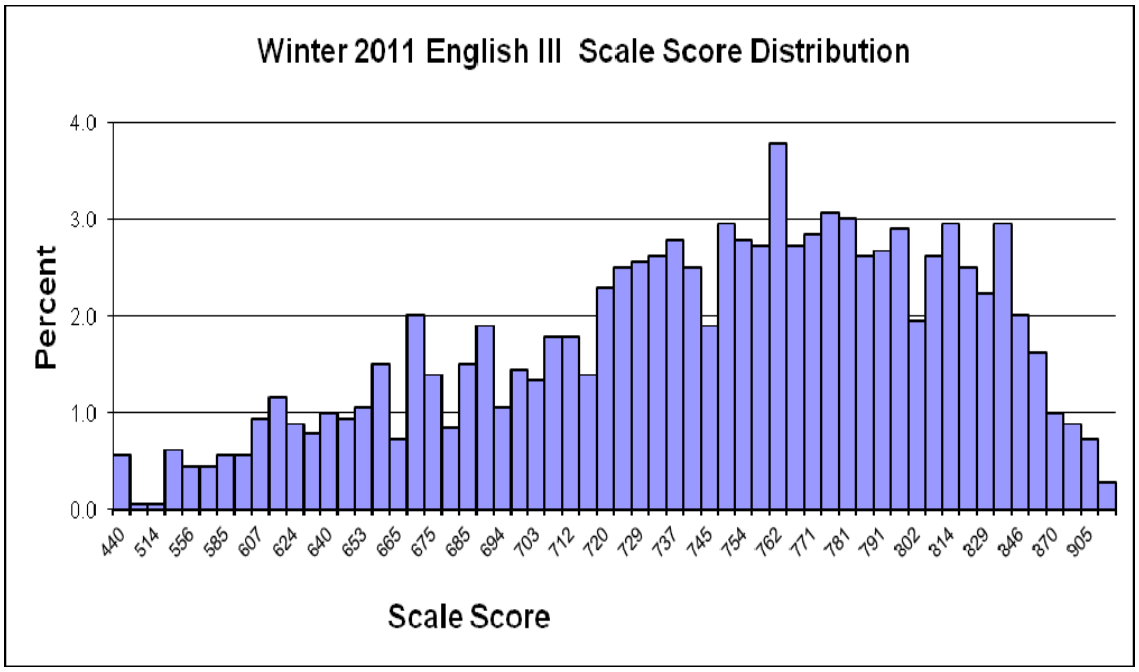


English III Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	10	0.6	10	0.6
476	1	0.1	11	0.6
514	1	0.1	12	0.7
538	11	0.6	23	1.3
556	8	0.4	31	1.7
572	8	0.4	39	2.2
585	10	0.6	49	2.7
596	10	0.6	59	3.3
607	17	0.9	76	4.2
616	21	1.2	97	5.4
624	16	0.9	113	6.3
632	14	0.8	127	7.1
640	18	1.0	145	8.1
646	17	0.9	162	9.0
653	19	1.1	181	10.1
659	27	1.5	208	11.6
665	13	0.7	221	12.3
670	36	2.0	257	14.3
675	25	1.4	282	15.7
680	15	0.8	297	16.6
685	27	1.5	324	18.1
690	34	1.9	358	20.0
694	19	1.1	377	21.0
700	26	1.4	403	22.5
703	24	1.3	427	23.8
708	32	1.8	459	25.6
712	32	1.8	491	27.4
716	25	1.4	516	28.8
720	41	2.3	557	31.0
725	45	2.5	602	33.6
729	46	2.6	648	36.1
733	47	2.6	695	38.7
737	50	2.8	745	41.5
741	45	2.5	790	44.0
745	34	1.9	824	45.9
750	53	3.0	877	48.9
754	50	2.8	927	51.7
758	49	2.7	976	54.4
762	68	3.8	1044	58.2
767	49	2.7	1093	60.9
771	51	2.8	1144	63.8
776	55	3.1	1199	66.8
781	54	3.0	1253	69.8

English III Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
786	47	2.6	1300	72.5
791	48	2.7	1348	75.1
796	52	2.9	1400	78.0
802	35	2.0	1435	80.0
808	47	2.6	1482	82.6
814	53	3.0	1535	85.6
821	45	2.5	1580	88.1
829	40	2.2	1620	90.3
837	53	3.0	1673	93.3
846	36	2.0	1709	95.3
857	29	1.6	1738	96.9
870	18	1.0	1756	97.9
885	16	0.9	1772	98.8
905	13	0.7	1785	99.5
934	5	0.3	1790	99.8
986	4	0.2	1794	100.0

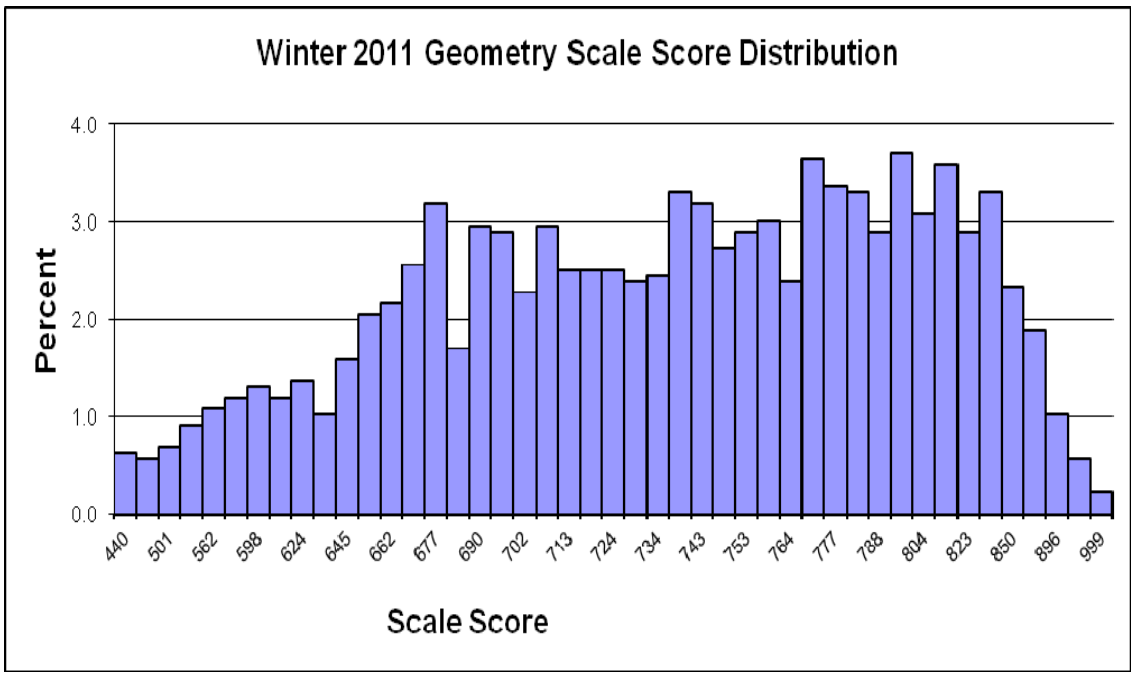


Geometry Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	11	0.6	11	0.6
443	10	0.6	21	1.2
501	12	0.7	33	1.9
537	16	0.9	49	2.8
562	19	1.1	68	3.9
582	21	1.2	89	5.1
598	23	1.3	112	6.4
612	21	1.2	133	7.6
624	24	1.4	157	8.9
635	18	1.0	175	10.0
645	28	1.6	203	11.6
654	36	2.0	239	13.6
662	38	2.2	277	15.8
670	45	2.6	322	18.3
677	56	3.2	378	21.5
684	30	1.7	408	23.2
690	52	3.0	460	26.2
700	51	2.9	511	29.1
702	40	2.3	551	31.4
708	52	3.0	603	34.3
713	44	2.5	647	36.8
718	44	2.5	691	39.3
724	44	2.5	735	41.8
729	42	2.4	777	44.2
734	43	2.4	820	46.7
739	58	3.3	878	50.0
743	56	3.2	934	53.2
748	48	2.7	982	55.9
753	51	2.9	1033	58.8
759	53	3.0	1086	61.8
764	42	2.4	1128	64.2
770	64	3.6	1192	67.8
777	59	3.4	1251	71.2
782	58	3.3	1309	74.5
788	51	2.9	1360	77.4
796	65	3.7	1425	81.1
804	54	3.1	1479	84.2
813	63	3.6	1542	87.8
823	51	2.9	1593	90.7
835	58	3.3	1651	94.0
850	41	2.3	1692	96.3
869	33	1.9	1725	98.2

Geometry Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
896	18	1.0	1743	99.2
946	10	0.6	1753	99.8
999	4	0.2	1757	100.0

