

**SOUTH CAROLINA  
END-OF-COURSE EXAMINATION PROGRAM**

**2011–12 OPERATIONAL TEST TECHNICAL REPORT**



Issued by the  
**South Carolina Department of Education**

**Office of Assessment  
Division of Accountability**

**Mick Zais, Ph.D.  
State Superintendent of Education**

# CONTENTS

LIST OF TABLES .....	ii
CHAPTER 1. HISTORY AND OVERVIEW .....	1
CHAPTER 2. STUDENT DEMOGRAPHICS.....	3
2.1 Student Participation.....	3
2.2 Accommodations .....	4
2.3 Test Administration Time.....	5
2.4 Student Questionnaire.....	7
CHAPTER 3. TEST ADMINISTRATION .....	8
3.1 Test Administration Window.....	8
3.2 Timing of the Test.....	8
3.3 Administration Manuals.....	8
3.4 Customized Materials .....	9
3.5 Materials Shipping and Return .....	10
3.6 Test Security .....	10
CHAPTER 4. TECHNICAL CHARACTERISTICS OF ITEMS .....	12
4.1 Item Nonresponse Rates .....	12
4.2 Classical Item Statistics .....	13
CHAPTER 5. ITEM CALIBRATION AND SCALING .....	14
5.1 Methodology and Software.....	14
5.2 Item Calibration and Pre-Equating .....	14
5.3 Scaling.....	14
5.4 Definition of Scoreability .....	14
5.5 Reporting of Zero and Perfect Scores.....	14
5.6 Percentage of Students Scoring in Each Letter-Grade Equivalent .....	15
CHAPTER 6. DESCRIPTIVE STATISTICS.....	27
CHAPTER 7. RELIABILITY .....	29
7.1 Reliability of Raw Scores .....	29
7.2 Overall and Conditional SEM.....	29
7.3 Consistency of Passing Cut Scores.....	31
CHAPTER 8. VALIDITY .....	32
8.1 Item Distribution across Content Domains.....	32
8.2 Item Development.....	34
8.3 Differential Item Functioning .....	34
8.4 Correlations among Content Domains.....	37
WORKS CITED .....	41

## LIST OF TABLES

2.1	Summary of 2011–12 EOCEP Student Demographics .....	3
2.2	Standard Accommodations Used in 2011–12 EOCEP Testing .....	5
2.3	Percentages of Students by Testing-Time Intervals in 2011–12 EOCEP Testing (with Regular Forms) .....	6
2.4	Percentages of Students by Testing-Time Intervals in 2011–12 EOCEP Testing (with Customized Forms).....	7
3	2011–12 EOCEP Test Administration Windows .....	8
4	Summary of Classical Item Statistics .....	13
5.1	Algebra 1/Math Tech 2 Operational Test, Regular Schools: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics.....	15
5.2	Algebra 1/Math Tech 2 Operational Test, Adult Education Programs: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Subgroups .....	17
5.3	Biology Operational Test, Regular Schools: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	18
5.4	Biology Operational Test, Adult Education Programs: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	20
5.5	English 1 Operational Test, Regular Schools: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	21
5.6	English 1 Operational Test, Adult Education Programs: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	23
5.7	US History and Constitution Operational Test, Regular Schools: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	24
5.8	US History and Constitution Operational Test, Adult Education Programs: Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics .....	26

6	2011–12 EOCEP Test Administration Summary Statistics: Regular Schools and Adult Education Programs, Overall and by Gender, Race, and Accommodations .....	27
7.1	Reliability Coefficients of Raw Scores .....	29
7.2	2011–12 EOCEP Conditional Standard Errors of Measurement.....	30
7.3	2011–12 EOCEP Consistency Index for Passing Scores.....	31
8.1	Item Distribution by Content Domain for Algebra 1/Math Tech 2 .....	32
8.2	Item Distribution by Content Domain for Biology.....	33
8.3	Item Distribution by Content Domain for English 1 .....	33
8.4	Item Distribution by Content Domain for US History and Constitution.....	34
8.5	Summary of Differential Item Functioning for 2011–12 EOCEP Operational Items ....	36
8.6	Correlations among Domain Scores for Algebra 1/Math Tech 2 .....	37
8.7	Correlations among Domain Scores for Biology.....	38
8.8	Correlations among Domain Scores for English 1 .....	39
8.9	Correlations among Domain Scores for US History and Constitution.....	40

## CHAPTER 1

### HISTORY AND OVERVIEW

The South Carolina Education Accountability Act of 1998 requires the development of end-of-course examinations in gateway courses. All students enrolled in End-of-Course Examination Program (EOCEP) courses will take the tests for those courses: Algebra 1, Mathematics for the Technologies 2, English 1, Biology 1, Applied Biology 2, and U.S. History and the Constitution.

As they are enunciated in State Board of Education Regulation 43-262.4, the purposes and uses of the EOCEP tests are as follows:

- A. The tests shall promote instruction in the specific academic standards for the courses, encourage student achievement, and document the level of students' mastery of the curriculum standards.
- B. The tests shall serve as indicators of program, school, and school district effectiveness in the manner prescribed by the Education Oversight Committee in accordance with the provisions of the Education Accountability Act of 1998 (EAA).
- C. The tests shall be weighted 20 percent in the determination of students' final grades in the gateway courses.

EOCEP exams are reported on the basis of the South Carolina uniform grading scale (UGS). The score reported is a scale score and not the percentage of correct answers.

The Algebra 1/Mathematics for the Technologies 2 end-of-course examination was implemented in the baseline year 2002–03 and was operational for the first time in 2003–04. The English 1, Physical Science, and Biology 1/Applied Biology 2 examinations that were field-tested in May 2003 were implemented for the baseline year in 2003–04. These subject-area EOCEP examinations became operational in 2004–05. The Biology 1/Applied Biology 2 examination was discontinued after the 2005–06 school year. The State Board of Education reinstated the Biology test with a field test in 2008. Additional field testing was conducted in spring 2009. The 2009–10 school year was an implementation year for Biology. The first operational administration for Biology was fall 2010. The last administration of Physical Science was in spring 2011. The U.S. History and Constitution examination was field-tested in 2005–06, with baseline implementation in 2006–07 and a second implementation in 2007–08. The first operational administration was in 2008–09.

The South Carolina Department of Education (SCDE) awarded the contract for the development and scoring of the EOCEP tests in October 2001 to American Institutes for Research (AIR) and its partners Insite, Inc., and Pearson Educational Measurement (PEM). In spring 2007, Pearson became the sole contractor. In fall 2008, Data Recognition Corporation (DRC) took over administration, while Pearson remained the development contractor. These contractors have undertaken a number of development, review, implementation, and data analysis activities.

All EOCEP exams contain only multiple-choice items. Rasch-ability-score-to-scale-score conversion tables were produced prior to each test administration on the basis of the item

parameters in the pre-equated item pool. This technical report summarizes the results of statistical and psychometric analyses performed on the current year's operational data.

In this report, all data are based on the students in the regular schools and in adult education programs only. Data on students in district-approved homeschools have been excluded.

## CHAPTER 2

### STUDENT DEMOGRAPHICS

#### 2.1 STUDENT PARTICIPATION

All schools administered EOCEP tests to the students who completed courses for Algebra 1, Mathematics for the Technologies 2, Biology 1, Applied Biology 2, U.S. History and the Constitution, or English 1 for credit toward a high school diploma. Summary data are reported for operational tests only.

Demographic data were collected for each student. These data included the categories of gender, race/ethnicity, grade, English language fluency (LEP, limited English proficiency), lunch program participation, individualized education program (IEP) status, disability status, and migrant status. Table 2.1 presents the combined student participation in the three EOCEP administrations (fall, spring, and summer) by the demographic variables.

**Table 2.1**  
**Summary of Student Demographics in the Sample**

Demographics	Algebra 1/ Math Tech 2		Biology		English 1		US Hist. & Const.	
	N	%	N	%	N	%	N	%
<b>Overall</b>	57,534	100.00	55,939	100.00	55,885	100.00	47,661	100.00
<b>Gender</b>								
Female	27,981	48.63	27,542	49.24	27,369	48.97	23,905	50.16
Male	29,339	50.99	28,270	50.54	28,363	50.75	23,667	49.66
Unknown	214	0.37	127	0.23	153	0.27	89	0.19
<b>Grade</b>								
6	21	0.04	2	0.004	2	0.004	1	0.002
7	2,819	4.90	1	0.002	3	0.01	0	0.00
8	13,591	23.62	167	0.30	11,601	20.76	0	0.00
9	30,079	52.28	20,738	37.07	43,467	77.78	559	1.17
10	9,682	16.83	30,873	55.19	612	1.10	5,535	11.61
11	980	1.70	3,105	5.55	127	0.23	38,584	80.96
12	311	0.54	987	1.76	26	0.05	2,917	6.12
Adult education	28	0.05	48	0.09	32	0.06	60	0.13
Other	23	0.04	18	0.03	15	0.03	5	0.01
<b>Ethnicity</b>								
Hispanic or Latino	2,990	5.20	2,682	4.79	2,887	5.17	2,309	4.84
American Indian or Alaska Native	156	0.27	169	0.30	161	0.29	130	0.27
Asian	755	1.31	792	1.42	731	1.31	690	1.45
Black or African American	19,986	34.74	18,646	33.33	19,230	34.41	17,071	35.82
Native Hawaiian or Other Pacific Islander	73	0.13	77	0.14	71	0.13	68	0.14
White	31,764	55.21	31,927	57.07	31,115	55.68	25,944	54.43
Two or More Races	1,197	2.08	1,052	1.88	1,202	2.15	824	1.73
Other	613	1.07	594	1.06	488	0.87	625	1.31

Cont'd

**Table 2.1**  
**Summary of Student Demographics in the Sample**

<b>Language</b>								
Parent waiver	50	0.09	55	0.10	54	0.10	39	0.08
Pre-functional	197	0.34	141	0.25	149	0.27	79	0.17
Beginner	202	0.35	174	0.31	221	0.40	109	0.23
Intermediate	503	0.87	403	0.72	476	0.85	352	0.74
Advanced	1,139	1.98	1,013	1.81	1,097	1.96	670	1.41
Initially English Proficient	34	0.06	35	0.06	40	0.07	39	0.08
Title III First Year Exited	128	0.22	116	0.21	136	0.24	133	0.28
Title III Second + Year Exited	139	0.24	127	0.23	133	0.24	182	0.38
English Speaker I	368	0.64	318	0.57	324	0.58	355	0.74
English Speaker II	53,473	92.94	52,389	93.65	51,919	92.90	44,375	93.11
Other	1,301	2.26	1,168	2.09	1,336	2.39	1,328	2.79
<b>Lunch</b>								
Free meals	25,423	44.19	23,012	41.14	24,806	44.39	19,193	40.27
Reduced-price meals	3,901	6.78	3,732	6.67	3,801	6.80	3,097	6.50
No free/reduced-price meals	28,210	49.03	29,195	52.19	27,278	48.81	25,371	53.23
<b>IEP</b>								
Yes	4,986	8.67	5,235	9.36	5,196	9.30	3,634	7.62
No	52,548	91.33	50,704	90.64	50,689	90.70	44,027	92.38
<b>Migrant</b>								
Yes	11	0.02	5	0.01	8	0.01	8	0.02
No	57,523	99.98	55,934	99.99	55,877	99.99	47,653	99.98
<b>Gifted/talented</b>								
Academic	9,640	16.76	7,808	13.96	8,975	16.06	4,846	10.17
Artistic	1,023	1.78	1,001	1.79	1,095	1.96	938	1.97
Both	1,226	2.13	611	1.09	1,139	2.04	333	0.70
No	45,645	79.34	46,519	83.16	44,676	79.94	41,544	87.17
<b>504 plan</b>								
Yes	954	1.66	906	1.62	893	1.60	755	1.58
No	56,580	98.34	55,033	98.38	54,992	98.40	46,906	98.42
<b>Alternative school</b>								
Yes	980	1.70	868	1.55	978	1.75	618	1.30
No	56,554	98.30	55,071	98.45	54,907	98.25	47,043	98.70
<b>Accommodations</b>								
Yes	2,669	4.64	2,975	5.32	2,843	5.09	1,898	3.98
No	54,865	95.36	52,964	94.68	53,042	94.91	45,763	96.02

**Note:** Includes all students who attempted the test except: home school students.

## 2.2 ACCOMMODATIONS

Supplemental information regarding the administration of the EOCEP to students with disabilities is contained in the EOCEP Test Administration Manuals (SCDE 2011b and 2012b). These manuals provide guidelines for IEP teams in making decisions about testing students with disabilities and gives specific information regarding standard and non-standard testing accommodations, test forms and materials, and test administration procedures.

