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CollegeBoard

National Curriculum Survey on English and Mathematics

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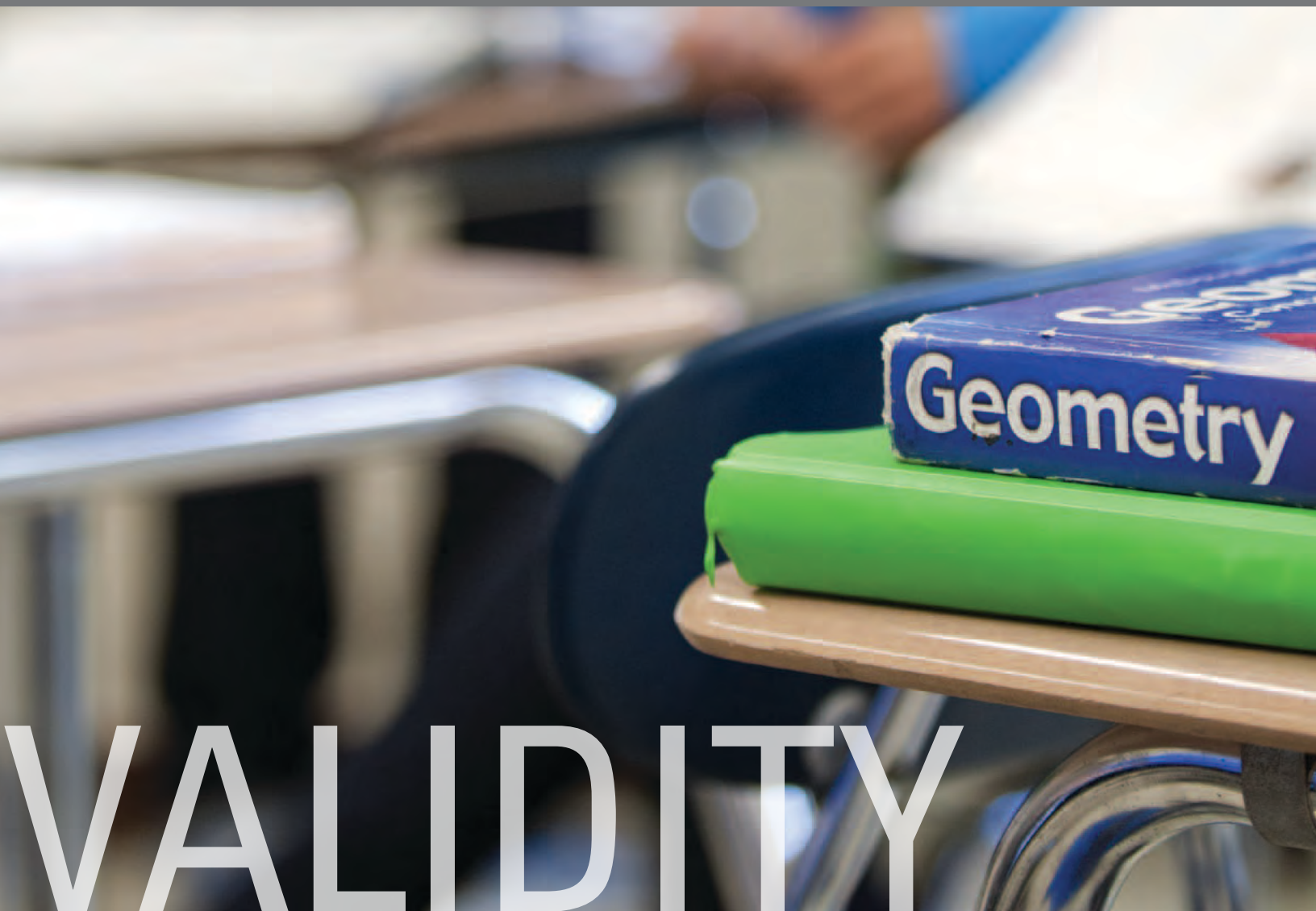

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About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of more than 5,900 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators and schools.

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The SAT®

Created and designed by educators, the SAT® is a valuable and reliable measure of college readiness for students seeking admission to undergraduate colleges and universities in the United States. The SAT tests the academic skills and knowledge that students acquire in high school. It also shows how well students can apply their knowledge, a factor that educators and researchers agree is critical to success in college course work. The SAT is consistently shown to be a fair and valid predictor of first-year college success for all students. A study including data from more than 100 colleges and universities demonstrates that the best predictor of college success is a combination of SAT scores and high school grades. In addition to admission, many colleges use the SAT for course placement. The SAT is administered annually to more than two million students at approximately 6,000 test centers located in more than 170 countries.