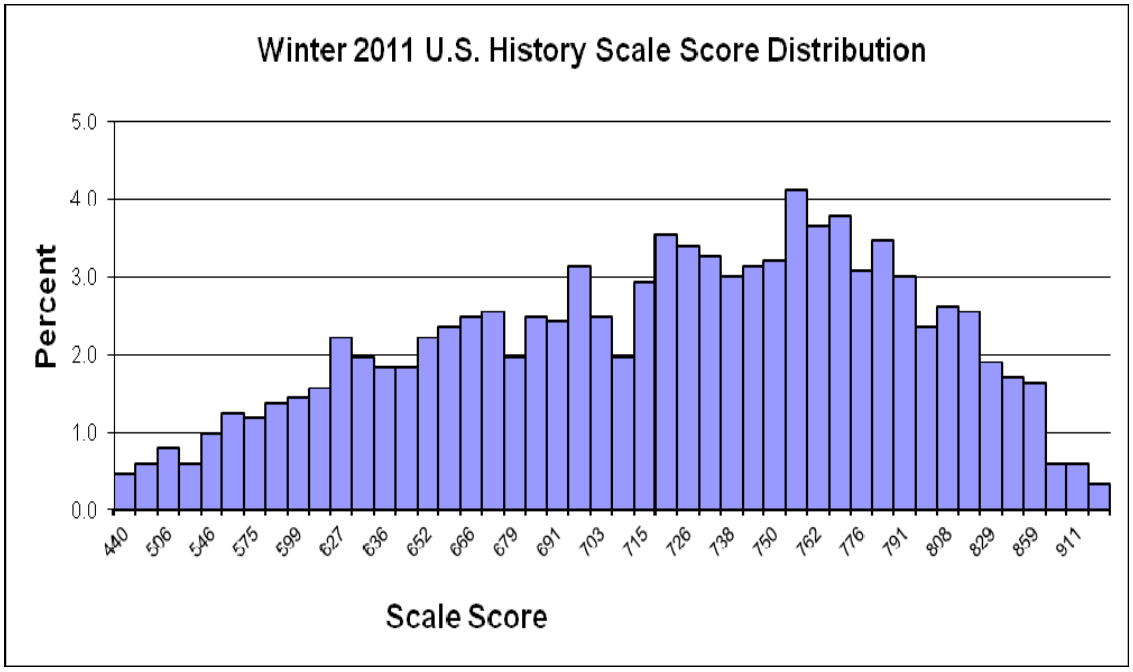


U.S. History Scale Score Distribution for Winter/Trimester 2011-12

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	7	0.5	7	0.5
477	9	0.6	16	1.0
506	12	0.8	28	1.8
528	9	0.6	37	2.4
546	15	1.0	52	3.4
562	19	1.2	71	4.6
575	18	1.2	89	5.8
588	21	1.4	110	7.2
599	22	1.4	132	8.6
609	24	1.6	156	10.2
627	34	2.2	190	12.4
628	30	2.0	220	14.4
636	28	1.8	248	16.2
644	28	1.8	276	18.0
652	34	2.2	310	20.2
659	36	2.4	346	22.6
666	38	2.5	384	25.1
673	39	2.5	423	27.6
679	30	2.0	453	29.6
685	38	2.5	491	32.1
691	37	2.4	528	34.5
700	48	3.1	576	37.6
703	38	2.5	614	40.1
709	30	2.0	644	42.1
715	45	2.9	689	45.0
720	54	3.5	743	48.5
726	52	3.4	795	51.9
732	50	3.3	845	55.2
738	46	3.0	891	58.2
744	48	3.1	939	61.3
750	49	3.2	988	64.5
756	63	4.1	1051	68.6
762	56	3.7	1107	72.3
773	58	3.8	1165	76.1
776	47	3.1	1212	79.2
783	53	3.5	1265	82.6
791	46	3.0	1311	85.6
799	36	2.4	1347	88.0
808	40	2.6	1387	90.6
818	39	2.5	1426	93.1
829	29	1.9	1455	95.0
842	26	1.7	1481	96.7
859	25	1.6	1506	98.4

U.S. History Scale Score Distribution for Winter/Trimester 2011-12 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
880	9	0.6	1515	99.0
911	9	0.6	1524	99.5
968	5	0.3	1529	99.9
999	2	0.1	1531	100.0



Appendix C

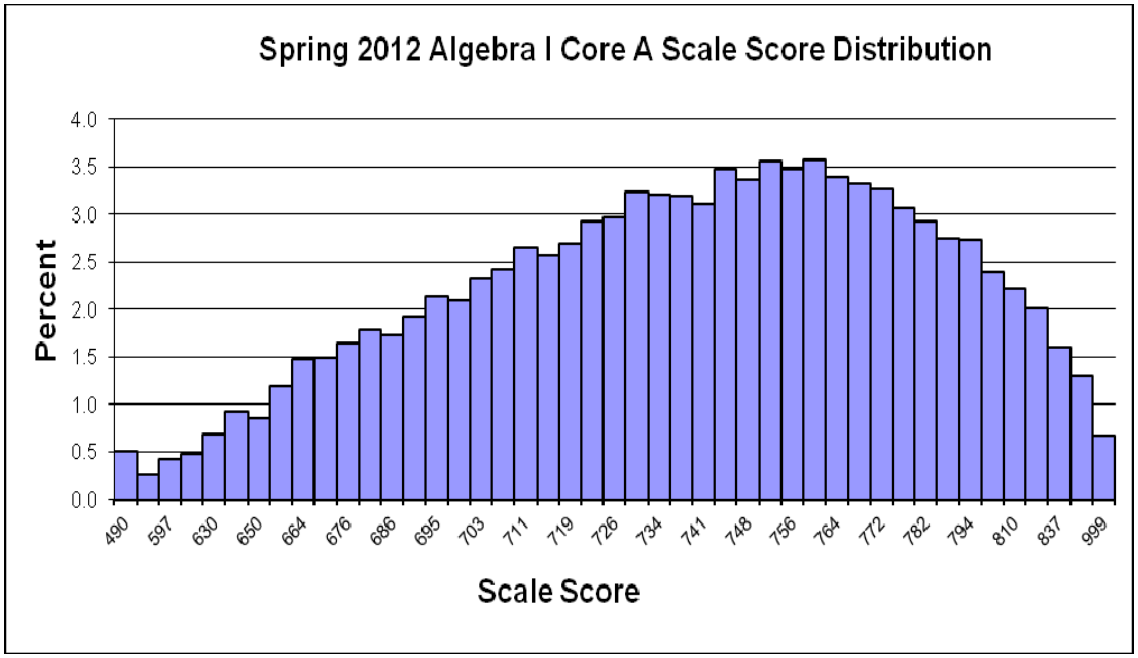
Scale Score Distributions for Spring 2012

Algebra I Core A Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
490	98	0.5	98	0.5
565	51	0.3	149	0.8
597	83	0.4	232	1.2
617	94	0.5	326	1.7
630	135	0.7	461	2.4
641	181	0.9	642	3.3
650	168	0.9	810	4.2
662	232	1.2	1042	5.4
664	287	1.5	1329	6.8
670	290	1.5	1619	8.3
676	320	1.6	1939	10.0
681	347	1.8	2286	11.7
686	338	1.7	2624	13.5
691	375	1.9	2999	15.4
695	415	2.1	3414	17.5
700	409	2.1	3823	19.6
703	453	2.3	4276	22.0
707	471	2.4	4747	24.4
711	516	2.7	5263	27.0
715	501	2.6	5764	29.6
719	523	2.7	6287	32.3
723	570	2.9	6857	35.2
726	578	3.0	7435	38.2
730	629	3.2	8064	41.4
734	623	3.2	8687	44.6
737	622	3.2	9309	47.8
741	606	3.1	9915	50.9
745	676	3.5	10591	54.4
748	654	3.4	11245	57.8
752	692	3.6	11937	61.3
756	677	3.5	12614	64.8
762	695	3.6	13309	68.4
764	660	3.4	13969	71.7
768	646	3.3	14615	75.1
772	635	3.3	15250	78.3
777	596	3.1	15846	81.4
782	570	2.9	16416	84.3
788	534	2.7	16950	87.1
794	531	2.7	17481	89.8
801	466	2.4	17947	92.2
810	433	2.2	18380	94.4
821	392	2.0	18772	96.4

Algebra I Core A Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
837	311	1.6	19083	98.0
865	254	1.3	19337	99.3
999	132	0.7	19469	100.0

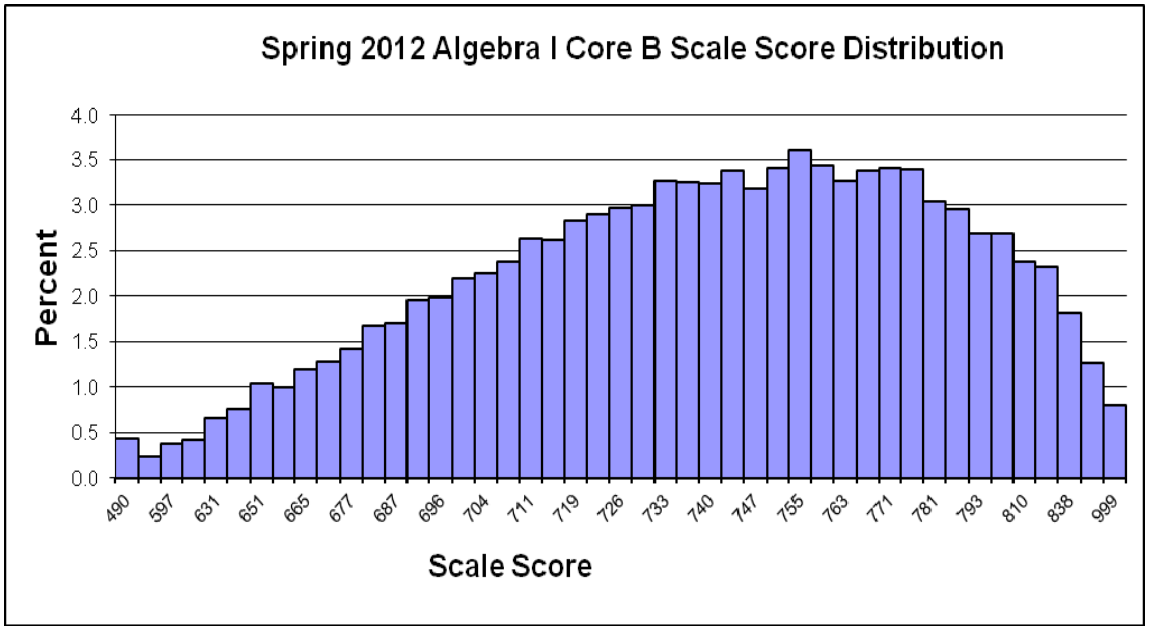


Algebra I Core B Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
490	82	0.4	82	0.4
560	44	0.2	126	0.7
597	70	0.4	196	1.0
617	79	0.4	275	1.5
631	124	0.7	399	2.1
642	143	0.8	542	2.9
651	195	1.0	737	3.9
662	189	1.0	926	4.9
665	224	1.2	1150	6.1
671	241	1.3	1391	7.4
677	268	1.4	1659	8.8
682	314	1.7	1973	10.5
687	321	1.7	2294	12.2
691	368	2.0	2662	14.1
696	373	2.0	3035	16.1
700	413	2.2	3448	18.3
704	424	2.3	3872	20.6
708	448	2.4	4320	22.9
711	496	2.6	4816	25.6
715	492	2.6	5308	28.2
719	533	2.8	5841	31.0
722	545	2.9	6386	33.9
726	559	3.0	6945	36.9
729	563	3.0	7508	39.9
733	614	3.3	8122	43.1
737	612	3.3	8734	46.4
740	610	3.2	9344	49.6
744	636	3.4	9980	53.0
747	598	3.2	10578	56.2
751	642	3.4	11220	59.6
755	677	3.6	11897	63.2
762	645	3.4	12542	66.6
763	615	3.3	13157	69.9
767	636	3.4	13793	73.3
771	641	3.4	14434	76.7
776	637	3.4	15071	80.1
781	573	3.0	15644	83.1
787	555	2.9	16199	86.1
793	505	2.7	16704	88.7
801	505	2.7	17209	91.4
810	447	2.4	17656	93.8
821	436	2.3	18092	96.1

Algebra I Core B Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
838	342	1.8	18434	97.9
868	239	1.3	18673	99.2
999	152	0.8	18825	100.0