A student with a documented disability is one who has been evaluated and found to meet the eligibility criteria for enrollment in special education as defined by the 1997 amendments to the Individuals with Disabilities Education Act and by State Board of Education Regulation 43-243.1, or one who has a disability covered under Section 504 of the Rehabilitation Act of 1973. The IEP or 504 plan team determines how a student with disabilities participates in the EOCEP assessments. Decisions about standard and non-standard accommodations must be made on an individual student basis, not on the basis of the category of disability. Table 2.2 presents the percentages of standard accommodations used in the current year’s testing.

**Table 2.2**  
**Accommodations Used in 2011–12 EOCEP Testing**

Accommodations	Algebra 1/ Math Tech 2	Biology	English 1	US Hist. & Const.
	(N =57,508)	(N =55,919)	(N =55,860)	(N =47,655)
<b>Regular Form</b>				
Setting	3.97	4.42	4.31	3.34
Timing	0.19	0.19	0.21	0.14
Scheduling	0.10	0.12	0.10	0.06
Response options	2.71	3.39	2.97	2.44
Presentation	0.13	0.20	0.16	0.11
Supplemental Materials	0.20	0.22	0.13	0.14
<b>Customized Form</b>				
	(N =26)	(N =20)	(N =25)	(N =6)
Setting	80.77	75.00	80.00	83.33
Timing	69.23	35.00	48.00	33.33
Scheduling	73.08	25.00	56.00	50.00
Response options	80.77	80.00	72.00	83.33
Presentation	7.69	35.00	16.00	16.67
Supplemental Materials	46.15	60.00	56.00	33.33

**Note:** Includes all students who attempted the test except: home school students.

Total responses in each column may exceed 100 percent because some students received accommodations in more than one category.

### 2.3 TEST ADMINISTRATION TIME

In addition to providing their demographic information, students were asked to record on their answer documents the exact times that they started and finished the test. These answer documents were scanned, and the total elapsed time was calculated for each student. (It was not possible to calculate a total testing time for students with incomplete or invalid data.) A large majority of students finished the test within two hours, as tables 2.3 and 2.4 reflect.

**Table 2.3**  
**Percentages of Students by Testing-Time Intervals in 2011–12 EOCEP Testing**  
**(with Regular Forms)**

	Algebra 1/Math Tech 2			Biology		
	Fall 2011	Spring 2012	Summer 2012	Fall 2011	Spring 2012	Summer 2012
	(N =8,465)	(N =48,868)	(N =175)	(N =14,406)	(N =41,459)	(N =54)
Less than 15 min	0.07	0.07	0.57	0.08	0.14	--
15 min - 29 min	0.82	0.52	1.14	2.82	2.04	7.41
30 min - 44 min	5.48	3.09	7.43	20.18	15.95	24.07
45 min - 59 min	17.19	12.11	28.00	31.73	29.72	29.63
1 hr - 1 hr 14 min	26.34	22.55	26.86	22.48	25.58	20.37
1 hr 15 min - 1 hr 29 min	20.13	21.59	17.14	10.10	13.49	7.41
1 hr 30 min - 1 hr 44 min	12.01	15.58	9.71	4.94	6.29	3.70
1 hr 45 min - 1 hr 59 min	6.40	9.74	2.86	2.98	2.73	3.70
2 hr - 2 hr 14 min	3.87	5.75	1.71	1.42	1.50	3.70
2 hr 15 min - 2 hr 29 min	2.39	3.06	1.14	0.49	0.61	--
2 hr 30 min - 2 hr 44 min	1.62	1.75	0.57	0.47	0.27	--
2 hr 45 min - 2 hr 59 min	0.53	1.01	2.29	0.26	0.17	--
3 hr or more	0.76	1.64	--	0.17	0.32	--
Invalid*	2.39	1.54	0.57	1.87	1.19	--
	English 1			US History and Constitution		
	Fall 2011	Spring 2012	Summer 2012	Fall 2011	Spring 2012	Summer 2012
	(N =7,228)	(N =48,485)	(N =147)	(N =10,958)	(N =36,622)	(N =75)
Less than 15 min	0.04	0.04	--	0.12	0.10	--
15 min - 29 min	0.43	0.61	0.68	2.40	3.59	9.33
30 min - 44 min	2.67	5.30	7.48	16.86	21.60	41.33
45 min - 59 min	11.01	17.07	14.97	29.83	31.23	25.33
1 hr - 1 hr 14 min	23.17	24.81	19.05	24.90	22.21	18.67
1 hr 15 min - 1 hr 29 min	21.21	19.84	23.13	11.75	10.79	4.00
1 hr 30 min - 1 hr 44 min	16.19	12.91	18.37	5.31	4.60	1.33
1 hr 45 min - 1 hr 59 min	10.32	7.83	6.80	2.90	2.24	--
2 hr - 2 hr 14 min	5.82	4.60	6.12	1.78	1.13	--
2 hr 15 min - 2 hr 29 min	3.43	2.46	1.36	1.06	0.51	--
2 hr 30 min - 2 hr 44 min	1.52	1.36	--	0.36	0.25	--
2 hr 45 min - 2 hr 59 min	1.23	0.66	0.68	0.12	0.16	--
3 hr or more	1.30	0.99	0.68	0.21	0.20	--
Invalid*	1.65	1.53	0.68	2.41	1.39	--

\* includes responses with no mark or multiple marks on start and/or stop time fields, making it impossible to compute the difference between start and stop times

**Note:** Includes all students who attempted the test using a regular form **except:** home school students.

**Table 2.4**  
**Percentages of Students by Testing-Time Intervals in 2011–12 EOCEP Testing**  
**(with Customized Forms)**

	Algebra 1/Math Tech 2			Biology		
	Fall 2011 (N =3)	Spring 2012 (N =23)	Summer 2012 (N =0)	Fall 2011 (N =2)	Spring 2012 (N =18)	Summer 2012 (N =0)
Less than 15 min	--	--	--	--	--	--
15 min - 29 min	--	--	--	--	--	--
30 min - 44 min	--	--	--	--	--	--
45 min - 59 min	--	4.35	--	--	--	--
1 hr - 1 hr 14 min	--	4.35	--	--	11.11	--
1 hr 15 min - 1 hr 29 min	--	4.35	--	--	--	--
1 hr 30 min - 1 hr 44 min	--	--	--	--	11.11	--
1 hr 45 min - 1 hr 59 min	--	4.35	--	--	22.22	--
2 hr - 2 hr 14 min	33.33	--	--	50.00	16.67	--
2 hr 15 min - 2 hr 29 min	33.33	--	--	--	5.56	--
2 hr 30 min - 2 hr 44 min	--	4.35	--	--	--	--
2 hr 45 min - 2 hr 59 min	--	8.70	--	50.00	5.56	--
3 hr or more	33.33	60.87	--	--	27.78	--
Invalid*	--	8.70	--	--	--	--
	English 1			US History and Constitution		
	Fall 2011 (N =2)	Spring 2012 (N =23)	Summer 2012 (N =0)	Fall 2011 (N =1)	Spring 2012 (N =5)	Summer 2012 (N =0)
Less than 15 min	--	--	--	--	--	--
15 min - 29 min	--	--	--	--	--	--
30 min - 44 min	--	--	--	--	--	--
45 min - 59 min	--	--	--	--	--	--
1 hr - 1 hr 14 min	--	4.35	--	--	--	--
1 hr 15 min - 1 hr 29 min	100.00	--	--	--	--	--
1 hr 30 min - 1 hr 44 min	--	--	--	--	20.00	--
1 hr 45 min - 1 hr 59 min	--	13.04	--	--	20.00	--
2 hr - 2 hr 14 min	--	21.74	--	--	--	--
2 hr 15 min - 2 hr 29 min	--	--	--	--	--	--
2 hr 30 min - 2 hr 44 min	--	13.04	--	100.00	20.00	--
2 hr 45 min - 2 hr 59 min	--	8.70	--	--	--	--
3 hr or more	--	39.13	--	--	20.00	--
Invalid*	--	--	--	--	20.00	--

\* includes responses with no mark or multiple marks on start and/or stop time fields, making it impossible to compute the difference between start and stop times

**Note:** Includes all students who attempted the test using a regular form **except:** home school students.

## 2.4 STUDENT QUESTIONNAIRE

After the administration of the EOCEP test in biology, students were instructed to complete a questionnaire that addressed such topics as the difficulty of the test, the nature of the instruction they had received in the particular course, their use of calculators in a particular course (algebra questionnaire only), and the amount of time they had spent engaged in lab activities in the particular course (biology questionnaire only). The only student questionnaire administered during 2011-12 was the biology questionnaire in Spring 2012.

## CHAPTER 3

### TEST ADMINISTRATION

#### 3.1 TEST ADMINISTRATION WINDOW

The test administration dates for the current year are given in Table 3, below. School districts were required to administer all EOCEP tests within a single five-day period. Districts were instructed to administer makeup tests following their regular testing period. For all three EOCEP administrations, district test coordinators (DTCs) were responsible for providing the testing schedule to all school test coordinators (STCs) in their particular districts.

For students who missed the originally scheduled EOCEP test due to a death in the family, illness, or another situation deemed valid by the state, school districts were required to have a five-day makeup period the week immediately following the original test administration. It was recommended that a single makeup test be given per day, but two could have been given per day if necessary. Districts were also allowed five additional days to schedule and complete testing for students who tested online.

**TABLE 3**  
**2011–12 EOCEP Test Administration Windows**

<b>Administration</b>	<b>Dates</b>
Fall 2011	December 1 – January 31
Spring 2012	May 1 – June 14
Summer 2012	July 2 – July 31

#### 3.2 TIMING OF THE TEST

The EOCEP tests were not timed; however, each session had to be administered during a single day (unless a student’s IEP or 504 plan specifically stated that he or she needed to have the test administered over several days). To ensure an accurate assessment, districts and schools were instructed that students should be given as much uninterrupted time as they needed to complete the test.