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Executive Summary

In the fall of 2009, the College Board conducted a curriculum survey to gather information on the curricula and institutional practices of high schools and colleges in the United States. The primary objective of the survey was to collect data on the knowledge and skills, or topics, taught in high school classrooms and assess the importance of these topics for institutions of higher education. The College Board periodically reviews the state of K–12 and college curricula as a standard part of the SAT® test development process (see example in Milewski, Johnsen, Glazer & Kutota, 2005). The results of the curriculum survey will allow the College Board to validate and ensure that the topics measured on the SAT and SAT Subject Tests™ reflect what is being taught in the nation's high schools and what college professors consider to be required for college success.

Curriculum surveys were completed by more than 5,000 high school and college teachers in English language arts (ELA) and mathematics. Surveys were also distributed in biology, chemistry, physics, and history, and the results of these surveys will be reported in later reports. Each survey covered the topics assessed on the SAT, SAT Subject Tests, and the College Board Standards for College Success™ and also inquired about various aspects of course curricula, including the use of assessments. This report presents the results of the English and mathematics surveys, with a focus on the alignment between the SAT and high school and college curricula. The report briefly introduces the SAT, discusses the method used to implement the survey, and concludes with a summary of the results of the ELA and mathematics surveys.

SAT®

The SAT is designed to help admission officers make fair and informed admission decisions. Given the number of applicants and the significant variation in grading standards and courses across high schools in the United States, the SAT plays a critical role as a fair, nationally standardized examination, whose scores mean the same for all students. Previous research has shown that the SAT is a fair and valid predictor of college performance and, combined with a student's high school GPA, it is the most predictive of student college performance (Kobrin, Patterson, Shaw, Mattern & Barbuti, 2008; Mattern & Patterson, 2009; Mattern, Patterson, Shaw, Kobrin & Barbuti, 2008). It should also be noted that the SAT is designed to assess the college readiness of students as they leave high school and not as a test that will assess any and all aspects of a student's high school curriculum. While the topics on the SAT do reflect the topics that students learn in high school, it does not necessarily reflect every single topic covered in every high school classroom across the United States.

The SAT assesses student topics in three areas: critical reading, mathematics, and writing. SAT item types include multiple-choice questions, student-produced responses, and essay questions. The critical reading section assesses reading skills, such as identifying main and supporting ideas, determining the meaning of words in context, understanding the purposes of authors, and understanding the structure and function of sentences. The mathematics section covers topics in four major strands: number and operations; algebra and functions; geometry and measurement; and data analysis, statistics, and probability. The writing section contains one 25-minute essay question that evaluates how well a student can express and support a point of view using the conventions of standard written English. It also contains multiple-choice questions that cover three key areas: recognizing sentence errors, improving sentences, and improving paragraphs.

Method

Survey materials

For both ELA and mathematics, two slightly different versions of the curriculum survey were created; one for high school teachers and one for college and university professors. High school teachers were instructed to respond with the single course in mind for which they were most familiar and that students take as they progress to college. College professors were asked to respond with the single course in mind for which they were most familiar and that students take as they transition from high school to college.

The curriculum survey was developed using College Board and external content experts, along with feedback from College Board program and research staff. Each curriculum survey was divided into five parts: (1) Introduction, (2) Coverage of content in the classroom, (3) Methods of instruction in the classroom, (4) Assessments in the classroom, and (5) Background/Demographic data.

Part I of the survey provided a general overview of the survey and provided instructions for the completion of the survey. In addition, it also asked teachers to identify the course they used when completing the survey and how many years they had been teaching the class.

Part II of the survey concentrated on the topics taught in ELA or mathematics courses in high school or college. The list of topics in the ELA survey was compiled by College Board content experts and covered all content included on the SAT, the SAT Subject Test in Literature, and the applicable English language arts topics from the College Board Standards for College Success (CBSCS). The list of topics in the mathematics survey covered all content included on the SAT, the SAT Subject Tests in Mathematics Level I and II and the applicable topics from the Mathematics College Board Standards for College Success.

The College Board Standards for College Success define the skills and knowledge students must develop and master to succeed in college and in the workforce in the 21st century. These standards for English language arts and mathematics are based on empirical research conducted by the University of Oregon's Center for Educational Policy Research in collaboration with the Association of American Universities. The standards are benchmarked against the College Board's Advanced Placement Program® as well as national and international frameworks including NAEP, TIMSS, and PISA. The CBSCS were designed to provide a model set of comprehensive standards for rigorous middle school and high school courses that lead to college and workplace readiness (College Board, n.d.).

After a draft list of topics was created, two high school teachers and two college professors from each content area, as well as other College Board staff members, reviewed the list and provided feedback. After compiling all reviews, the College Board content experts aggregated all feedback and revised the lists into their final forms. It is important to note that the list of topics is not, and could not possibly be, comprehensive of all topics taught in high school. Rather, these topics were selected because they represent the key topics for students as they transition from high school to college.