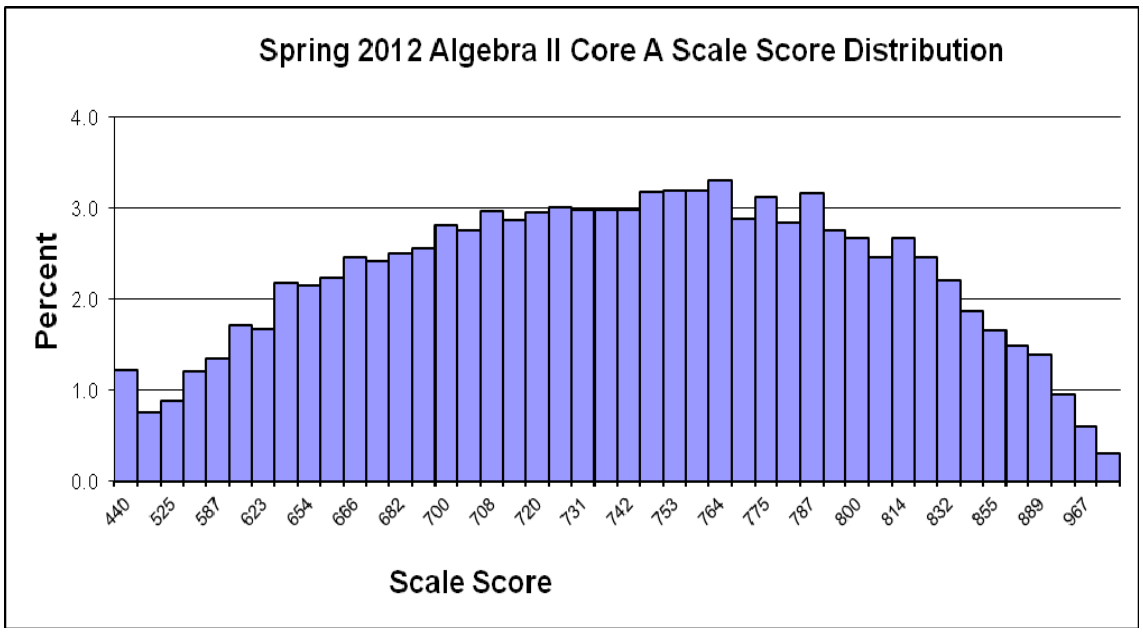


Algebra II Core A Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	199	1.2	199	1.2
459	123	0.8	322	2.0
525	144	0.9	466	2.9
562	197	1.2	663	4.1
587	219	1.3	882	5.4
607	278	1.7	1160	7.1
623	271	1.7	1431	8.8
636	354	2.2	1785	11.0
654	350	2.2	2135	13.1
657	364	2.2	2499	15.4
666	401	2.5	2900	17.8
674	392	2.4	3292	20.3
682	406	2.5	3698	22.8
689	417	2.6	4115	25.3
700	456	2.8	4571	28.1
702	449	2.8	5020	30.9
708	482	3.0	5502	33.9
714	467	2.9	5969	36.7
720	479	2.9	6448	39.7
726	488	3.0	6936	42.7
731	485	3.0	7421	45.7
737	485	3.0	7906	48.7
742	484	3.0	8390	51.6
747	517	3.2	8907	54.8
753	519	3.2	9426	58.0
758	518	3.2	9944	61.2
764	536	3.3	10480	64.5
769	468	2.9	10948	67.4
775	507	3.1	11455	70.5
783	462	2.8	11917	73.3
787	515	3.2	12432	76.5
793	447	2.8	12879	79.3
800	434	2.7	13313	81.9
807	400	2.5	13713	84.4
814	435	2.7	14148	87.1
823	400	2.5	14548	89.5
832	358	2.2	14906	91.7
842	305	1.9	15211	93.6
855	269	1.7	15480	95.3
870	241	1.5	15721	96.7
889	225	1.4	15946	98.1
917	155	1.0	16101	99.1

Algebra II Core A Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
967	98	0.6	16199	99.7
999	51	0.3	16250	100.0

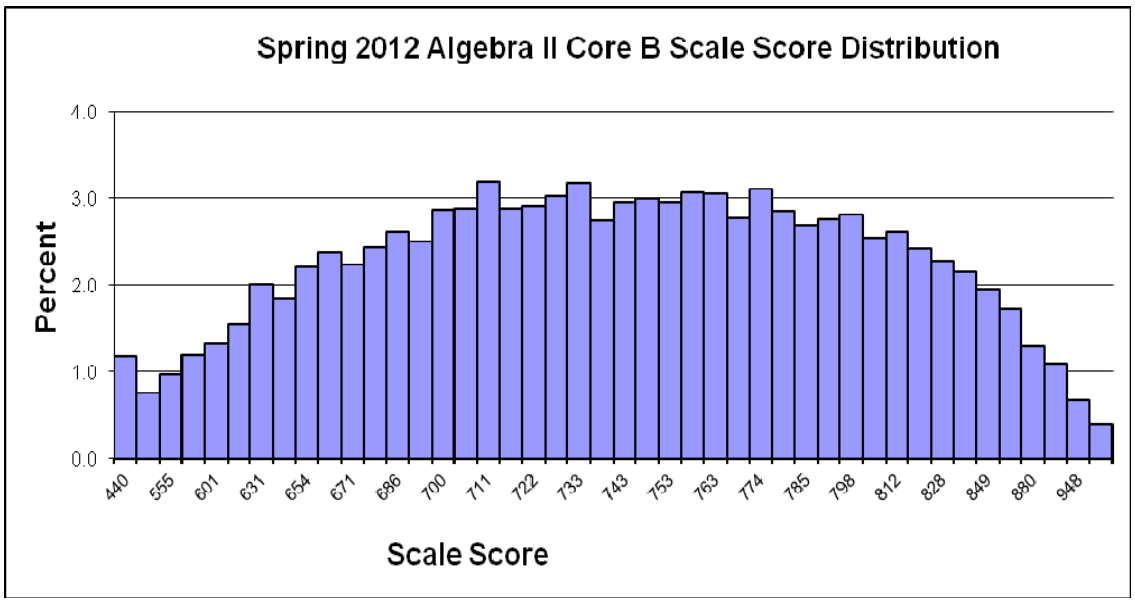


Algebra II Core B Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	185	1.2	185	1.2
516	118	0.8	303	1.9
555	151	1.0	454	2.9
581	187	1.2	641	4.1
601	206	1.3	847	5.4
617	241	1.5	1088	7.0
631	313	2.0	1401	9.0
643	288	1.8	1689	10.8
654	344	2.2	2033	13.0
662	370	2.4	2403	15.4
671	349	2.2	2752	17.6
679	380	2.4	3132	20.1
686	408	2.6	3540	22.7
693	391	2.5	3931	25.2
700	447	2.9	4378	28.1
705	450	2.9	4828	31.0
711	497	3.2	5325	34.1
717	449	2.9	5774	37.0
722	453	2.9	6227	39.9
728	471	3.0	6698	42.9
733	496	3.2	7194	46.1
738	427	2.7	7621	48.9
743	460	2.9	8081	51.8
748	467	3.0	8548	54.8
753	460	2.9	9008	57.8
758	478	3.1	9486	60.8
763	475	3.0	9961	63.9
769	432	2.8	10393	66.6
774	485	3.1	10878	69.7
783	445	2.9	11323	72.6
785	420	2.7	11743	75.3
791	429	2.8	12172	78.0
798	438	2.8	12610	80.8
804	397	2.5	13007	83.4
812	409	2.6	13416	86.0
819	377	2.4	13793	88.4
828	355	2.3	14148	90.7
838	336	2.2	14484	92.9
849	304	1.9	14788	94.8
863	269	1.7	15057	96.5
880	202	1.3	15259	97.8
904	170	1.1	15429	98.9

Algebra II Core B Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
948	106	0.7	15535	99.6
999	62	0.4	15597	100.0

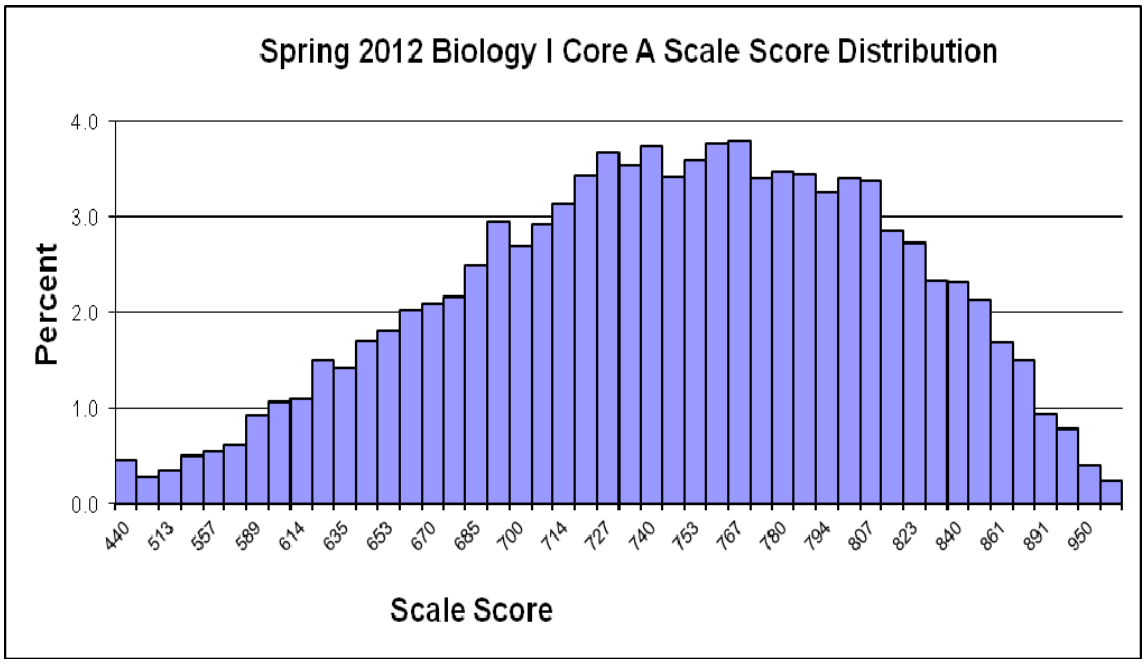


Biology I Core A Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	88	0.5	88	0.5
481	53	0.3	141	0.7
513	68	0.4	209	1.1
537	97	0.5	306	1.6
557	107	0.6	413	2.1
574	118	0.6	531	2.7
589	178	0.9	709	3.7
602	205	1.1	914	4.7
614	211	1.1	1125	5.8
634	290	1.5	1415	7.3
635	275	1.4	1690	8.8
644	329	1.7	2019	10.5
653	350	1.8	2369	12.3
662	391	2.0	2760	14.3
670	404	2.1	3164	16.4
678	417	2.2	3581	18.5
685	482	2.5	4063	21.0
693	571	3.0	4634	24.0
700	522	2.7	5156	26.7
707	565	2.9	5721	29.6
714	605	3.1	6326	32.8
720	663	3.4	6989	36.2
727	710	3.7	7699	39.9
734	684	3.5	8383	43.4
740	722	3.7	9105	47.1
747	660	3.4	9765	50.6
753	693	3.6	10458	54.2
760	727	3.8	11185	57.9
767	733	3.8	11918	61.7
773	656	3.4	12574	65.1
780	672	3.5	13246	68.6
787	665	3.4	13911	72.0
794	630	3.3	14541	75.3
800	656	3.4	15197	78.7
807	651	3.4	15848	82.1
815	550	2.8	16398	84.9
823	528	2.7	16926	87.6
831	450	2.3	17376	90.0
840	448	2.3	17824	92.3
849	412	2.1	18236	94.4
861	325	1.7	18561	96.1
874	291	1.5	18852	97.6