#### 3.3 ADMINISTRATION MANUALS

Working with the SCDE, DRC staff drafted the administration manuals for the test. SCDE staff reviewed and revised the manuals, and DRC finalized and printed them. The EOCEP district test coordinator supplements (SCDE 2011a, 2012a, and 2012c) were produced for each administration of the EOCEP. The DTC supplements included only the information that DTCs needed for the administration of the EOCEP tests. Test Administration Manuals (TAMs) (2011b and 2012b) were provided each fall and spring administration; the spring TAM is also used for

general reference each summer. The TAMs contained the information that STCs, test administrators (TAs), and monitors needed to administer the tests to students in their schools.

The TAMs and the supplements included logistical and administration procedures as well as the directions (scripts) for administering the tests. The DTCs, STCs, and TAs were encouraged to use a form provided in the manuals to offer comments and suggestions on the procedures therein. The comments were provided to the SCDE to review and to use as the basis for potential changes in test procedures.

Appendix C in the TAMs includes a detailed description of customized materials available, as well as additional graphics for completing student demographic information and returning scorable and nonscorable test materials. Tables showing the types of customized materials available for students who require such special testing formats were also provided.

### **3.4 CUSTOMIZED MATERIALS**

Customized formats of the EOCEP test were available for Algebra 1/Mathematics for the Technologies 2, Biology 1/Applied Biology 2, English 1, and United States History and the Constitution:

- Loose-leaf test booklets—printed single-sided, one item to a page, and bound in three-ring binders—allowed individuals to remove the pages, if necessary, during testing.
- Large-print booklets were produced for students who have difficulty reading text in a standard-size font. The large-print version used an 18-point sans serif font and was issued as a 9 x 12-inch spiral-bound booklet.
- Braille booklets were produced for students who typically read classroom materials in braille. The braille version was issued as spiral-bound booklets containing 11½ x 11-inch interpoint braille pages.
- A regular print Form C test booklet was provided in test packets for students or TAs to use with customized formats such as the braille oral script, braille, large-print, loose-leaf, and sign language versions. These booklets were saddle-stitched and printed in a 12-point font, just as the regular, noncustomized test booklets were.
- For students whose IEP or 504 plan requires the oral administration of tests, oral administration scripts gave specific directions to TAs regarding the appropriate way to read the test questions, the passages on which the questions were based, and the answer choices.

Beginning in spring 2005, audiocassettes were also produced to be used in the oral administration of the tests. These audiocassettes contained the directions for administering the tests, the passages that were the basis of the questions, the test questions, and the answer choices. The audiocassettes and the oral administration scripts contained the same information. In fall 2008, CD-ROMs replaced audiocassettes.

- Sign language videotapes included the signed test directions, questions, and response options, all in sign language. The videotapes were produced in two languages: American Sign Language and Pidgin Signed English. In spring 2010, DVDs replaced videotapes.

### 3.5 MATERIALS SHIPPING AND RETURN

For all three administrations, test materials were shipped to district offices approximately two weeks before testing—in time for the DTCs to be able to distribute school materials at least one week before the schools' test dates. Each school's shipment was boxed individually and labeled with the total number of boxes shipped to that school.

The district office was also sent a shipment of noncustomized overage materials, which were to be used by the DTCs to complete any additional materials requests from the STCs. Materials in customized formats were sent only to the schools and only in the quantities ordered.

TAs were instructed to return their test materials to the STCs immediately after the test administration. The STCs then redistributed test materials to the TAs who needed them in order to administer makeup tests. Those TAs were instructed to return the makeup test materials to their STC immediately after the makeup session. DTCs were to arrange for the pickup of all scorable materials for return to DRC within three days after testing.

Because the test scores were required to be reported back to the schools quickly for calculating final course grades, a rapid scoring and reporting process was utilized for all three administrations. Each school district could return the scorable materials to DRC, in as many as five separate shipments, as they arrived from the schools. Nonscorable materials were to be returned in one shipment within three days of the completion of makeup tests. For all three administrations, step-by-step instructions for returning scorable and nonscorable materials were included in the DTC Supplement. These instructions listed the toll-free phone numbers of the trucking companies that the DTCs were instructed to call to schedule pickups of return materials

### 3.6 TEST SECURITY

Test security is an important issue before, during, and following test administrations. The specific procedures to be followed during the EOCEP test administrations are outlined in the *Test Administration Manual* (2011b and 2012b). Reprinted in the manual are an excerpt from Section 59-1-445 of the South Carolina Code of Laws, a summary of Section 59-1-447 of the Code of Laws, and the entirety of State Board of Education Regulation 43-100.

Section 59-1-445 states in part:

It is unlawful for anyone knowingly and wilfully [*sic*] to violate security procedures regulations promulgated by the State Board of Education for mandatory tests administered by or through the State Board of Education to students or educators, or knowingly and willfully to:

- (a) Give examinees access to test questions prior to testing;
- (b) Copy, reproduce, or use in any manner inconsistent with test security regulations all or any portion of any secure test booklet;
- (c) Coach examinees during testing or alter or interfere with examinees' responses in any way;
- (d) Make answer keys available to examinees;

- (e) Fail to follow security regulations for distribution and return of secure test [materials] as directed, or fail to account for all secure test materials before, during, and after testing;
- (f) Participate in, direct, aid, counsel, assist in, encourage, or fail to report any of the acts prohibited in this section.

Regulation 43-100 mandates that “Each local school board must develop and adopt a district test security policy” with procedures for the storage and handling of all test materials and that each district superintendent must annually designate a DTC. The regulation and the *TAM* provide specific security guidelines regarding various aspects of the test administration process (e.g., the storage and handling of test materials, the responsibility of administrators to monitor students during testing and to remove supplemental materials from the testing room, and the requirement that administrators refrain from interference with student responses).

Following the test administration and the return of materials, DRC generated a missing-document report, listing the identification numbers of unreturned secure materials. The report was used to notify districts of missing materials. A toll-free telephone line was manned to answer questions regarding missing documents, and follow-up procedures were employed until all materials were accounted for. Subsequently, the districts located and returned the materials or sent signed statements indicating that all secure materials had been returned.

### **Secure Materials**

Secure materials—each assigned a human- and machine-readable security identification number—are test booklets, answer documents (human-readable only in fall 2011), customized test materials, and administration scripts. Secure materials are locked in storage until the day of the test administration and are signed out when they are to be used, and signed in when they are returned. These materials are not to be left unattended at any time.

## CHAPTER 4

### TECHNICAL CHARACTERISTICS OF ITEMS

This chapter reports the results of item analyses based on classical test theory (CTT) using a proprietary program designed by DRC. Item difficulty ( $p$ ) is the proportion (or percentage) of examinees correctly answering a dichotomously scored item.

Item discrimination is defined as a correlation between the item score and the total score. For the discrimination index, point-biserial correlations were produced. In computing the point-biserial correlation, DRC corrected for spuriousness. In the recoding of missing data for item analysis, all omitted and not-reached items were recoded as incorrect, with a zero score. After discussions between the SCDE and DRC, it was decided to exclude from the CTT item analyses and item calibrations those students who had used customized test materials.

#### 4.1 ITEM NONRESPONSE RATES

Although the EOCEP tests were not timed, students were required to finish each test during one school day, unless they had an IEP that allowed for accommodations in administration. Districts and schools were instructed that, if they had space and staff available, students should be given as much uninterrupted time as necessary to take the test to ensure an accurate assessment.

The item nonresponse rates indicate the percentage of students who did not reach a particular item and all items thereafter. The item omit rates indicate the percentage of students who did not respond to that particular item but did respond to a later item. The percentages for not-reached and omit rates were quite low—less than 1 percent—in all subjects. These data indicate that students were given ample time to complete the test in every subject.

## 4.2 CLASSICAL ITEM STATISTICS

Table 4 provides a summary of item  $p$ -values and item discrimination values for operational items for all three administrations.

**Table 4**  
**Summary of Classical Item Statistics**

<b>Administration</b>	<b>Number of items</b>	<b>Mean <math>p</math>-value</b>	<b>Adjusted Point-Biserial Correlation</b>
<b>Algebra 1/Math Tech 2</b>			
Fall 2011	50	0.537	0.318
Spring 2012	50	0.611	0.372
Summer 2012	50	0.487	0.247
<b>Biology</b>			
Fall 2011	60	0.589	0.372
Spring 2012	60	0.611	0.359
Summer 2012	60	0.547	0.338
<b>English 1</b>			
Fall 2011	55	0.669	0.350
Spring 2012	55	0.711	0.355
Summer 2012	55	0.583	0.327
<b>US History and Constitution</b>			
Fall 2011	55	0.502	0.320
Spring 2012	55	0.538	0.346
Summer 2012	55	0.455	0.286

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

## CHAPTER 5

### ITEM CALIBRATION AND SCALING

#### 5.1 METHODOLOGY AND SOFTWARE

The one-parameter Rasch model (Rasch 1960; Wright and Stone 1979) was used to calibrate all items, using WINSTEPS software (see Linacre and Wright 2003). The WINSTEPS program employs joint maximum likelihood estimation, an approach that estimates the item and person parameters simultaneously.

#### 5.2 ITEM CALIBRATION AND PRE-EQUATING

The AIR conducted field tests with a sufficient number of items to create precalibrated item pools and to construct pre-equated operational-test forms for all tests. For all subjects, the Rasch-ability-score-to-scale-score conversion tables were produced prior to each test administration based on the item parameters in the pre-equated item pools. If an item or items on a test form had to be replaced, SCDE staff recalibrated the forms, producing new conversion tables.

#### 5.3 SCALING

The SCDE provided DRC with initial Rasch-ability-score-to-scale-score conversion tables that showed the transformation of the ability score interval for each scale score for each subject area. DRC then applied these tables specifically to each test form for each subject area on the basis of the pre-equated item pool. The conversion tables took into account any differences in the difficulty of the various forms. All items shared a common metric so that the scale scores developed for each form were automatically adjusted for differences in item difficulty. For all EOCEP test subjects, the scale scores are now reported according to the South Carolina UGS. Scale scores range from 0 to 100 with a minimum passing score of 70. Each scale score is assigned a letter-grade equivalent (A, B, C, D, or F) in accordance with the UGS.

#### 5.4 DEFINITION OF SCOREABILITY

A student was considered “tested” if the student answered at least one question on the answer document or by means of the online testing system. All tested students’ item responses were scored. All omits and not-reached items were recoded as incorrect, with a zero score.

#### 5.5 REPORTING OF ZERO AND PERFECT SCORES

In item response theory (IRT), zero and perfect scores are assigned the ability of minus and plus infinity. The AIR used the WINSTEPS default setting in estimating finite values for the extreme scores. In other words, a fractional score point value was subtracted from perfect scores, and was added to zero scores. The WINSTEPS default value for adjusting the extreme scores for extreme measures is 0.3. This value was also used by SCDE staff when recalibrating forms.

## 5.6 PERCENTAGE OF STUDENTS SCORING IN EACH LETTER-GRADE EQUIVALENT

Tables 5.1 through 5.8 report student performance for all administrations combined. The results are summarized separately for regular schools and for adult education programs. The number and percentage of students in each letter-grade equivalent and the mean scale score are reported for the test-takers overall and by demographic category.