Every topic identified was tagged with its source material, with some topics tagged to more than one source. There were 85 total topics identified for the ELA survey. Among the 85 topics in the ELA survey, 60 were covered on the SAT. Of these 60 topics, six were also covered on the SAT Subject Test in Literature and the CBSCS, 53 were covered in both the SAT and the CBSCS, and one was covered only on the SAT. The distribution of the sources of all 85 topics is shown in Table 1.

Table 1: Number of Topics in the ELA Survey and the Mathematics Survey by Source

Total	SAT® only	SAT Subject Tests™ only	CB Standards only	SAT and SAT Subject Tests	SAT and CB Standards	SAT Subject Tests and CB Standards	SAT and SAT Subject Tests and CB Standards	Other
ELA: 85	1		21		53	4	6	
Mathematics: 132	1	1	18	5	34	34	65	8

The topics in the list in the ELA survey were divided into Reading and Writing sections. In Reading, topics were listed under five content areas: (1) Comprehending words and sentences; (2) Understanding literary texts; (3) Organizational patterns, textual features, and graphical representation; 4) Author's purpose, craft, and message; and (5) Evaluating informational texts. In Writing, there were six content areas: (1) Purposes of writing, (2) Writing an essay, (3) Writing process, (4) Grammar and usage, (5) Sentence structure, and (6) Paragraph/Unity Coherence.

On the mathematics survey, there were a total of 132 topics identified, with 71 topics identified as covered on the SAT. From these 71 topics, 65 were associated with the SAT, the SAT Subject Test in Mathematics, and the CBSCS, five were included in both the SAT and the SAT Subject Test in Mathematics, and one was covered in the SAT only (see Table 1 for complete details).

The topics in the list of the mathematics survey were divided into four strands: (1) Number and Operations; (2) Algebra and Functions consisting of *Expressions, Equations, and Inequalities; Representation;* and *Modeling and Functions and Their Properties*; (3) Geometry and Measurement including *Plane Euclidean Geometry, Coordinate Geometry, Three-Dimensional Geometry,* and *Trigonometry*; and 4) Data Analysis, Statistics, and Probability.

All survey respondents were asked to provide three points of information on each topic: (1) the extent of their coverage of the topic in their classroom, (2) the importance of the topic for students who are planning to pursue a traditional four-year college degree after high school, and (3) the time frame in which students are expected to achieve mastery on each topic. Survey respondents responded to each question using a three-point scale. For the coverage item, the scale was represented by 1 = not covered, 2 = some coverage, 3 = substantial coverage. For the importance question, the scale was represented by 1 = not important, 2 = somewhat important, and 3 = essential. The mastery items asked respondents to answer using three categories: "before my class," "during my class," and "after my class."

For the SAT, which is designed to assist admission officers in making fair and informed admission decisions for potential students, the primary data of interest were the ratings of importance from the higher education survey respondents. While the higher education importance ratings are viewed as the primary evidence, the other ratings can provide important information to help fully understand the role of each topic in high school and higher education.

The ELA survey allowed respondents to skip content areas that were not relevant to the material in their courses. Each content area began with a question asking whether or not the topics contained within were relevant to the respondents. If they were not, the respondents could skip the content area and be forwarded to the next one.

As in the ELA survey, the mathematics survey provided respondents with an option to skip the content areas except for "Number and Operations." The Numbers and Operations area was identified as a basic or fundamental content area. The topics in this area are frequently

taught in lower level mathematics classes, but remain essential building blocks for students to move forward in mathematics. Because of this role, respondents were required to respond to all topics in this area even though coverage ratings were expected to be lower than in other content areas. In addition to the option of bypassing content areas, the mathematics survey also supplied respondents with an option to skip individual topics by providing a "Not Applicable" option for each individual topic.

Part III of the survey included questions regarding the methods of instruction of the courses and the level of in-class or out-of-class activities. In addition, each survey included questions about the use of technology in the classroom for instruction, for in-class assignments, or for out-of-class assignments. Part IV of the survey addressed the use of assessments within the identified course for each teacher. At the end of Part IV, a series of questions about the perception of the SAT Subject Tests were asked for the purposes of internal College Board test development. The respondents were allowed to skip the series of questions and thus only those who wished to respond participated in this section of the survey. The results from Part III and IV will be released in one of the forthcoming College Board research reports. Finally, Part V asked about the background information of teachers and their institutions. The questions about the teachers' background characteristics included gender, highest degree of education obtained, and number of years of teaching experience. The questions about the teachers' high schools or colleges included type of school, geographic area, and enrollment size.