Biology I Core A Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
891	181	0.9	19033	98.6
914	153	0.8	19186	99.4
950	79	0.4	19265	99.8
999	46	0.2	19311	100.0

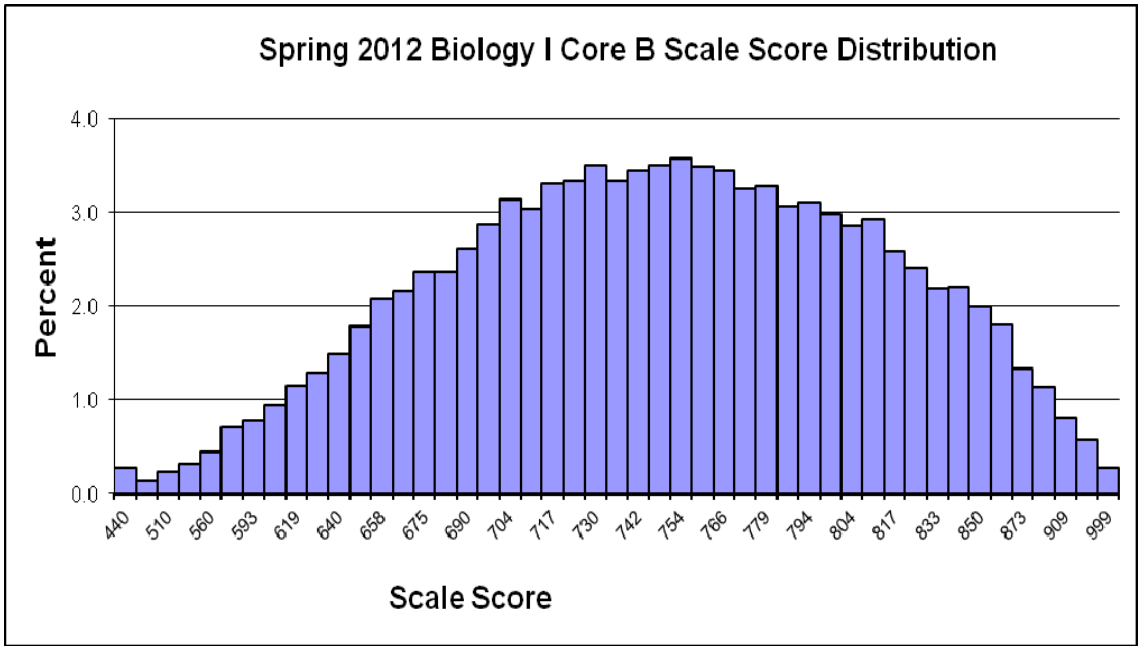


Biology I Core B Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	52	0.3	52	0.3
472	25	0.1	77	0.4
510	45	0.2	122	0.7
538	61	0.3	183	1.0
560	83	0.4	266	1.4
578	133	0.7	399	2.2
593	145	0.8	544	2.9
607	175	0.9	719	3.9
619	214	1.2	933	5.0
634	239	1.3	1172	6.3
640	277	1.5	1449	7.8
650	330	1.8	1779	9.6
658	385	2.1	2164	11.7
667	402	2.2	2566	13.8
675	439	2.4	3005	16.2
682	438	2.4	3443	18.6
690	486	2.6	3929	21.2
700	533	2.9	4462	24.1
704	582	3.1	5044	27.2
710	564	3.0	5608	30.2
717	612	3.3	6220	33.5
724	618	3.3	6838	36.9
730	651	3.5	7489	40.4
736	619	3.3	8108	43.7
742	640	3.4	8748	47.2
748	651	3.5	9399	50.7
754	664	3.6	10063	54.2
760	648	3.5	10711	57.7
766	640	3.4	11351	61.2
773	604	3.3	11955	64.4
779	608	3.3	12563	67.7
785	568	3.1	13131	70.8
794	577	3.1	13708	73.9
797	554	3.0	14262	76.9
804	530	2.9	14792	79.7
810	543	2.9	15335	82.7
817	480	2.6	15815	85.3
825	446	2.4	16261	87.7
833	408	2.2	16669	89.9
841	409	2.2	17078	92.1
850	370	2.0	17448	94.1
861	333	1.8	17781	95.8

Biology I Core B Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
873	248	1.3	18029	97.2
889	211	1.1	18240	98.3
909	150	0.8	18390	99.1
940	108	0.6	18498	99.7
999	53	0.3	18551	100.0

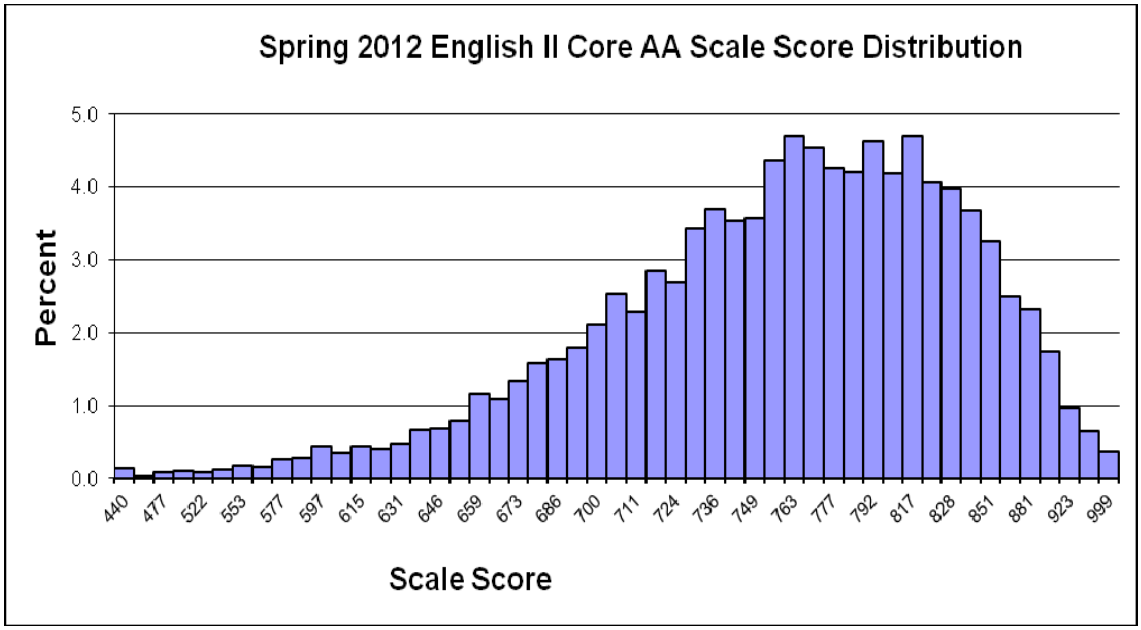


English II Core AA Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	15	0.1	15	0.1
444	4	0.0	19	0.2
477	9	0.1	28	0.3
502	10	0.1	38	0.4
522	9	0.1	47	0.5
538	12	0.1	59	0.6
553	19	0.2	78	0.7
566	16	0.2	94	0.9
577	27	0.3	121	1.2
588	29	0.3	150	1.4
597	46	0.4	196	1.9
609	36	0.3	232	2.2
615	45	0.4	277	2.7
623	42	0.4	319	3.1
631	49	0.5	368	3.5
638	69	0.7	437	4.2
646	72	0.7	509	4.9
653	82	0.8	591	5.7
659	120	1.2	711	6.8
666	114	1.1	825	7.9
673	139	1.3	964	9.2
679	164	1.6	1128	10.8
686	171	1.6	1299	12.5
692	186	1.8	1485	14.2
700	220	2.1	1705	16.4
705	264	2.5	1969	18.9
711	238	2.3	2207	21.2
717	297	2.8	2504	24.0
724	281	2.7	2785	26.7
730	357	3.4	3142	30.1
736	385	3.7	3527	33.8
743	369	3.5	3896	37.4
749	372	3.6	4268	40.9
756	455	4.4	4723	45.3
763	490	4.7	5213	50.0
770	473	4.5	5686	54.5
777	443	4.2	6129	58.8
784	439	4.2	6568	63.0
792	482	4.6	7050	67.6
800	437	4.2	7487	71.8
817	490	4.7	7977	76.5
818	423	4.1	8400	80.6

English II Core AA Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
828	414	4.0	8814	84.5
839	383	3.7	9197	88.2
851	339	3.3	9536	91.5
865	261	2.5	9797	94.0
881	241	2.3	10038	96.3
899	182	1.7	10220	98.0
923	101	1.0	10321	99.0
958	68	0.7	10389	99.6
999	38	0.4	10427	100.0