**Table 5.1**  
**Algebra 1/Math Tech 2 Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

Demographics	N	Mean Scale Score	A	B	C	D	F
<b>Overall</b>	57,506	81.07	19.99	19.49	22.56	19.72	18.24
<b>Gender</b>							
Female	27,968	81.43	20.24	19.84	23.29	19.92	16.70
Male	29,324	80.80	19.86	19.25	21.95	19.50	19.44
Unknown	214	70.14	4.67	7.48	10.75	22.90	54.21
<b>Grade</b>							
6	21	97.67	85.71	9.52	4.76	--	--
7	2,819	94.92	70.20	19.44	7.66	2.02	0.67
8	13,591	90.00	44.89	28.53	16.45	6.91	3.22
9	30,079	78.39	10.23	18.90	26.40	23.13	21.34
10	9,682	73.63	2.55	9.60	23.47	31.61	32.78
11	980	74.19	4.39	12.04	23.78	25.20	34.59
12	311	76.60	9.00	15.11	22.83	24.44	28.62
Other	23	73.04	8.70	13.04	17.39	8.70	52.17
<b>Ethnicity</b>							
Hispanic or Latino	2,988	80.44	17.07	19.08	24.30	20.95	18.61
American Indian or Alaska Native	156	80.31	13.46	23.08	24.36	22.44	16.67
Asian	755	89.26	47.28	21.99	14.83	8.74	7.15
Black or African American	19,969	75.56	6.56	13.68	23.32	26.80	29.66
Native Hawaiian or Other Pacific Islander	73	83.84	26.03	26.03	17.81	17.81	12.33
White	31,761	84.51	28.31	23.28	22.18	15.26	10.96
Two or More Races	1,197	82.24	21.55	20.05	23.89	20.47	14.04
Other	607	72.21	4.94	8.73	15.82	25.54	44.98
<b>Language</b>							
Parent waiver	50	78.52	16.00	14.00	18.00	28.00	24.00
Pre-functional	197	68.80	2.03	4.06	15.23	19.29	59.39
Beginner	202	72.74	6.93	8.42	13.86	26.24	44.55
Intermediate	503	75.87	6.36	14.12	23.26	27.83	28.43
Advanced	1,139	82.62	19.14	22.21	27.57	21.51	9.57
Initially English Proficient	34	82.18	35.29	11.76	14.71	14.71	23.53
Title III First Year Exited	128	87.91	39.84	23.44	22.66	7.03	7.03
Title III Second + Year Exited	139	90.45	49.64	23.74	14.39	9.35	2.88
English Speaker I	368	90.38	48.91	25.00	13.59	8.42	4.08
English Speaker II	53,473	81.25	20.24	19.75	22.74	19.63	17.64
Other	1,273	72.95	6.52	10.68	16.58	23.02	43.21

**Table 5.1**  
**Algebra 1/Math Tech 2 Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

Demographics	N	Mean Scale Score	A	B	C	D	F
<b>Lunch</b>							
Free meals	25,418	76.81	9.32	15.30	23.32	24.96	27.10
Reduced-price meals	3,901	80.77	15.92	21.53	25.10	21.28	16.18
No free/reduced-price meals	28,187	84.94	30.18	22.99	21.52	14.77	10.54
<b>IEP</b>							
Yes	4,982	70.78	2.91	6.76	15.60	25.73	49.00
No	52,524	82.04	21.61	20.70	23.22	19.15	15.32
<b>Migrant</b>							
Yes	11	75.45	9.09	--	36.36	27.27	27.27
No	57,495	81.07	19.99	19.50	22.56	19.71	18.24
<b>Courses taken</b>							
4211 (Alg 1)	47,450	82.58	23.67	21.49	22.32	17.23	15.29
3142 (Math for the Techs 2)	10,047	73.91	2.64	10.10	23.71	31.44	32.11
Other	9	63.00	--	--	--	11.11	88.89
<b>Gifted/talented</b>							
Academic	9,640	93.27	60.30	25.20	10.43	3.23	0.85
Artistic	1,023	83.83	21.51	27.66	25.61	15.93	9.29
Both	1,226	95.05	69.49	21.04	7.01	1.79	0.65
No	45,617	78.05	10.11	18.06	25.47	23.77	22.59
<b>504 plan</b>							
Yes	954	79.73	14.68	19.08	24.53	22.54	19.18
No	56,552	81.09	20.08	19.50	22.53	19.67	18.22
<b>Alternative school</b>							
Yes	980	69.56	1.63	7.14	12.55	23.67	55.00
No	56,526	81.26	20.31	19.71	22.73	19.65	17.60
<b>Accommodations</b>							
Yes	2,667	69.24	1.91	4.95	13.31	24.90	54.93
No	54,839	81.64	20.87	20.20	23.01	19.46	16.46

**Note:** Includes all students who attempted the test **except:** home school students and students in an adult education program.

**Table 5.2**  
**Algebra 1/Math Tech 2 Operational Test, Adult Education Programs:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	28	63.71	--	3.57	7.14	3.57	85.71
<b>Gender</b>							
Female	13	63.46	--	7.69	7.69	--	84.62
Male	15	63.93	--	--	6.67	6.67	86.67
<b>Ethnicity</b>							
Hispanic or Latino	2	74.00	--	--	50.00	--	50.00
Asian	0	--	--	--	--	--	--
Black or African American	17	60.00	--	--	--	5.88	94.12
White	3	63.33	--	--	--	--	100.00
Other	6	71.00	--	16.67	16.67	--	66.67
<b>Language</b>							
Advanced	0	--	--	--	--	--	--
English Speaker II	0	--	--	--	--	--	--
Other	28	63.71	--	3.57	7.14	3.57	85.71
<b>Lunch</b>							
Free meals	5	61.80	--	--	--	20.00	80.00
No free/reduced-price meals	23	64.13	--	4.35	8.70	--	86.96
<b>IEP</b>							
No	24	64.08	--	4.17	8.33	4.17	83.33
<b>Migrant</b>							
No	28	63.71	--	3.57	7.14	3.57	85.71
<b>Courses taken</b>							
4111 (Alg 1)	18	65.22	--	5.56	11.11	5.56	77.78
3142 (Math for the Techs 2)	10	61.00	--	--	--	--	100.00
Other	0	--	--	--	--	--	--
<b>Gifted/talented</b>							
Academic	0	--	--	--	--	--	--
No	28	63.71	--	3.57	7.14	3.57	85.71
<b>504 plan</b>							
No	28	63.71	--	3.57	7.14	3.57	85.71
<b>Alternative school</b>							
Yes	0	--	--	--	--	--	--
No	28	63.71	--	3.57	7.14	3.57	85.71
<b>Accommodations</b>							
No	26	63.69	--	3.85	7.69	3.85	84.62

**Note:** Includes all students who attempted the test and are in an adult education program **except:** home school students.

**Table 5.3**  
**Biology Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	55,891	80.81	27.42	14.66	17.96	16.25	23.71
<b>Gender</b>							
Female	27,519	80.96	26.55	14.97	18.91	17.06	22.52
Male	28,245	80.72	28.37	14.38	17.08	15.46	24.71
Unknown	127	66.06	7.09	7.87	6.30	16.54	62.20
<b>Grade</b>							
6	2	91.50	50.00	--	50.00	--	--
7	1	64.00	--	--	--	--	100.00
8	167	85.71	30.54	22.16	25.75	14.37	7.19
9	20,738	79.71	26.00	13.62	17.02	16.36	27.00
10	30,873	82.41	30.34	15.92	18.55	15.64	19.55
11	3,105	74.22	13.40	9.63	17.94	19.90	39.13
12	987	73.79	10.13	11.55	18.14	21.58	38.60
Other	18	63.89	5.56	5.56	--	27.78	61.11
<b>Ethnicity</b>							
Hispanic or Latino	2,680	78.57	20.07	14.18	20.41	18.02	27.31
American Indian or Alaska Native	169	78.22	21.89	12.43	14.79	21.30	29.59
Asian	792	87.47	50.51	14.02	11.36	9.72	14.39
Black or African American	18,627	73.52	10.53	10.51	17.64	21.31	40.01
Native Hawaiian or Other Pacific Islander	77	84.43	40.26	15.58	14.29	11.69	18.18
White	31,903	85.21	37.53	17.23	18.17	13.26	13.80
Two or More Races	1,052	82.04	28.90	15.68	19.39	15.78	20.25
Other	591	71.97	14.04	8.12	12.69	18.44	46.70
<b>Language</b>							
Parent waiver	55	79.76	25.45	16.36	14.55	16.36	27.27
Pre-functional	141	60.90	0.71	2.13	6.38	9.22	81.56
Beginner	174	64.67	4.02	2.87	9.20	13.22	70.69
Intermediate	403	70.34	3.72	6.20	17.87	23.33	48.88
Advanced	1,013	79.57	18.66	15.10	23.00	21.03	22.21
Initially English Proficient	35	79.60	20.00	20.00	20.00	17.14	22.86
Title III First Year Exited	116	89.05	44.83	25.00	13.79	12.07	4.31
Title III Second + Year Exited	127	89.02	50.39	12.60	18.90	13.39	4.72
English Speaker I	318	88.62	45.28	20.44	16.04	10.38	7.86
English Speaker II	52,362	81.16	28.04	14.89	18.07	16.20	22.80
Other	1,147	70.64	13.43	7.32	12.21	15.17	51.87
<b>Lunch</b>							
Free meals	22,994	74.79	12.73	11.50	18.49	20.74	36.54
Reduced-price meals	3,729	80.20	23.01	15.39	20.81	18.05	22.74
No free/reduced-price meals	29,168	85.63	39.57	17.05	17.17	12.47	13.73
<b>IEP</b>							
Yes	5,233	66.94	5.04	5.62	11.45	15.86	62.03
No	50,658	82.24	29.74	15.59	18.63	16.29	19.76
<b>Migrant</b>							
Yes	5	82.60	20.00	20.00	40.00	--	20.00
No	55,886	80.80	27.43	14.66	17.95	16.25	23.71

**Table 5.3**  
**Biology Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Courses taken</b>							
3221 (Biology 1)	53,383	81.27	28.41	15.00	18.04	15.95	22.61
3227 (Applied Biology 2)	2,450	70.56	4.86	7.55	16.61	23.18	47.80
Other	58	89.91	75.86	3.45	--	1.72	18.97
<b>Gifted/talented</b>							
Academic	7,808	94.39	69.29	16.82	10.00	2.97	0.92
Artistic	1,001	86.75	41.56	18.18	16.78	13.89	9.59
Both	611	95.24	73.49	14.89	8.18	2.78	0.65
No	46,471	78.21	19.48	14.22	19.45	18.71	28.15
<b>504 plan</b>							
Yes	905	81.82	29.61	16.35	17.57	13.59	22.87
No	54,986	80.79	27.39	14.63	17.96	16.29	23.73
<b>Alternative school</b>							
Yes	841	67.51	3.92	6.30	11.30	20.57	57.91
No	55,050	81.01	27.78	14.78	18.06	16.18	23.19
<b>Accommodations</b>							
Yes	2,975	64.56	3.23	4.13	9.58	13.88	69.18
No	52,916	81.72	28.79	15.25	18.43	16.38	21.16

**Note:** Includes all students who attempted the test **except:** home school students and students in an adult education program.

**Table 5.4**  
**Biology Operational Test, Adult Education Programs:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	48	71.19	6.25	6.25	16.67	25.00	45.83
<b>Gender</b>							
Female	23	68.04	--	8.70	17.39	17.39	56.52
Male	25	74.08	12.00	4.00	16.00	32.00	36.00
<b>Ethnicity</b>							
Hispanic or Latino	2	60.50	--	--	--	--	10--
Black or African American	19	67.84	--	5.26	21.05	15.79	57.89
White	24	74.71	12.50	8.33	12.50	37.50	29.17
Other	3	71.33	--	--	33.33	--	66.67
<b>Language</b>							
English Speaker I			--	--	--	--	--
English Speaker II	27	73.70	7.41	11.11	11.11	37.04	33.33
Other	21	67.95	4.76	--	23.81	9.52	61.90
<b>Lunch</b>							
Free meals	18	69.22	5.56	5.56	5.56	33.33	50.00
Reduced-price meals	3	72.33	--	--	--	66.67	33.33
No free/reduced-price meals	27	72.37	7.41	7.41	25.93	14.81	44.44
<b>IEP</b>							
Yes	2	73.00	--	--	50.00	--	50.00
No	46	71.11	6.52	6.52	15.22	26.09	45.65
<b>Migrant</b>							
No	48	71.19	6.25	6.25	16.67	25.00	45.83
<b>Courses taken</b>							
3221 (Biology 1)	48	71.19	6.25	6.25	16.67	25.00	45.83
<b>Gifted/talented</b>							
Academic	48	71.19	6.25	6.25	16.67	25.00	45.83
No							
<b>504 plan</b>							
No	1	100.00	100.00	--	--	--	--
	47	70.57	4.26	6.38	17.02	25.53	46.81
<b>Alternative school</b>							
Yes	27	73.70	7.41	11.11	11.11	37.04	33.33
No	21	67.95	4.76	--	23.81	9.52	61.90
<b>Accommodations</b>							
No	48	71.19	6.25	6.25	16.67	25.00	45.83

**Note:** Includes all students who attempted the test and are in an adult education program **except:** home school students.

**Table 5.5**  
**English 1 Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	55,853	78.25	13.40	20.82	20.57	19.29	25.93
<b>Gender</b>							
Female	27,355	79.48	14.84	22.39	21.37	19.13	22.26
Male	28,345	77.13	12.06	19.37	19.84	19.44	29.30
Unknown	153	68.18	3.92	7.19	11.11	20.26	57.52
<b>Grade</b>							
6	2	77.50	--	50.00	--	--	50.00
7	3	83.00	66.67	--	--	--	33.33
8	11601	87.72	31.65	36.59	19.53	8.43	3.79
9	43,467	75.92	8.69	16.88	21.00	22.21	31.22
10	612	68.06	3.92	5.56	12.91	18.79	58.82
11	127	65.67	3.15	5.51	8.66	15.75	66.93
12	26	69.96	3.85	15.38	19.23	11.54	50.00
Other	15	64.27	6.67	6.67	--	6.67	80.00
<b>Ethnicity</b>							
Hispanic or Latino	2,884	75.19	7.91	16.16	21.08	21.74	33.11
American Indian or Alaska Native	161	77.63	13.04	24.84	17.39	16.77	27.95
Asian	731	82.74	26.95	23.39	18.88	13.00	17.78
Black or African American	19,216	72.49	3.79	11.82	18.45	24.58	41.35
Native Hawaiian or Other Pacific Islander	71	81.07	9.86	32.39	22.54	23.94	11.27
White	31,101	82.06	19.63	26.83	21.84	15.94	15.77
Two or More Races	1,202	79.99	14.48	22.55	23.63	19.97	19.38
Other	487	69.50	4.72	8.62	15.61	17.45	53.59
<b>Language</b>							
Parent waiver	54	73.69	5.56	7.41	31.48	20.37	35.19
Pre-functional	149	55.31	--	--	0.67	5.37	93.96
Beginner	221	60.39	--	1.81	1.81	11.31	85.07
Intermediate	476	67.65	0.21	2.52	10.71	24.79	61.76
Advanced	1,097	76.79	4.38	16.13	28.17	29.44	21.88
Initially English Proficient	40	78.40	15.00	20.00	22.50	17.50	25.00
Title III First Year Exited	136	85.48	28.68	27.21	28.68	9.56	5.88
Title III Second + Year Exited	133	84.92	21.80	32.33	24.81	15.04	6.02
English Speaker I	324	86.08	27.16	33.64	19.75	11.73	7.72
English Speaker II	51,895	78.62	13.83	21.39	20.70	19.20	24.89
Other	1,328	71.23	7.08	10.17	16.34	18.60	47.82
<b>Lunch</b>							
Free meals	24,787	73.36	5.07	13.34	19.30	23.45	38.83
Reduced-price meals	3,799	78.24	10.24	21.30	23.59	21.58	23.30
No free/reduced-price meals	27,267	82.71	21.41	27.55	21.30	15.18	14.56
<b>IEP</b>							
Yes	5,192	66.35	1.41	4.64	9.88	18.37	65.70
No	50,661	79.47	14.63	22.48	21.66	19.38	21.85
<b>Migrant</b>							
Yes	7	70.43	--	--	28.57	28.57	42.86
No	55,846	78.25	13.40	20.82	20.57	19.29	25.93

**Table 5.5**  
**English 1 Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

Demographics	N	Mean Scale Score	A	B	C	D	F
<b>Courses taken</b>							
3011 (Eng 1)	55,846	78.25	13.40	20.82	20.57	19.29	25.92
Other	7	70.57	--	--	28.57	14.29	57.14
<b>Gifted/talented</b>							
Academic	8975	90.27	40.75	38.25	15.21	4.64	1.16
Artistic	1,095	83.15	19.09	29.59	25.48	14.98	10.87
Both	1,139	92.68	51.71	36.87	9.04	2.19	0.18
No	44,644	75.35	6.78	16.69	21.82	22.77	31.93
<b>504 plan</b>							
Yes	893	78.02	12.54	20.83	21.50	18.59	26.54
No	54,960	78.26	13.41	20.82	20.55	19.30	25.92
<b>Alternative school</b>							
Yes	954	66.00	1.68	3.88	11.74	17.40	65.30
No	54,899	78.47	13.60	21.11	20.72	19.32	25.24
<b>Accommodations</b>							
Yes	2841	65.08	0.99	3.27	7.46	17.49	70.78
No	53,012	78.96	14.06	21.76	21.27	19.38	23.52

**Note:** Includes all students who attempted the test **except:** home school students and students in an adult education program.

**Table 5.6**  
**English 1 Operational Test, Adult Education Programs:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	32	70.75	3.13	12.50	9.38	25.00	5--
<b>Gender</b>							
Female	14	70.79	7.14	7.14	7.14	21.43	57.14
Male	18	70.72	--	16.67	11.11	27.78	44.44
Unknown							
<b>Ethnicity</b>							
Hispanic or Latino	3	74.67	--	33.33	--	33.33	33.33
Asian							
Black or African American	14	67.43	--	7.14	14.29	14.29	64.29
White	14	74.14	7.14	14.29	7.14	35.71	35.71
Other	1	58.00	--	--	--	--	100.00
<b>Language</b>							
English Speaker I							
English Speaker II	24	73.29	4.17	16.67	12.50	25.00	41.67
Other	8	63.13	--	--	--	25.00	75.00
<b>Lunch</b>							
Free meals	19	70.21	--	15.79	10.53	15.79	57.89
Reduced-price meals	2	86.00	50.00	--	--	50.00	--
No free/reduced-price meals	11	68.91	--	9.09	9.09	36.36	45.45
<b>IEP</b>							
Yes	4	55.25	--	--	--	--	100.00
No	28	72.96	3.57	14.29	10.71	28.57	42.86
<b>Migrant</b>							
Yes	1	58.00	--	--	--	--	100.00
No	31	71.16	3.23	12.90	9.68	25.81	48.39
<b>Courses taken</b>							
3011 (Eng 1)	32	70.75	3.13	12.50	9.38	25.00	50.00
<b>Gifted/talented</b>							
No	32	70.75	3.13	12.50	9.38	25.00	50.00
<b>504 plan</b>							
No	32	70.75	3.13	12.50	9.38	25.00	50.00
<b>Alternative school</b>							
Yes	24	73.29	4.17	16.67	12.50	25.00	41.67
No	8	63.13	--	--	--	25.00	75.00
<b>Accommodations</b>							
Yes	2	50.00	--	--	--	--	100.00
No	30	72.13	3.33	13.33	10.00	26.67	46.67

**Note:** Includes all students who attempted the test and are in an adult education program **except:** home school students.

**Table 5.7**  
**US History and Constitution Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	47601	71.25	3.00	8.53	17.47	23.80	47.19
<b>Gender</b>							
Female	23878	70.26	2.15	6.92	15.69	24.00	51.24
Male	23634	72.27	3.87	10.17	19.32	23.67	42.97
Unknown	89	64.75	1.12	3.37	5.62	7.87	82.02
<b>Grade</b>							
6	1	75.00	--	--	--	100.00	--
9	559	63.52	0.36	2.86	7.51	9.84	79.43
10	5535	67.15	1.75	4.32	10.59	18.07	65.28
11	38584	72.06	3.28	9.33	18.88	24.96	43.56
12	2917	69.69	2.23	7.03	13.88	22.11	54.75
Other	5	62.60	--	--	20.00	--	80.00
<b>Ethnicity</b>							
Hispanic or Latino	2307	70.35	1.91	7.28	14.95	26.22	49.63
American Indian or Alaska Native	130	70.13	2.31	8.46	10.77	24.62	53.85
Asian	690	76.24	9.13	17.39	21.88	21.59	30.00
Black or African American	17042	66.70	0.47	2.76	9.61	20.36	66.80
Native Hawaiian or Other Pacific Islander	68	74.29	2.94	14.71	22.06	25.00	35.29
White	25923	74.28	4.68	12.35	22.83	25.86	34.28
Two or More Races	823	72.24	2.43	7.05	21.75	30.50	38.27
Other	618	65.84	0.65	3.40	9.06	16.83	70.06
<b>Language</b>							
Parent waiver	39	69.82	--	5.13	20.51	25.64	48.72
Pre-functional	79	61.73	1.27	2.53	2.53	8.86	84.81
Beginner	109	61.11	--	--	2.75	10.09	87.16
Intermediate	352	65.30	--	1.70	6.53	18.75	73.01
Advanced	670	69.52	1.34	4.48	13.28	27.61	53.28
Initially English Proficient	39	71.46	5.13	12.82	5.13	30.77	46.15
Title III First Year Exited	133	75.00	2.26	14.29	23.31	33.83	26.32
Title III Second + Year Exited	182	76.82	4.40	18.13	25.27	27.47	24.73
English Speaker I	355	76.44	7.89	16.06	22.82	24.79	28.45
English Speaker II	44363	71.38	3.05	8.62	17.74	23.91	46.68
Other	1280	68.19	1.88	6.56	12.58	19.61	59.38
<b>Lunch</b>							
Free meals	19181	67.37	0.77	3.51	10.93	21.20	63.58
Reduced-price meals	3096	70.22	1.78	5.78	16.99	24.35	51.10
No free/reduced-price meals	25324	74.31	4.84	12.66	22.48	25.71	34.30
<b>IEP</b>							
Yes	3630	64.22	0.30	1.93	6.34	14.63	76.80

**Table 5.7**  
**US History and Constitution Operational Test, Regular Schools:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
No	43971	71.83	3.22	9.07	18.39	24.56	44.75
<b>Migrant</b>							
Yes	8	70.00	--	12.50	12.50	25.00	50.00
No	47593	71.25	3.00	8.53	17.47	23.80	47.19
<b>Courses taken</b>							
3320 (US Hst of Const. or College Prep US Hst)	42888	69.87	1.40	6.11	16.15	24.62	51.71
3372 (AP US Hst)	4327	84.11	18.30	31.11	29.26	15.62	5.71
336D (IB Hst of Americas)	173	81.69	8.67	28.90	35.84	20.81	5.78
Other	213	79.49	9.86	19.72	29.58	27.70	13.15
<b>Gifted/talented</b>							
Academic	4846	79.64	8.44	21.32	32.23	24.60	13.41
Artistic	938	75.24	5.97	12.90	25.27	25.05	30.81
Both	333	81.37	12.61	25.83	29.73	21.62	10.21
No	41484	70.09	2.22	6.80	15.47	23.70	51.81
<b>504 plan</b>							
Yes	755	72.36	3.71	10.20	20.79	21.85	43.44
No	46846	71.23	2.99	8.50	17.42	23.84	47.25
<b>Alternative school</b>							
Yes	606	63.15	0.50	1.16	5.12	10.73	82.51
No	46995	71.35	3.03	8.62	17.63	23.97	46.74
<b>Accommodations</b>							
Yes	1896	62.80	0.16	1.32	4.27	11.23	83.02
No	45705	71.60	3.12	8.83	18.02	24.33	45.71

**Note:** Includes all students who attempted the test **except:** home school students and students in an adult education program.