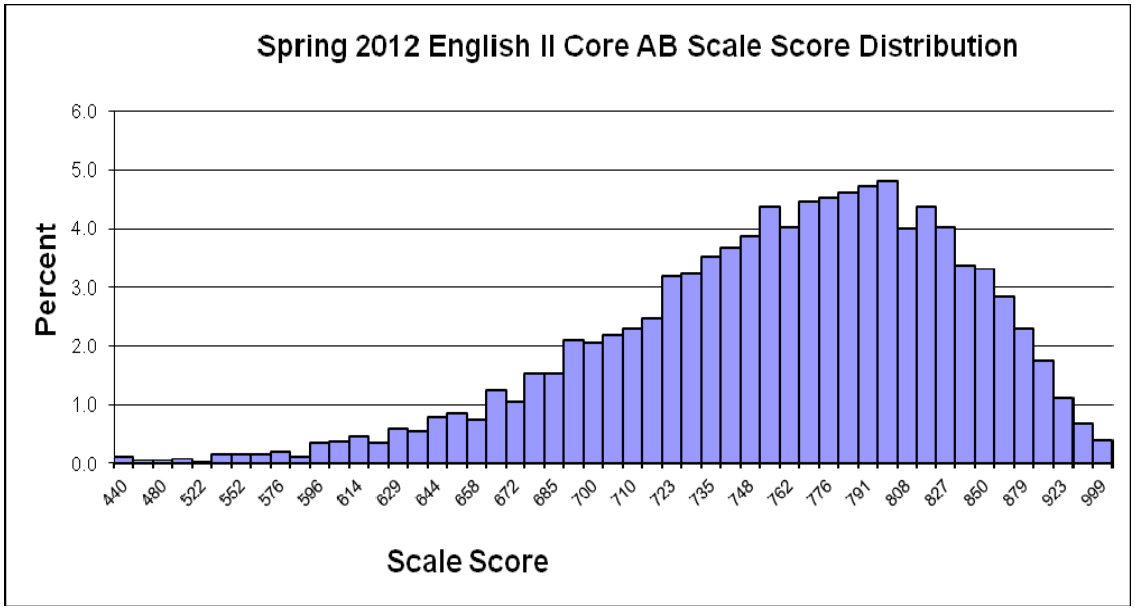


English II Core AB Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	12	0.1	12	0.1
451	6	0.1	18	0.2
480	6	0.1	24	0.2
503	8	0.1	32	0.3
522	2	0.0	34	0.3
538	18	0.2	52	0.5
552	18	0.2	70	0.7
565	18	0.2	88	0.8
576	21	0.2	109	1.0
586	14	0.1	123	1.2
596	37	0.4	160	1.5
609	40	0.4	200	1.9
614	48	0.5	248	2.4
622	36	0.3	284	2.7
629	62	0.6	346	3.3
637	57	0.5	403	3.9
644	84	0.8	487	4.7
651	90	0.9	577	5.5
658	79	0.8	656	6.3
665	130	1.3	786	7.6
672	109	1.0	895	8.6
678	159	1.5	1054	10.1
685	161	1.5	1215	11.7
691	219	2.1	1434	13.8
700	214	2.1	1648	15.8
704	229	2.2	1877	18.0
710	240	2.3	2117	20.4
716	257	2.5	2374	22.8
723	332	3.2	2706	26.0
729	336	3.2	3042	29.3
735	366	3.5	3408	32.8
742	382	3.7	3790	36.4
748	402	3.9	4192	40.3
755	455	4.4	4647	44.7
762	418	4.0	5065	48.7
768	464	4.5	5529	53.2
776	470	4.5	5999	57.7
783	478	4.6	6477	62.3
791	492	4.7	6969	67.0
799	500	4.8	7469	71.8
808	417	4.0	7886	75.8
817	454	4.4	8340	80.2

English II Core AB Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
827	419	4.0	8759	84.2
838	351	3.4	9110	87.6
850	344	3.3	9454	90.9
864	296	2.8	9750	93.8
879	240	2.3	9990	96.1
898	182	1.8	10172	97.8
923	116	1.1	10288	98.9
958	69	0.7	10357	99.6
999	42	0.4	10399	100.0

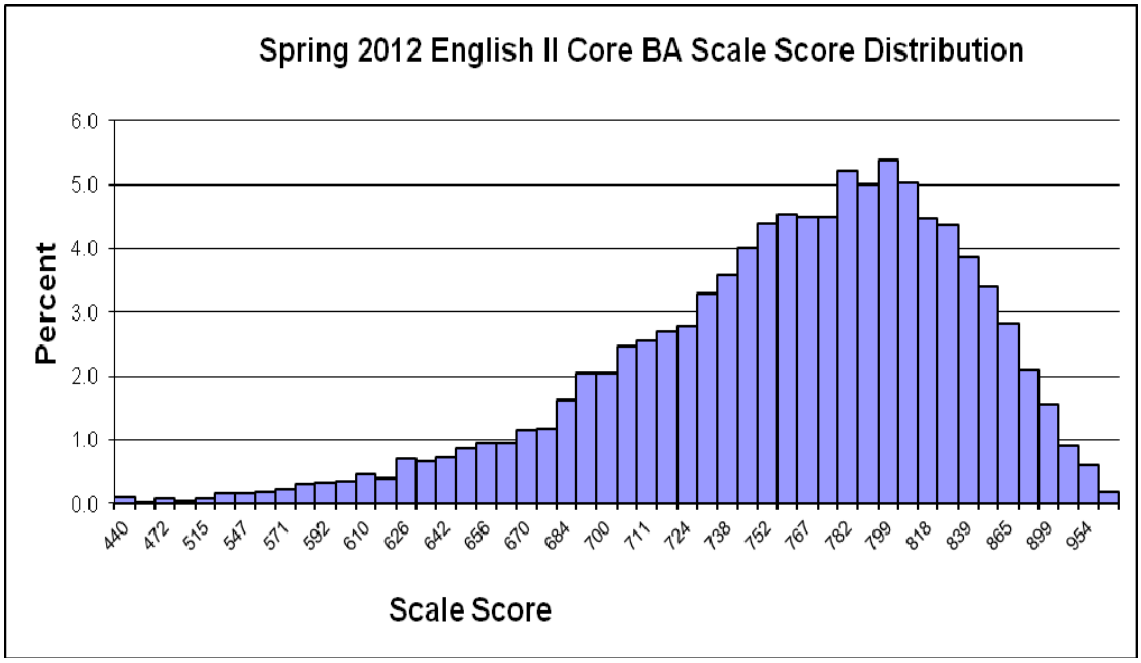


English II Core BA Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	8	0.1	8	0.1
442	1	0.0	9	0.1
472	6	0.1	15	0.2
496	3	0.0	18	0.2
515	7	0.1	25	0.3
532	12	0.2	37	0.5
547	13	0.2	50	0.7
560	15	0.2	65	0.8
571	18	0.2	83	1.1
582	24	0.3	107	1.4
592	25	0.3	132	1.7
609	27	0.4	159	2.1
610	35	0.5	194	2.5
618	31	0.4	225	2.9
626	55	0.7	280	3.7
634	51	0.7	331	4.3
642	56	0.7	387	5.1
649	66	0.9	453	5.9
656	72	0.9	525	6.9
663	72	0.9	597	7.8
670	89	1.2	686	9.0
677	91	1.2	777	10.1
684	124	1.6	901	11.8
690	157	2.0	1058	13.8
700	156	2.0	1214	15.8
704	189	2.5	1403	18.3
711	195	2.5	1598	20.9
717	207	2.7	1805	23.6
724	214	2.8	2019	26.4
731	252	3.3	2271	29.6
738	274	3.6	2545	33.2
745	307	4.0	2852	37.2
752	336	4.4	3188	41.6
759	347	4.5	3535	46.1
767	345	4.5	3880	50.6
775	344	4.5	4224	55.1
782	400	5.2	4624	60.4
791	383	5.0	5007	65.4
799	412	5.4	5419	70.7
817	384	5.0	5803	75.7
818	343	4.5	6146	80.2
828	334	4.4	6480	84.6

English II Core BA Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
839	295	3.9	6775	88.4
851	260	3.4	7035	91.8
865	216	2.8	7251	94.6
880	160	2.1	7411	96.7
899	120	1.6	7531	98.3
922	69	0.9	7600	99.2
954	46	0.6	7646	99.8
999	15	0.2	7661	100.0

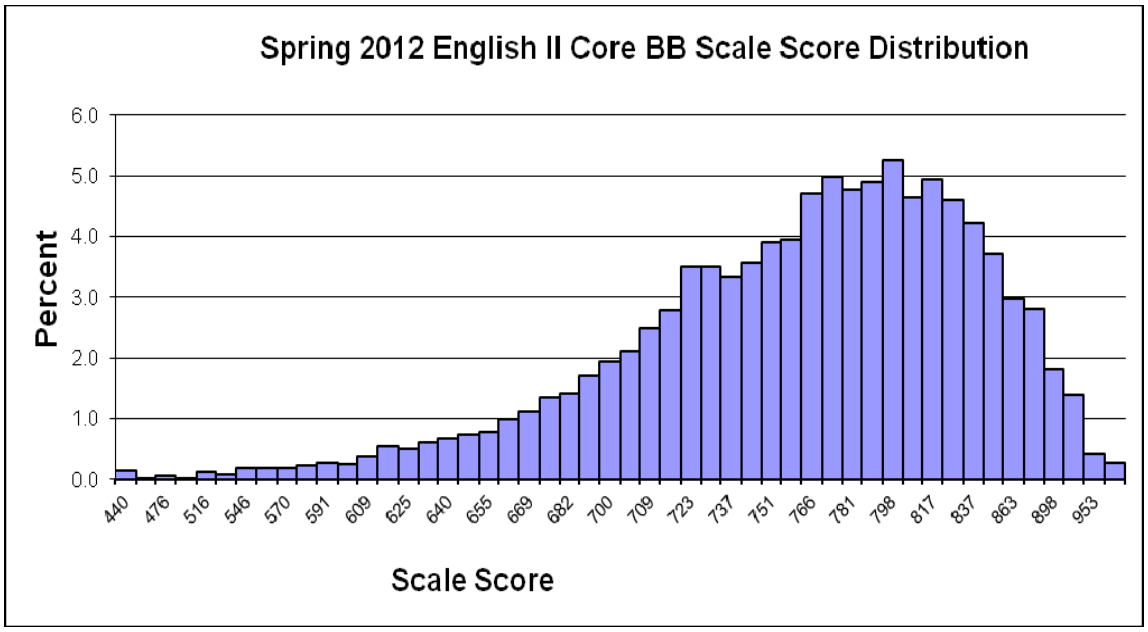


English II Core BB Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	11	0.1	11	0.1
449	2	0.0	13	0.2
476	4	0.1	17	0.2
498	1	0.0	18	0.2
516	10	0.1	28	0.4
532	6	0.1	34	0.4
546	14	0.2	48	0.6
559	14	0.2	62	0.8
570	14	0.2	76	1.0
581	17	0.2	93	1.2
591	21	0.3	114	1.5
600	20	0.3	134	1.7
609	30	0.4	164	2.1
617	42	0.5	206	2.7
625	39	0.5	245	3.2
633	47	0.6	292	3.8
640	52	0.7	344	4.4
647	57	0.7	401	5.2
655	60	0.8	461	6.0
662	77	1.0	538	6.9
669	87	1.1	625	8.1
675	105	1.4	730	9.4
682	110	1.4	840	10.8
689	132	1.7	972	12.5
700	150	1.9	1122	14.5
703	163	2.1	1285	16.6
709	192	2.5	1477	19.1
716	216	2.8	1693	21.9
723	272	3.5	1965	25.4
730	272	3.5	2237	28.9
737	258	3.3	2495	32.2
744	276	3.6	2771	35.8
751	303	3.9	3074	39.7
758	305	3.9	3379	43.6
766	364	4.7	3743	48.3
773	385	5.0	4128	53.3
781	369	4.8	4497	58.0
789	380	4.9	4877	63.0
798	407	5.3	5284	68.2
807	359	4.6	5643	72.8
817	382	4.9	6025	77.8
826	357	4.6	6382	82.4

English II Core BB Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
837	327	4.2	6709	86.6
850	288	3.7	6997	90.3
863	231	3.0	7228	93.3
879	217	2.8	7445	96.1
898	140	1.8	7585	97.9
921	108	1.4	7693	99.3
953	33	0.4	7726	99.7
999	21	0.3	7747	100.0