**Table 5.8**  
**US History and Constitution Operational Test, Adult Education Programs:**  
**Percentages of Student Scores in Letter-Grade Equivalents, Overall and by Demographics**

<b>Demographics</b>	<b>N</b>	<b>Mean Scale Score</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Overall</b>	60	63.616667	--	--	8.33	10.00	81.67
<b>Gender</b>							
Female	27	61.333333	--	--	3.70	--	96.30
Male	33	65.484848	--	--	12.12	18.18	69.70
Unknown							
<b>Ethnicity</b>							
Hispanic or Latino	2	68.5	--	--	--	50.00	50.00
Two or more races	1	61	--	--	--	--	100.00
Black or African American	29	61.551724	--	--	3.45	6.90	89.66
White	21	66.095238	--	--	14.29	14.29	71.43
Other	7	63.714286	--	--	14.29	--	85.71
<b>Language</b>							
English Speaker I							
English Speaker II	12	67.916667	--	--	16.67	16.67	66.67
Other	48	62.541667	--	--	6.25	8.33	85.42
<b>Lunch</b>							
Free meals	12	63.75	--	--	16.67	8.33	75.00
Reduced-price meals	1	75	--	--	--	100.00	--
No free/reduced-price meals	47	63.340426	--	--	6.38	8.51	85.11
<b>IEP</b>							
Yes	4	63.25	--	--	--	25.00	75.00
No	56	63.642857	--	--	8.93	8.93	82.14
<b>Migrant</b>							
No	60	63.616667	--	--	8.33	10.00	81.67
<b>Courses taken</b>							
3320 (US Hst of Const. or College Prep US Hst)	59	63.711864	--	--	8.47	10.17	81.36
Other	1	58	--	--	--	--	100.00
<b>Gifted/talented</b>							
Academic							
No	60	63.616667	--	--	8.33	10.00	81.67
<b>504 plan</b>							
No	60	63.616667	--	--	8.33	10.00	81.67
<b>Alternative school</b>							
Yes	12	67.916667	--	--	16.67	16.67	66.67
No	48	62.541667	--	--	6.25	8.33	85.42
<b>Accommodations</b>							
Yes	2	60.5	--	--	--	--	100.00
No	58	63.724138	--	--	8.62	10.34	81.03

**Note:** Includes all students who attempted the test and are in an adult education program **except:** home school students.

## CHAPTER 6

### DESCRIPTIVE STATISTICS

Descriptive statistics of scale score distributions for the three test administrations of the current year combined are presented in table 6 for students overall and by gender and race.

**TABLE 6**  
**2011–12 EOCEP Test Administration Summary Statistics: Regular Schools and Adult Education Programs, Overall and by Gender, Race, and Accommodations**

<b>Algebra 1/Math Tech 2</b>							
<b>Regular Schools</b>				<b>Adult Education Programs</b>			
	<b>N</b>	<b>Scale Score</b>			<b>N</b>	<b>Scale Score</b>	
		<b>Mean</b>	<b>SD</b>			<b>Mean</b>	<b>SD</b>
<b>Overall</b>	57,506	81.07	11.99	<b>Overall</b>	28	63.71	8.92
<b>Gender</b>				<b>Gender</b>			
Female	27,968	81.43	11.75	Female	13	63.46	11.64
Male	29,324	80.80	12.19	Male	15	63.93	6.10
<b>Ethnicity</b>				<b>Ethnicity</b>			
African-American	19,969	75.56	10.62	African-American	17	60.00	6.25
White	31,761	84.51	11.48	White	3	63.33	6.43
<b>Accommodations</b>				<b>Accommodations</b>			
No	54,839	81.64	11.80	No	26	63.69	9.26
Yes	2,667	69.24	9.50	Yes	2	64.00	2.83
<b>Biology</b>							
<b>Regular Schools</b>				<b>Adult Education Programs</b>			
	<b>N</b>	<b>Scale Score</b>			<b>N</b>	<b>Scale Score</b>	
		<b>Mean</b>	<b>SD</b>			<b>Mean</b>	<b>SD</b>
<b>Overall</b>	55,891	80.81	14.57	<b>Overall</b>	48	71.19	12.19
<b>Gender</b>				<b>Gender</b>			
Female	27,519	80.96	14.09	Female	23	68.04	11.08
Male	28,245	80.72	14.99	Male	25	74.08	12.66
<b>Ethnicity</b>				<b>Ethnicity</b>			
African-American	18,627	73.52	13.52	African-American	19	67.84	10.79
White	31,903	85.21	13.32	White	24	74.71	13.12
<b>Accommodations</b>				<b>Accommodations</b>			
No	52,916	81.72	14.13	No	48	71.19	12.19
Yes	2,975	64.56	12.62	Yes	--	--	--

**TABLE 6**  
**2011–12 EOCEP Test Administration Summary Statistics: Regular Schools and Adult**  
**Education Programs, Overall and by Gender, Race, and Accommodations**

English 1							
Regular Schools				Adult Education Programs			
	N	Scale Score			N	Scale Score	
		Mean	SD			Mean	SD
<b>Overall</b>	55,853	78.25	12.51	<b>Overall</b>	32	70.75	11.65
<b>Gender</b>				<b>Gender</b>			
Female	27,355	79.48	12.02	Female	14	70.79	11.34
Male	28,345	77.13	12.84	Male	18	70.72	12.20
<b>Ethnicity</b>				<b>Ethnicity</b>			
African-American	19,216	72.49	11.14	African-American	14	67.43	11.07
White	31,101	82.06	11.81	White	14	74.14	11.49
<b>Accommodations</b>				<b>Accommodations</b>			
No	53,012	78.96	12.23	No	30	72.13	10.61
Yes	2,841	65.08	10.06	Yes	2	50.00	4.24

  

US History and Constitution							
Regular Schools				Adult Education Programs			
	N	Scale Score			N	Scale Score	
		Mean	SD			Mean	SD
<b>Overall</b>	47,601	71.25	10.23	<b>Overall</b>	60	63.62	7.44
<b>Gender</b>				<b>Gender</b>			
Female	23,878	70.26	9.70	Female	27	61.33	4.96
Male	23,634	72.27	10.63	Male	33	65.48	8.60
<b>Ethnicity</b>				<b>Ethnicity</b>			
African-American	17,042	66.70	8.30	African-American	29	61.55	6.81
White	25,923	74.28	10.26	White	21	66.10	7.66
<b>Accommodations</b>				<b>Accommodations</b>			
No	45,705	71.60	10.17	No	58	63.72	7.53
Yes	1,896	62.80	7.64	Yes	2	60.50	3.54

**Note:** Includes all students who attempted the test **except:** home school students.

## CHAPTER 7

### RELIABILITY

In this chapter, multiple types of reliability indexes are presented. For the total tests, two measures of the reliability of raw scores and the classical standard error of measurement (SEM) are given. At the passing cut scores, conditional standard errors of measurement (CSEM) for raw scores, for scale scores, and measures of decision consistency were determined.

#### 7.1 RELIABILITY OF RAW SCORES

Table 7.1 reports the reliability coefficients and SEMs. The reliabilities of the total raw scores were computed using the Kuder-Richardson formulas 20 (KR20) and 21 (KR21). The KR21 reliability coefficients were used in computing the CSEM for the raw scores shown below, in section 7.2.

**Table 7.1**  
**Reliability Coefficients of Raw Scores**

<b>Administration</b>	<b>Number of Items</b>	<b>Number of Test Takers</b>	<b>KR-20</b>	<b>KR-21</b>	<b>Classical SEM</b>
<b>Algebra 1/Mathematics for the Technologies 2</b>					
Fall 2011	50	8,455	0.865	0.843	4.004
Spring 2012	50	48,856	0.894	0.881	3.937
Summer 2012	50	169	0.809	0.783	4.247
<b>Biology</b>					
Fall 2011	60	14,399	0.909	0.900	4.479
Spring 2012	60	41,421	0.907	0.896	4.402
Summer 2012	60	51	0.890	0.879	4.678
<b>English 1</b>					
Fall 2011	55	7,225	0.876	0.853	3.955
Spring 2012	55	48,456	0.898	0.886	4.028
Summer 2012	55	147	0.876	0.855	4.053
<b>US History and Constitution</b>					
Fall 2011	55	10,943	0.873	0.860	3.484
Spring 2012	55	36,582	0.878	0.866	3.605
Summer 2012	55	70	0.834	0.825	3.565

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

#### 7.2 OVERALL AND CONDITIONAL SEM

The overall classical SEM is defined as  $s_x\sqrt{1-r_{xx}}$ , where  $s_x$  is the standard deviation of the scale score and  $r_{xx}$  is the reliability coefficient. The CSEM for raw scores at the cut score was computed using the following formula (Feldt and Qualls 1998; Huynh, Meyer, and Barton 2000):

$$\text{raw score CSEM} = \sqrt{\left(\frac{1-KR20}{1-KR21}\right)\left(\frac{c(k-c)}{k-1}\right)}, \text{ where } c = \text{cut score and } k = \text{number of items.}$$

The scale score CSEM at the passing cut score was computed on the basis of the conditional standard error of the Rasch ability cut score. The scale score CSEM is defined as the reciprocal of the square root of the test information function at the point on the ability continuum that corresponds to the scale score cut (Hambleton, Swaminathan, and Rogers 1991). Although classical and conditional SEMs serve similar roles, the values of the conditional standard errors are determined separately for each possible test score, while the classical SEM is a single value used for all scores. Table 7.2 presents both the raw score and scale score CSEMs.

**TABLE 7.2**  
**2011–12 EOCEP Conditional Standard Errors of Measurement**

<b>Administration</b>	<b>Raw Scores</b>	<b>Scale Scores</b>
<b>Algebra/ Mathematics for the Technologies 2</b>		
Fall 2011	3.246	4.273
Spring 2012	3.328	4.348
Summer 2012	3.328	4.323
<b>Biology</b>		
Fall 2011	3.717	4.393
Spring 2012	3.669	4.348
Summer 2012	3.719	4.395
<b>English 1</b>		
Fall 2011	3.359	4.219
Spring 2012	3.469	4.357
Summer 2012	3.415	4.260
<b>US History and Constitution</b>		
Fall 2011	3.574	4.400
Spring 2012	3.561	4.384
Summer 2012	3.640	4.481

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

### 7.3 CONSISTENCY OF PASSING CUT SCORES

When student performance is reported in a pass or fail category, a reliability index is computed in terms of the probabilities of consistent classification of students, as specified in standard 2.15 in *Standards for Educational and Psychological Testing* (AERA, APA, and NCME 1999). This index takes into consideration the consistency of classifications for the percentage of examinees who would be classified in the same way on a second (hypothetical) EOCEP administration using either the same form or an alternate equivalent form.