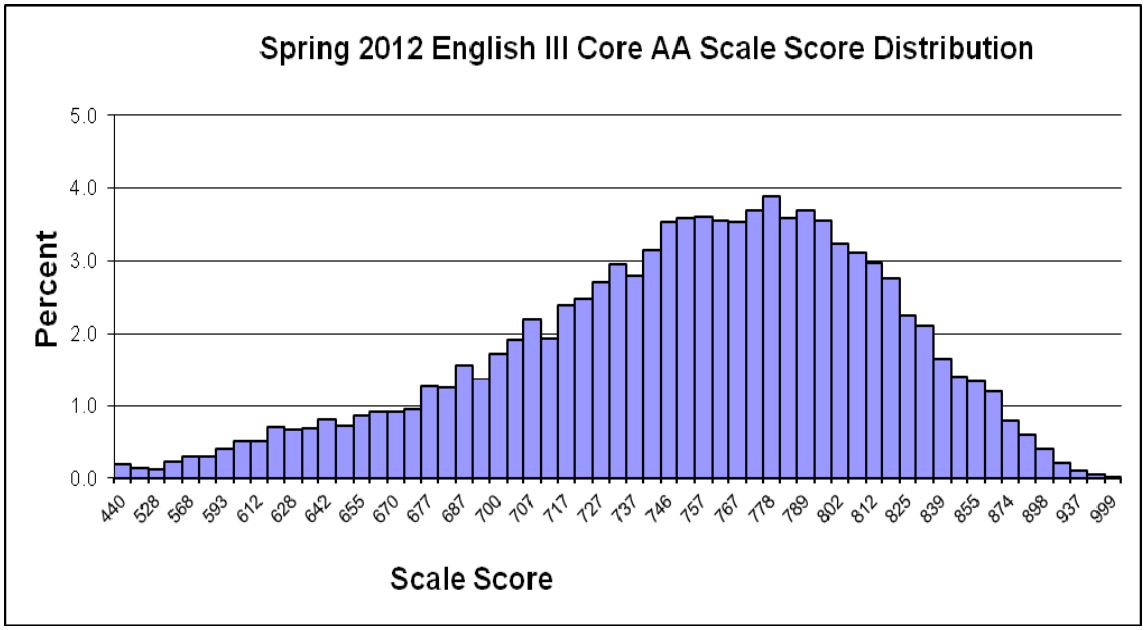


English III Core AA Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	18	0.2	18	0.2
496	14	0.1	32	0.3
528	12	0.1	44	0.4
551	23	0.2	67	0.7
568	29	0.3	96	1.0
581	29	0.3	125	1.3
593	39	0.4	164	1.7
603	50	0.5	214	2.2
612	50	0.5	264	2.7
621	69	0.7	333	3.4
628	65	0.7	398	4.0
635	68	0.7	466	4.7
642	80	0.8	546	5.5
649	71	0.7	617	6.3
655	84	0.9	701	7.1
661	90	0.9	791	8.0
670	90	0.9	881	8.9
672	93	0.9	974	9.9
677	125	1.3	1099	11.2
682	123	1.2	1222	12.4
687	154	1.6	1376	14.0
692	135	1.4	1511	15.3
700	170	1.7	1681	17.1
702	189	1.9	1870	19.0
707	217	2.2	2087	21.2
712	190	1.9	2277	23.1
717	236	2.4	2513	25.5
722	244	2.5	2757	28.0
727	267	2.7	3024	30.7
732	291	3.0	3315	33.7
737	276	2.8	3591	36.5
741	310	3.1	3901	39.6
746	348	3.5	4249	43.2
752	353	3.6	4602	46.7
757	354	3.6	4956	50.3
762	349	3.5	5305	53.9
767	348	3.5	5653	57.4
772	364	3.7	6017	61.1
778	383	3.9	6400	65.0
783	353	3.6	6753	68.6
789	364	3.7	7117	72.3

English III Core AA Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
794	349	3.5	7466	75.8
802	318	3.2	7784	79.1
806	306	3.1	8090	82.2
812	293	3.0	8383	85.1
819	271	2.8	8654	87.9
825	221	2.2	8875	90.1
832	207	2.1	9082	92.2
839	162	1.6	9244	93.9
847	138	1.4	9382	95.3
855	132	1.3	9514	96.6
864	118	1.2	9632	97.8
874	78	0.8	9710	98.6
885	58	0.6	9768	99.2
898	39	0.4	9807	99.6
915	20	0.2	9827	99.8
937	11	0.1	9838	99.9
971	5	0.1	9843	100.0
999	2	0.0	9845	100.0


Spring 2012 English III Core AA Scale Score Distribution
Percent
5.0
4.0
3.0
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440
528
568
593
612
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642
655
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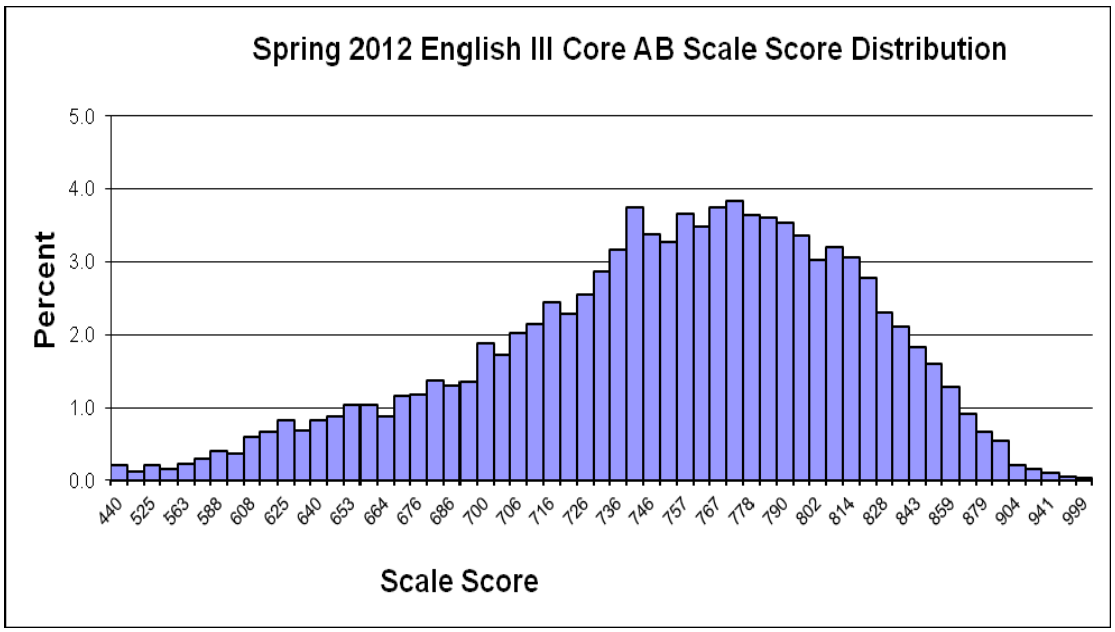
707
717
727
737
746
757
767
778
789
802
812
825
839
855
874
898
937
999
Scale Score

English III Core AB Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	21	0.2	21	0.2
494	11	0.1	32	0.3
525	21	0.2	53	0.5
546	16	0.2	69	0.7
563	22	0.2	91	0.9
576	28	0.3	119	1.2
588	39	0.4	158	1.6
599	36	0.4	194	2.0
608	58	0.6	252	2.6
617	64	0.7	316	3.3
625	80	0.8	396	4.1
633	66	0.7	462	4.8
640	80	0.8	542	5.6
646	86	0.9	628	6.5
653	101	1.0	729	7.5
659	101	1.0	830	8.5
664	85	0.9	915	9.4
670	112	1.2	1027	10.6
676	115	1.2	1142	11.8
681	133	1.4	1275	13.1
686	127	1.3	1402	14.4
691	132	1.4	1534	15.8
700	183	1.9	1717	17.7
701	168	1.7	1885	19.4
706	197	2.0	2082	21.4
711	208	2.1	2290	23.6
716	237	2.4	2527	26.0
721	222	2.3	2749	28.3
726	248	2.6	2997	30.8
731	278	2.9	3275	33.7
736	307	3.2	3582	36.9
741	364	3.7	3946	40.6
746	328	3.4	4274	44.0
752	318	3.3	4592	47.3
757	356	3.7	4948	50.9
762	338	3.5	5286	54.4
767	363	3.7	5649	58.1
773	373	3.8	6022	62.0
778	354	3.6	6376	65.6
784	350	3.6	6726	69.2
790	343	3.5	7069	72.8

English III Core AB Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
796	326	3.4	7395	76.1
802	294	3.0	7689	79.1
808	311	3.2	8000	82.3
814	298	3.1	8298	85.4
821	269	2.8	8567	88.2
828	224	2.3	8791	90.5
835	205	2.1	8996	92.6
843	178	1.8	9174	94.4
851	156	1.6	9330	96.0
859	125	1.3	9455	97.3
868	88	0.9	9543	98.2
879	65	0.7	9608	98.9
890	52	0.5	9660	99.4
904	21	0.2	9681	99.7
920	16	0.2	9697	99.8
941	10	0.1	9707	99.9
974	5	0.1	9712	100.0
999	3	0.0	9715	100.0

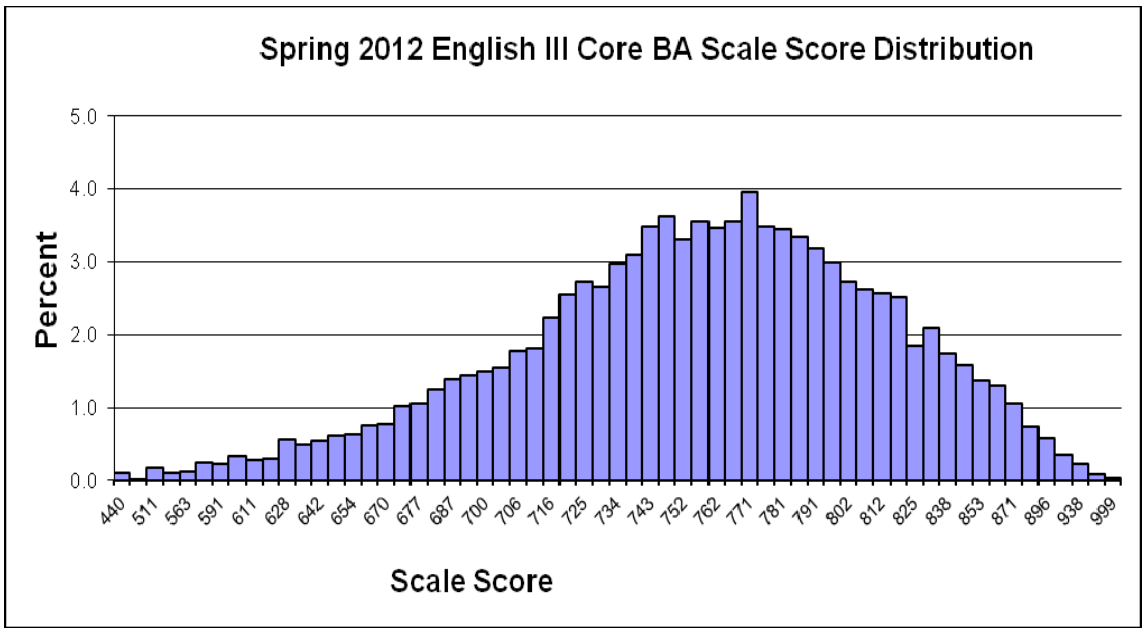

Spring 2012 English III Core AB Scale Score Distribution
Percent
5.0
4.0
3.0
2.0
1.0
0.0
440
525
563
588
608
625
640
653
664
676
686
700
706
716
726
736
746
757
767
778
790
802
814
828
843
859
879
904
941
999
Scale Score