Although a number of procedures are available for estimating classification errors (Livingston and Lewis 1995; Hanson and Brennan 1990; Huynh 1976; Subkoviak 1976), DRC used the *beta* binomial distribution method (Huynh 1979; Huynh, Meyer, and Barton 2000). Table 7.3 presents a summary of agreements between the operational test classifications—that is, the percentages of students who would be consistently classified in the same category (pass or fail) on two equivalent administrations of the test. The consistency index for the passing score is computed for each administration.

**TABLE 7.3**  
**2011–12 EOCEP Consistency Index for Passing Scores**

<b>Administration</b>	<b>Consistency Index</b>
<b>Algebra/ Mathematics for the Technologies 2</b>	
Fall 2011	87.012
Spring 2012	90.355
Summer 2012	79.778
<b>Biology</b>	
Fall 2011	88.348
Spring 2012	89.707
Summer 2012	85.245
<b>English 1</b>	
Fall 2011	85.214
Spring 2012	88.458
Summer 2012	83.043
<b>US History and Constitution</b>	
Fall 2011	83.442
Spring 2012	83.914
Summer 2012	82.628

**Note:** Includes all students who attempted the test using a regular form  
**except:** home school students and students in an adult education program.

## CHAPTER 8

### VALIDITY

Three types of validity evidence are reported for the algebra test forms: test content, item fairness, and internal structure. Evidence of content validity is presented in the item content distribution across domains and the alignment of the current year's EOCEP test items with the state content standards. Evidence of item fairness is examined with the information on differential item functioning (DIF). Evidence of internal structure is provided in correlations among content domains.

#### 8.1 ITEM DISTRIBUTION ACROSS CONTENT DOMAINS

The EOCEP operational and implementation test forms were constructed according to the test specifications and the test blueprints. These items measured the specific assessment standards that were approved by the SCDE. All items in the test forms were reviewed by the content review committee and the sensitivity review committee and were approved by the SCDE. The current year's EOCEP test form specifications are presented in tables 8.1 through 8.4 by subject.

**Table 8.1**  
**Item Distribution by Content Domain for Algebra 1/Math Tech 2**

<b>Content Domain*</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
EA-1	4	5	9
EA-2	8	9	9
EA-3	5	11	7
EA-4	9	10	10
EA-5	20	11	11
EA-6	4	4	4
<b>Totals</b>	<b>50</b>	<b>50</b>	<b>50</b>

\*EA-1: The student will understand and utilize the mathematical processes of problem solving, reasoning and proof, communication, connections, and representation

EA-2: The student will demonstrate through the mathematical processes an understanding of the real number system and operations involving exponents, matrices, and algebraic expressions.

EA-3: The student will demonstrate through the mathematical processes an understanding of relationships and functions.

EA-4: The student will demonstrate through the mathematical processes an understanding of the procedures for writing and solving linear equations and inequalities.

EA-5: The student will demonstrate through the mathematical processes an understanding of the graphs and characteristics of linear equations and inequalities.

EA-6: The student will demonstrate through the mathematical processes an understanding of quadratic relationships and functions.

**TABLE 8.2**  
**Item Distribution by Content Domain for Biology**

<b>Content Domain*</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
B-1	11	11	11
B-2	9	9	9
B-3	10	10	10
B-4	11	11	11
B-5	9	9	9
B-6	10	10	10
<b>Totals</b>	<b>60</b>	<b>60</b>	<b>60</b>

\*B-1: The student will demonstrate an understanding of how scientific inquiry and technological design, including mathematical analysis, can be used appropriately to pose questions, seek answers, and develop solutions.

B-2: The student will demonstrate an understanding of the structure and function of cells and their organelles.

B-3: The student will demonstrate an understanding of the flow of energy within and between living systems.

B-4: The student will demonstrate an understanding of the molecular basis of heredity.

B-5: The student will demonstrate an understanding of biological evolution and the diversity of life.

B-6: The student will demonstrate an understanding of the interrelationships among organisms and the biotic and abiotic components of their environments.

**Table 8.3**  
**Item Distribution by Content Domain for English 1**

<b>Content Domain*</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
E1-1	13	20	20
E1-2	13	8	9
E1-3	5	6	7
E1-4	9	9	11
E1-6	15	12	8
<b>Totals</b>	<b>55</b>	<b>55</b>	<b>55</b>

\*E1-1: The student will read and comprehend a variety of literary texts in print and nonprint formats.

E1-2: The student will read and comprehend a variety of informational texts in print and nonprint formats.

E1-3: The student will use word analysis and vocabulary strategies to read fluently.

E1-4: The student will create written work that has a clear focus, sufficient detail, coherent organization, effective use of voice, and correct use of the conventions of written Standard American English.

E1-6: The student will access and use information from a variety of sources.

**TABLE 8.4**  
**Item Distribution by Content Domain for US History and Constitution**

<b>Content Domain*</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
USHC-1	2	2	2
USHC-2	8	8	8
USHC-3	4	3	4
USHC-4	5	6	5
USHC-5	7	7	7
USHC-6	5	5	5
USHC-7	8	8	8
USHC-8	5	5	6
USHC-9	9	9	8
USCH-10	2	2	2
<b>Totals</b>	<b>55</b>	<b>55</b>	<b>55</b>

\*USHC-1: The student will demonstrate an understanding of the settlement of North America.

USHC-2: The student will demonstrate an understanding of the establishment of the United States as a new nation.

USHC-3: The student will demonstrate an understanding of the westward movement and the resulting regional conflicts that took place in America in the nineteenth century.

USHC-4: The student will demonstrate an understanding of the causes and the course of the Civil War and Reconstruction in America.

USHC-5: The student will demonstrate an understanding of major social, political, and economic developments that took place in the United States during the second half of the nineteenth century.

USHC-6: The student will demonstrate an understanding of foreign developments that contributed to the United States' emergence as a world power in the twentieth century.

USHC-7: The student will demonstrate an understanding of the economic boom-and-bust in America in the 1920s and 1930s, in resultant political instability, and the subsequent worldwide response.

USHC-8: The student will demonstrate an understanding of the impact of World War II on United States' foreign and domestic policies.

USHC-9: The student will demonstrate an understanding of the social, economic, and political events that impacted the United States during the Civil War era.

USHC-10: The student will demonstrate an understanding of developments in foreign policy and economics that have taken place in the United States since the fall of the Soviet Union and its satellite states in 1992.

## 8.2 ITEM DEVELOPMENT

All EOCEP items were developed with reference to the South Carolina academic standards and measurement guidelines. Various committees reviewed all items; only items approved by these committees and the SCDE were included in the operational forms.

## 8.3 DIFFERENTIAL ITEM FUNCTIONING

A critical issue in statewide high-stakes testing is whether the test is fair to all test-takers; therefore, an important goal of item and test development is to produce a pool of items that are judged to be free of bias either toward or against any group of students. All EOCEP items were reviewed both for bias and for differential item functioning (DIF).

The sensitivity review committee examined the EOCEP items for potential bias, including language that might disadvantage a particular group, might be considered offensive to members of a particular group, or might present obstacles to a particular group due to factors unrelated to content and processes specified in the standards.

As with other statistical methodologies, there are numerous widely accepted approaches to detecting potential unfairness in test items. Many of these methods fall into the general category of DIF analyses. DIF statistics provide information regarding relative group performance at the item level for gender and ethnic comparisons while controlling for ability. Once an item is flagged for a significant DIF, judgment is used to determine whether the difference in difficulty shown by the DIF index is unfairly related to group membership. The DIF statistics do not necessarily indicate bias or unfairness in an item but may simply show the relative strengths and weaknesses of the two groups being compared after the overall ability that the test is intended to measure has been controlled for.

### **Procedure:**

The procedure that DRC selected for detecting DIF was the Mantel-Haenszel (MH) chi-square for dichotomous items. DRC calculated the Mantel-Haenszel statistic (MH D-DIF) for MC items (Holland and Thayer 1988) to measure the degree and magnitude of DIF. The examinee group of interest is the *focal* group, and the group to which performance on the item is being compared is the *reference* group. In this report, the focal groups for DIF were females and African Americans.

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.

Positive values of *delta* indicate that the item is easier for the *focal* group, suggesting that the item favors the *focal* group. A negative value of *delta* indicates that the item is more difficult for the *focal* group. The item classifications are based on the Mantel-Haenszel chi-square and the MH delta ( $\Delta$ ) value as follows:

- The item is classified as C category if the absolute value of the MH delta value (i.e.,  $|\Delta|$ ) is significantly greater than 1 and also greater than or equal to 1.5.
- The item is classified as B category if the MH delta value ( $\Delta$ ) is significantly different from 0 and either the absolute value of the MH delta ( $|\Delta|$ ) is less than 1.5 or the absolute value of the MH delta ( $|\Delta|$ ) is not significantly different from 1.
- The item is classified as A category if delta value ( $\Delta$ ) is not significantly different from 0 or the absolute value of delta ( $|\Delta|$ ) is less than or equal to 1.

The data in table 8.5, below, summarize the number of items in DIF categories for the current year's operational test items.

When the operational forms were constructed, all item statistics from the initial field test were reviewed and approved by the SCDE. Due to the large number of items subjected to DIF analyses, erroneous flags could be expected. All flagged items were closely examined by the SCDE. Inclusion of any flagged item on an operational form (i.e., an item classified as C category) was possible only when the SCDE had approved that item.

**Table 8.5**  
**Summary of Differential Item Functioning for Operational Items**

Administration	Cat	Whites/African-Americans				Males/Females			
		Alg	Bio	Eng	USHC	Alg	Bio	Eng	USHC
Fall 2011	A+	23	24	23	18	26	34	33	27
	A-	25	34	30	33	21	25	19	26
	B+	0	0	0	1	0	0	2	0
	B-	0	2	1	3	2	1	1	1
	C+	0	0	0	0	0	0	0	0
	C-	2	0	1	0	1	0	0	1
Spring 2012	A+	28	21	21	21	33	34	34	28
	A-	15	38	33	33	13	25	18	25
	B+	0	0	0	0	0	0	2	0
	B-	5	1	1	1	3	1	1	0
	C+	0	0	0	0	0	0	0	0
	C-	2	0	0	0	1	0	0	2
Summer 2012*	A+	--	--	--	--	--	--	--	--
	A-	--	--	--	--	--	--	--	--
	B+	--	--	--	--	--	--	--	--
	B-	--	--	--	--	--	--	--	--
	C+	--	--	--	--	--	--	--	--
	C-	--	--	--	--	--	--	--	--

\*Due to low N counts, DIF was not calculated for the summer administrations

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

## 8.4 CORRELATIONS AMONG CONTENT DOMAINS

Evidence of internal structure was examined using correlations among content domains. On the following pages, tables 8.6 through 8.9 report the correlation matrices for the raw scores among content domains for each test.