English III Core BA Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	9	0.1	9	0.1
442	1	0.0	10	0.1
511	15	0.2	25	0.3
542	9	0.1	34	0.4
563	10	0.1	44	0.5
578	20	0.2	64	0.8
591	19	0.2	83	1.0
602	28	0.3	111	1.3
611	23	0.3	134	1.6
620	25	0.3	159	1.9
628	47	0.6	206	2.4
635	41	0.5	247	2.9
642	46	0.5	293	3.5
648	52	0.6	345	4.1
654	54	0.6	399	4.7
660	64	0.8	463	5.5
670	66	0.8	529	6.2
671	86	1.0	615	7.2
677	89	1.0	704	8.3
682	106	1.2	810	9.5
687	118	1.4	928	10.9
692	122	1.4	1050	12.4
700	127	1.5	1177	13.9
702	131	1.5	1308	15.4
706	151	1.8	1459	17.2
711	153	1.8	1612	19.0
716	190	2.2	1802	21.2
720	217	2.6	2019	23.8
725	232	2.7	2251	26.5
730	225	2.7	2476	29.2
734	252	3.0	2728	32.1
739	263	3.1	2991	35.2
743	295	3.5	3286	38.7
748	308	3.6	3594	42.3
752	281	3.3	3875	45.7
757	301	3.5	4176	49.2
762	294	3.5	4470	52.7
766	301	3.5	4771	56.2
771	336	4.0	5107	60.2
776	295	3.5	5402	63.6
781	292	3.4	5694	67.1

English III Core BA Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
786	284	3.3	5978	70.4
791	270	3.2	6248	73.6
796	253	3.0	6501	76.6
802	231	2.7	6732	79.3
807	222	2.6	6954	81.9
812	218	2.6	7172	84.5
818	214	2.5	7386	87.0
825	157	1.8	7543	88.9
831	178	2.1	7721	91.0
838	148	1.7	7869	92.7
845	134	1.6	8003	94.3
853	117	1.4	8120	95.7
861	110	1.3	8230	97.0
871	89	1.0	8319	98.0
882	62	0.7	8381	98.7
896	49	0.6	8430	99.3
913	29	0.3	8459	99.7
938	19	0.2	8478	99.9
984	7	0.1	8485	100.0
999	3	0.0	8488	100.0

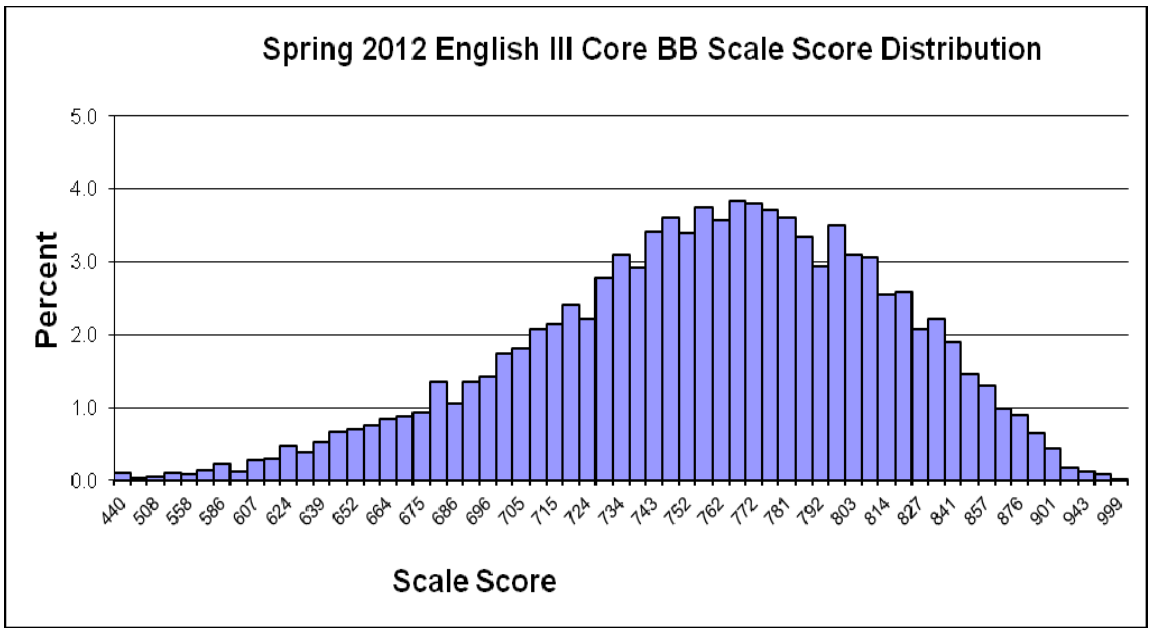

Spring 2012 English III Core BA Scale Score Distribution
Percent
5.0
4.0
3.0
2.0
1.0
0.0
440
511
563
591
611
628
642
654
670
677
687
700
706
716
725
734
743
752
762
771
781
791
802
812
825
838
853
871
896
938
999
Scale Score

English III Core BB Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	9	0.1	9	0.1
442	3	0.0	12	0.1
508	5	0.1	17	0.2
538	9	0.1	26	0.3
558	8	0.1	34	0.4
573	12	0.1	46	0.5
586	20	0.2	66	0.8
597	10	0.1	76	0.9
607	24	0.3	100	1.2
616	26	0.3	126	1.5
624	41	0.5	167	1.9
632	33	0.4	200	2.3
639	46	0.5	246	2.9
646	57	0.7	303	3.5
652	61	0.7	364	4.2
658	65	0.8	429	5.0
664	73	0.8	502	5.8
670	76	0.9	578	6.7
675	80	0.9	658	7.6
680	116	1.3	774	9.0
686	90	1.0	864	10.0
691	117	1.4	981	11.4
696	122	1.4	1103	12.8
700	150	1.7	1253	14.5
705	156	1.8	1409	16.4
710	178	2.1	1587	18.4
715	184	2.1	1771	20.6
720	208	2.4	1979	23.0
724	191	2.2	2170	25.2
729	239	2.8	2409	28.0
734	267	3.1	2676	31.1
738	251	2.9	2927	34.0
743	294	3.4	3221	37.4
748	311	3.6	3532	41.0
752	292	3.4	3824	44.4
757	322	3.7	4146	48.1
762	307	3.6	4453	51.7
767	330	3.8	4783	55.5
772	327	3.8	5110	59.3
776	319	3.7	5429	63.0
781	310	3.6	5739	66.6

English III Core BB Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
787	288	3.3	6027	70.0
792	253	2.9	6280	72.9
802	302	3.5	6582	76.4
803	266	3.1	6848	79.5
808	264	3.1	7112	82.5
814	220	2.6	7332	85.1
821	223	2.6	7555	87.7
827	179	2.1	7734	89.8
834	191	2.2	7925	92.0
841	163	1.9	8088	93.9
849	125	1.5	8213	95.3
857	112	1.3	8325	96.6
866	85	1.0	8410	97.6
876	77	0.9	8487	98.5
888	56	0.6	8543	99.2
901	38	0.4	8581	99.6
919	15	0.2	8596	99.8
943	11	0.1	8607	99.9
987	8	0.1	8615	100.0
999	1	0.0	8616	100.0

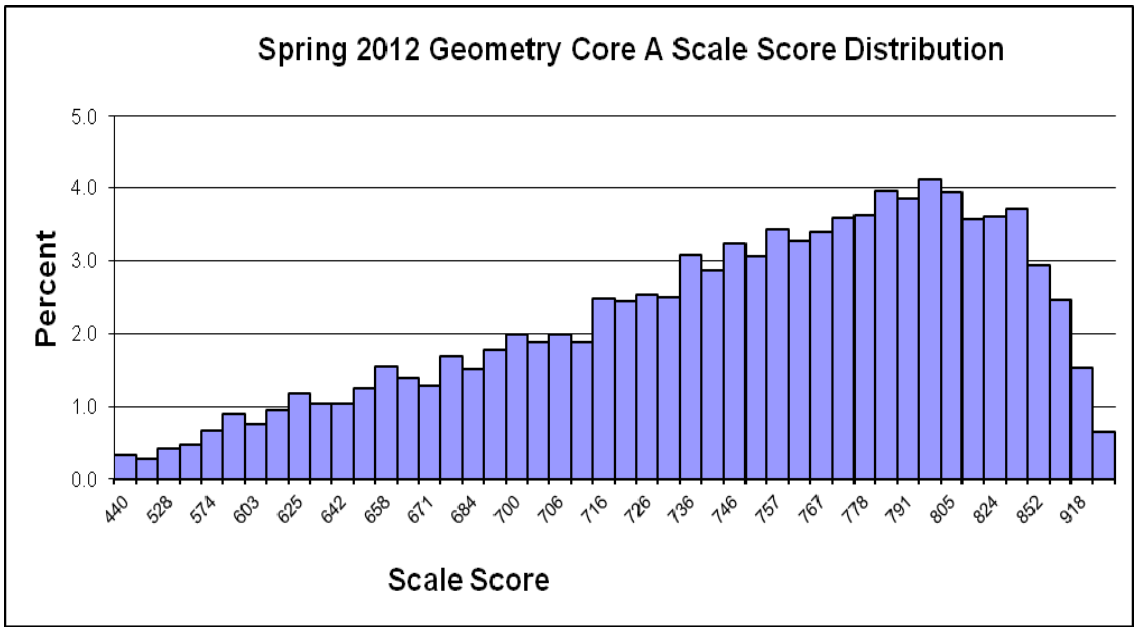

Spring 2012 English III Core BB Scale Score Distribution
Percent
5.0
4.0
3.0
2.0
1.0
0.0
440
508
558
586
607
624
639
652
664
675
686
696
705
715
724
734
743
752
762
772
781
792
803
814
827
841
857
876
901
943
999
Scale Score

Geometry Core A Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	65	0.3	65	0.3
487	55	0.3	120	0.6
528	80	0.4	200	1.0
555	91	0.5	291	1.5
574	128	0.7	419	2.2
590	173	0.9	592	3.1
603	146	0.8	738	3.8
615	184	1.0	922	4.8
625	226	1.2	1148	6.0
635	199	1.0	1347	7.0
642	199	1.0	1546	8.0
650	242	1.3	1788	9.3
658	298	1.5	2086	10.8
664	266	1.4	2352	12.2
671	247	1.3	2599	13.5
677	325	1.7	2924	15.2
684	292	1.5	3216	16.7
689	342	1.8	3558	18.5
700	382	2.0	3940	20.4
701	364	1.9	4304	22.3
706	382	2.0	4686	24.3
711	362	1.9	5048	26.2
716	478	2.5	5526	28.7
721	472	2.4	5998	31.1
726	489	2.5	6487	33.7
731	481	2.5	6968	36.1
736	592	3.1	7560	39.2
741	551	2.9	8111	42.1
746	623	3.2	8734	45.3
751	590	3.1	9324	48.4
757	662	3.4	9986	51.8
762	631	3.3	10617	55.1
767	654	3.4	11271	58.5
777	690	3.6	11961	62.1
778	698	3.6	12659	65.7
784	763	4.0	13422	69.6
791	742	3.8	14164	73.5
798	792	4.1	14956	77.6
805	759	3.9	15715	81.5
814	689	3.6	16404	85.1
824	696	3.6	17100	88.7
836	714	3.7	17814	92.4