**Table 8.6**  
**Correlations among Domain Scores for Algebra 1/Math Tech 2**

Domain	EA-1	EA-2	EA-3	EA-4	EA-5	EA-6	Number of Items
<b>Fall 2011 (N=8,455)</b>							
<b>EA-1</b>	1	0.343	0.299	0.394	0.456	0.282	4
<b>EA-2</b>	—	1	0.389	0.524	0.536	0.370	8
<b>EA-3</b>	—	—	1	0.449	0.505	0.296	5
<b>EA-4</b>	—	—	—	1	0.648	0.376	9
<b>EA-5</b>	—	—	—	—	1	0.422	20
<b>EA-6</b>	—	—	—	—	—	1	4
<b>Spring 2012 (N=48,856)</b>							
<b>EA-1</b>	1	0.494	0.519	0.514	0.536	0.371	5
<b>EA-2</b>	—	1	0.606	0.632	0.625	0.478	9
<b>EA-3</b>	—	—	1	0.609	0.635	0.484	11
<b>EA-4</b>	—	—	—	1	0.632	0.473	10
<b>EA-5</b>	—	—	—	—	1	0.476	11
<b>EA-6</b>	—	—	—	—	—	1	4
<b>Summer 2012 (N=169)</b>							
<b>EA-1</b>	1	0.382	0.270	0.444	0.534	0.167	9
<b>EA-2</b>	—	1	0.380	0.574	0.522	0.217	9
<b>EA-3</b>	—	—	1	0.305	0.217	0.068	7
<b>EA-4</b>	—	—	—	1	0.483	0.122	10
<b>EA-5</b>	—	—	—	—	1	0.097	11
<b>EA-6</b>	—	—	—	—	—	1	4

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

**Table 8.7**  
**Correlations among Domain Scores for Biology**

<b>Domain</b>	<b>B-1</b>	<b>B-2</b>	<b>B-3</b>	<b>B-4</b>	<b>B-5</b>	<b>B-6</b>	<b>Number of Items</b>
<b>Fall 2011 (N=14,399)</b>							
<b>B-1</b>	1	0.548	0.568	0.553	0.552	0.585	11
<b>B-2</b>	—	1	0.622	0.635	0.538	0.609	9
<b>B-3</b>	—	—	1	0.639	0.561	0.642	10
<b>B-4</b>	—	—	—	1	0.553	0.627	11
<b>B-5</b>	—	—	—	—	1	0.580	9
<b>B-6</b>	—	—	—	—	—	1	10
<b>Spring 2012 (N=41,421)</b>							
<b>B-1</b>	1	0.587	0.564	0.558	0.590	0.605	11
<b>B-2</b>	—	1	0.610	0.626	0.585	0.624	9
<b>B-3</b>	—	—	1	0.600	0.565	0.602	10
<b>B-4</b>	—	—	—	1	0.554	0.584	11
<b>B-5</b>	—	—	—	—	1	0.616	9
<b>B-6</b>	—	—	—	—	—	1	10
<b>Summer 2012 (N=51)</b>							
<b>B-1</b>	1	0.535	0.415	0.498	0.577	0.589	11
<b>B-2</b>	—	1	0.529	0.625	0.599	0.440	9
<b>B-3</b>	—	—	1	0.450	0.498	0.579	10
<b>B-4</b>	—	—	—	1	0.550	0.561	11
<b>B-5</b>	—	—	—	—	1	0.515	9
<b>B-6</b>	—	—	—	—	—	1	10

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

**Table 8.8**  
**Correlations among Domain Scores for English 1**

<b>Domain</b>	<b>E1-1</b>	<b>E1-2</b>	<b>E1-3</b>	<b>E1-4</b>	<b>E1-6</b>	<b>Number of Items</b>
<b>Fall 2011 (N=7,225)</b>						
<b>E1-1</b>	1	0.665	0.530	0.511	0.627	13
<b>E1-2</b>	—	1	0.532	0.474	0.617	13
<b>E1-3</b>	—	—	1	0.450	0.550	5
<b>E1-4</b>	—	—	—	1	0.553	9
<b>E1-6</b>	—	—	—	—	1	15
<b>Spring 2012 (N=48,456)</b>						
<b>E1-1</b>	1	0.687	0.622	0.675	0.604	20
<b>E1-2</b>	—	1	0.580	0.612	0.560	8
<b>E1-3</b>	—	—	1	0.536	0.505	6
<b>E1-4</b>	—	—	—	1	0.533	9
<b>E1-6</b>	—	—	—	—	1	12
<b>Summer 2012 (N=147)</b>						
<b>E1-1</b>	1	0.631	0.648	0.608	0.600	20
<b>E1-2</b>	—	1	0.590	0.509	0.441	9
<b>E1-3</b>	—	—	1	0.437	0.506	7
<b>E1-4</b>	—	—	—	1	0.555	11
<b>E1-6</b>	—	—	—	—	1	8

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

**Table 8.9**  
**Correlations among Domain Scores for US History and Constitution**

Domain	USHC-1	USHC-2	USHC-3	USHC-4	USHC-5	USHC-6	USHC-7	USHC-8	USHC-9	USHC-10	Number of Items
<b>Fall 2011 (N=10,943)</b>											
USHC-1	1	0.248	0.208	0.221	0.233	0.213	0.246	0.247	0.244	0.133	2
USHC-2	—	1	0.394	0.380	0.454	0.392	0.477	0.489	0.465	0.235	8
USHC-3	—	—	1	0.344	0.385	0.351	0.422	0.429	0.417	0.199	4
USHC-4	—	—	—	1	0.393	0.354	0.384	0.420	0.397	0.185	5
USHC-5	—	—	—	—	1	0.424	0.474	0.482	0.466	0.233	7
USHC-6	—	—	—	—	—	1	0.426	0.466	0.437	0.200	5
USHC-7	—	—	—	—	—	—	1	0.529	0.515	0.239	8
USHC-8	—	—	—	—	—	—	—	1	0.551	0.235	5
USHC-9	—	—	—	—	—	—	—	—	1	0.256	9
USHC-10	—	—	—	—	—	—	—	—	—	1	2
<b>Spring 2012 (N=36,582)</b>											
USHC-1	1	0.306	0.230	0.263	0.251	0.271	0.297	0.286	0.307	0.215	2
USHC-2	—	1	0.413	0.464	0.434	0.457	0.496	0.492	0.541	0.340	8
USHC-3	—	—	1	0.366	0.333	0.350	0.380	0.378	0.408	0.259	3
USHC-4	—	—	—	1	0.396	0.411	0.448	0.476	0.473	0.323	6
USHC-5	—	—	—	—	1	0.385	0.424	0.414	0.450	0.303	7
USHC-6	—	—	—	—	—	1	0.454	0.435	0.482	0.326	5
USHC-7	—	—	—	—	—	—	1	0.495	0.541	0.345	8
USHC-8	—	—	—	—	—	—	—	1	0.541	0.341	5
USHC-9	—	—	—	—	—	—	—	—	1	0.359	9
USHC-10	—	—	—	—	—	—	—	—	—	1	2
<b>Summer 2012 (N=70)</b>											
USHC-1	1	0.307	0.303	0.279	0.148	0.162	0.379	0.086	0.413	0.193	2
USHC-2	—	1	0.353	0.470	0.529	0.444	0.471	0.370	0.269	0.485	8
USHC-3	—	—	1	0.258	0.325	0.407	0.457	0.172	0.400	0.431	4
USHC-4	—	—	—	1	0.418	0.360	0.531	0.252	0.358	0.422	5
USHC-5	—	—	—	—	1	0.227	0.336	0.212	0.309	0.243	7
USHC-6	—	—	—	—	—	1	0.447	0.238	0.389	0.387	5
USHC-7	—	—	—	—	—	—	1	0.354	0.457	0.363	8
USHC-8	—	—	—	—	—	—	—	1	0.366	0.191	6
USHC-9	—	—	—	—	—	—	—	—	1	0.364	8
USHC-10	—	—	—	—	—	—	—	—	—	1	2

**Note:** Includes all students who attempted the test using a regular form **except:** home school students and students in an adult education program.

## WORKS CITED

- AERA, APA, and NCME 1999. *Standards for Educational and Psychological Testing*. Washington, DC: American Educational Research Association.
- Dorans, Neil J., and Paul W. Holland. 1993. "DIF Detection and Description: Mantel-Haenszel and Standardization." In *Differential Item Functioning*, edited by Paul W. Holland and Howard Wainer. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Feldt, Leonard S., and Audrey L. Qualls. 1998. "Approximating Scale Score Standard Error of Measurement from the Raw Score Standard Error." *Applied Measurement in Education* 11, no. 2:159–77.
- Hambleton, Ronald K., Hariharan Swaminathan, and H. Jane Rogers. 1991. *Fundamentals of Item Response Theory*. Newbury Park, CA: Sage Publications.
- Hanson, Bradley A., and Robert L. Brennan. 1990. "An Investigation of Classification Consistency Indexes Estimated under Alternative Strong True Score Models." *Journal of Educational Measurement* 27:345–59.
- Holland, P. W., and Dorothy T. Thayer. 1988. "Differential Item Performance and the Mantel-Haenszel Procedure." In *Test Validity*, edited by Howard Wainer and Henry I. Braun. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Huynh, Huynh. 1976. "On the Reliability of Decisions in Domain-Referenced Testing." *Journal of Educational Measurement* 13:253–64.
- . 1979. "Computational and Statistical Inference for Two Reliability Indices Based on the Beta-Binomial Model." *Journal of Educational Statistics* 4:231–46.
- Huynh, H., J. Patrick Meyer III, and Karen Barton. 2000. *Technical Documentation for the 1999 Palmetto Achievement Challenge Tests of English Language Arts and Mathematics, Grades Three through Eight*. Columbia: South Carolina Department of Education.
- Linacre, John M., and Benjamin D. Wright. 2003. *WINSTEPS Rasch-Model Computer Program*. Chicago: MESA Press.
- Livingston, Samuel A., and Charles Lewis. 1995. "Estimating the Consistency and Accuracy of Classifications Based on Test Scores." *Journal of Educational Measurement* 32:179–97.
- Rasch, Georg. 1960. *Probabilistic Models for Some Intelligence and Attainment Tests*. Copenhagen: Danish Institute for Educational Research.
- SCDE. 2011a. *Fall/Winter 2011-2012 District Test Coordinator's Supplement*. Columbia: South Carolina Department of Education.
- . 2011b. *Fall/Winter 2011-2012 Test Administration Manual for School Test Coordinators and Test Administrators*. Columbia: South Carolina Department of Education.

- . 2012a. *Spring 2012 District Test Coordinator’s Supplement*. Columbia: South Carolina Department of Education.
- . 2012b. *Spring 2012 Test Administration Manual for School Test Coordinators and Test Administrators*. Columbia: South Carolina Department of Education.
- . 2012c. *Summer 2012 End-of-Course Examination (EOCEP) Supplement*. Columbia: South Carolina Department of Education.
- Subkoviak, Michael J. 1976. “Estimating Reliability from a Single Administration of a Criterion-Referenced Test.” *Journal of Educational Measurement* 13:265–76.
- Wright, Benjamin D., and Mark H. Stone. 1979. *Best Test Design*. Chicago: Mesa Press.

The South Carolina Department of Education does not discriminate on the basis of race, color, religion, national origin, age, sex, or disability in admission to, treatment in, or employment in its programs and activities. Inquiries regarding the nondiscrimination policies should be made to the Employee Relations Manager, 1429 Senate Street, Columbia, South Carolina 29201, (803-734-8781). For further information on federal non-discrimination regulations, including Title IX, contact the Assistant Secretary for Civil Rights at OCR.DC@ed.gov or call 1(800)421-3481.