Geometry Core A Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
852	567	2.9	18381	95.4
875	475	2.5	18856	97.8
918	295	1.5	19151	99.4
999	125	0.6	19276	100.0

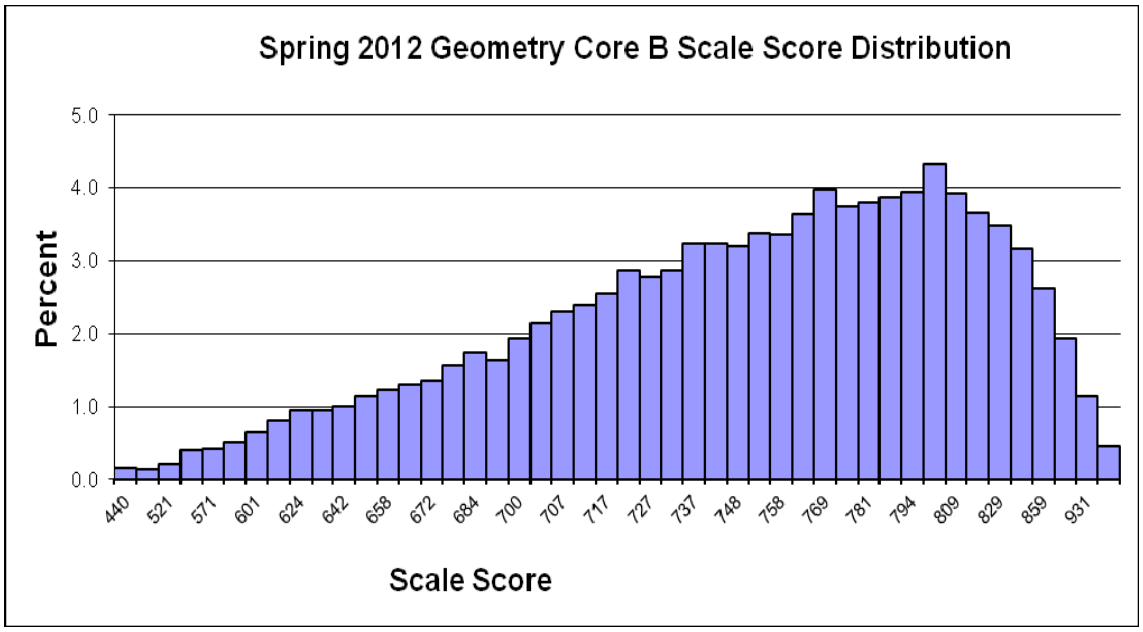


Geometry Core B Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	28	0.2	28	0.2
475	25	0.1	53	0.3
521	37	0.2	90	0.5
550	71	0.4	161	0.9
571	74	0.4	235	1.3
587	90	0.5	325	1.8
601	116	0.6	441	2.5
613	144	0.8	585	3.3
624	171	1.0	756	4.2
635	169	0.9	925	5.2
642	181	1.0	1106	6.2
650	205	1.1	1311	7.3
658	220	1.2	1531	8.5
665	233	1.3	1764	9.8
672	242	1.3	2006	11.2
678	280	1.6	2286	12.7
684	313	1.7	2599	14.5
690	292	1.6	2891	16.1
700	346	1.9	3237	18.0
701	386	2.2	3623	20.2
707	414	2.3	4037	22.5
712	430	2.4	4467	24.9
717	458	2.6	4925	27.4
722	515	2.9	5440	30.3
727	497	2.8	5937	33.1
732	514	2.9	6451	36.0
737	580	3.2	7031	39.2
743	581	3.2	7612	42.4
748	573	3.2	8185	45.6
753	607	3.4	8792	49.0
758	602	3.4	9394	52.4
763	653	3.6	10047	56.0
769	712	4.0	10759	60.0
777	671	3.7	11430	63.7
781	680	3.8	12110	67.5
787	695	3.9	12805	71.4
794	708	3.9	13513	75.3
801	776	4.3	14289	79.6
809	703	3.9	14992	83.5
818	656	3.7	15648	87.2
829	625	3.5	16273	90.7
842	567	3.2	16840	93.8

Geometry Core B Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
859	469	2.6	17309	96.5
884	348	1.9	17657	98.4
931	205	1.1	17862	99.5
999	82	0.5	17944	100.0

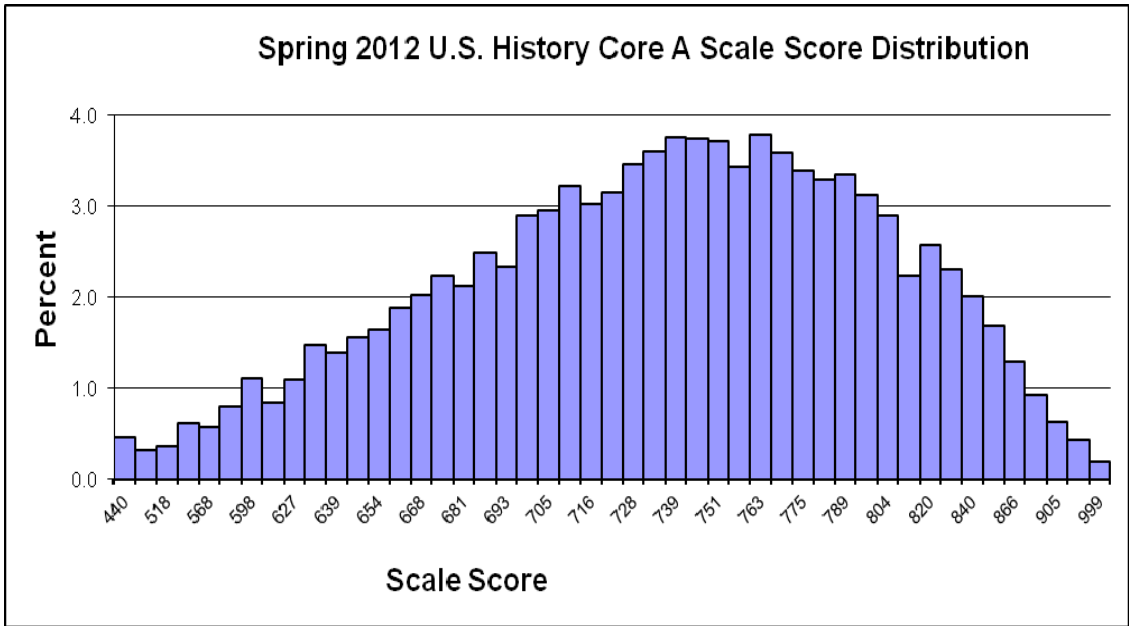


U.S. History Core A Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	80	0.5	80	0.5
475	55	0.3	135	0.8
518	64	0.4	199	1.2
547	106	0.6	305	1.8
568	99	0.6	404	2.3
584	139	0.8	543	3.1
598	191	1.1	734	4.3
610	145	0.8	879	5.1
627	188	1.1	1067	6.2
630	255	1.5	1322	7.7
639	239	1.4	1561	9.0
647	269	1.6	1830	10.6
654	283	1.6	2113	12.2
661	326	1.9	2439	14.1
668	349	2.0	2788	16.2
675	385	2.2	3173	18.4
681	366	2.1	3539	20.5
687	429	2.5	3968	23.0
693	404	2.3	4372	25.3
700	501	2.9	4873	28.2
705	509	2.9	5382	31.2
711	557	3.2	5939	34.4
716	523	3.0	6462	37.4
722	543	3.1	7005	40.6
728	598	3.5	7603	44.0
733	622	3.6	8225	47.7
739	649	3.8	8874	51.4
745	647	3.7	9521	55.2
751	641	3.7	10162	58.9
757	592	3.4	10754	62.3
763	653	3.8	11407	66.1
773	620	3.6	12027	69.7
775	584	3.4	12611	73.1
782	567	3.3	13178	76.3
789	579	3.4	13757	79.7
796	540	3.1	14297	82.8
804	499	2.9	14796	85.7
812	386	2.2	15182	88.0
820	444	2.6	15626	90.5
830	397	2.3	16023	92.8
840	346	2.0	16369	94.8
852	290	1.7	16659	96.5

U.S. History Core A Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
866	224	1.3	16883	97.8
883	161	0.9	17044	98.7
905	109	0.6	17153	99.4
938	74	0.4	17227	99.8
999	34	0.2	17261	100.0



U.S. History Core B Score Distribution for Spring 2012

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
440	98	0.6	98	0.6
473	55	0.3	153	0.9
519	61	0.4	214	1.3
548	81	0.5	295	1.8
569	103	0.6	398	2.4
586	114	0.7	512	3.1
600	146	0.9	658	3.9
612	160	1.0	818	4.9
627	192	1.1	1010	6.0
632	206	1.2	1216	7.2
641	220	1.3	1436	8.6
649	253	1.5	1689	10.1
656	265	1.6	1954	11.6
663	312	1.9	2266	13.5
670	327	1.9	2593	15.5
676	370	2.2	2963	17.7
682	371	2.2	3334	19.9
688	416	2.5	3750	22.4
694	414	2.5	4164	24.8
700	453	2.7	4617	27.5
705	479	2.9	5096	30.4
711	476	2.8	5572	33.2
716	477	2.8	6049	36.1
722	484	2.9	6533	38.9
727	496	3.0	7029	41.9
733	538	3.2	7567	45.1
738	565	3.4	8132	48.5
744	573	3.4	8705	51.9
750	569	3.4	9274	55.3
755	616	3.7	9890	59.0
761	570	3.4	10460	62.4
773	570	3.4	11030	65.8
774	596	3.6	11626	69.3
780	593	3.5	12219	72.8
787	586	3.5	12805	76.3
794	558	3.3	13363	79.7
801	515	3.1	13878	82.7
808	559	3.3	14437	86.1
816	459	2.7	14896	88.8
825	407	2.4	15303	91.2
835	370	2.2	15673	93.4
846	379	2.3	16052	95.7

U.S. History Core B Score Distribution for Spring 2012 (cont.)

Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
859	261	1.6	16313	97.3
876	219	1.3	16532	98.6
899	117	0.7	16649	99.3
934	82	0.5	16731	99.7
999	43	0.3	16774	100.0