Survey participants

The survey targeted high school teachers of courses that students take as they progress to college, as well as college instructors of introductory college courses. The survey was restricted to high school and college teachers within the United States. All survey participants were identified as teachers of classes that could be taken by students as they either prepare to enter college or when they first enter college. The mailing list was obtained from Market Data Retrieval (MDR), a company that provides the email contacts, including a list of U.S. college professors from four- and two-year institutions of higher education and U.S. high school teachers who taught English/writing or mathematics. Initial invitations were sent to 19,761 high school teachers in ELA and 30,540 college instructors in ELA. In mathematics, 20,040 high school teachers and 23,990 college instructors were contacted.

Procedure

Initial email invitations for the curriculum survey were sent to approximately 95,000 high school teachers and college professors beginning in October of 2009. The initial emails were staggered over a one-month period of time. Two follow-up emails were also sent, the first approximately 10 days after the initial email, and the second, approximately three weeks after the initial email was sent. The initial invitation and follow-up emails contained a link that directed participants to the College Board website, which held the survey questions. All participants who completed the survey were permitted to submit their names to be placed into a raffle for one of ten $100 Amazon gift certificates. Data collection took place from October 2009 through December 2009.

Results

English Language Arts Survey

Response Rate and Characteristic of Respondents

The ELA curriculum survey was sent out to 19,761 high school teachers and 30,540 college instructors. Of those, 1,254 high school teachers and 1,910 college professors responded to the survey, which yielded a response rate of 6.3% for each of the surveys. Tables 2 and 3 summarize the key characteristics of the survey respondents and their institutions, with a brief description of the characteristics included below.

Table 2: Background Information for Higher Education Survey Respondents

	English College Professors (n = 1,910)		Mathematics College Professors (n = 1,488)	
	n	%	n	%
Gender				
Male	608	32	825	55
Female	1,302	68	663	45
Highest degree				
Bachelor's	38	2	44	3
Master's	862	45	612	41
Doctorate	923	48	803	54
Professional (e.g., law)	14	1	6	0
Other	73	4	23	2
Years of teaching				
Less than 5 years	146	8	101	7
5–10 years	354	19	245	16
11–15 years	319	17	203	14
16–20 years	286	15	202	14
More than 20 years	805	42	737	50
Control				
Public	1,355	71	984	66
Private	532	28	481	32
Other	21	1	14	1
No response	2	0	9	1
Geographic area				
Urban	735	38	603	41
Suburban	675	35	499	34
Rural	496	26	375	25
No response	4	0	11	1
Total enrollment: undergraduates				
Fewer than 1,000	93	5	73	5
1,000 to 2,500	299	16	282	19
2,501 to 5,000	344	18	282	19
5,001 to 10,000	427	22	326	22
10,001 to 20,000	413	22	284	19
More than 20,000	313	16	223	15
No response	21	1	18	1

Table 3: Background Information for High School Survey Respondents

	English High School Teachers (*n* = 1,254)		Mathematics High School Teachers (*n* = 1,017)	
	n	%	*n*	%
Gender				
Male	280	22	401	39
Female	974	78	616	61
Highest degree				
Bachelor's	339	27	285	28
Master's	794	63	671	66
Doctorate	47	4	30	3
Professional (e.g., law)	10	1	6	1
Other	64	5	25	2
Years of teaching				
Less than 5 years	92	7	97	10
5–10 years	273	22	253	25
11–15 years	229	18	160	16
16–20 years	168	13	154	15
More than 20 years	492	39	353	35
Control				
Public	1131	90	890	88
Private	102	8	106	10
Other	12	1	18	2
No response	9	1	3	0
Geographic area				
Urban	278	22	255	25
Suburban	616	49	517	51
Rural	353	28	242	24
No response	7	1	3	0
Total enrollment:12th-grade students				
Under 100	160	13	127	12
100–200	230	18	187	18
201–400	392	31	361	35
401–750	313	25	252	25
751–1,000	58	5	38	4
More than 1,000	93	7	47	5
No response	8	1	5	0

English Language Arts Demographics and School Type — Higher Education

For the higher education ELA survey, a majority of respondents were females, with an approximately equal number of respondents indicating a master's (45%) or a doctorate (48%) as their highest degree. More than 40% of ELA professors indicated that they have been teaching more than 20 years, with the rest fairly evenly distributed across the remaining experience range. A majority of ELA professors who answered the survey were from public institutions with a total enrollment of undergraduate students greater than 5,000.

The higher education survey was intended for professors who taught students who were just entering higher education. Unfortunately, the authors were unable to locate an accurate data source for the population of college professors by the grade level they teach. Instead, the sample was compared to overall population of college professors, which was obtained through the *2009 College Handbook* (College Board, 2008). Data on teachers' demographic characteristics were not available through the handbook, but data on school type were reviewed. The distribution of the ELA higher education survey respondents seems to closely resemble the data provided in the handbook, with similar distributions for geographic area and school type, while having a slight overrepresentation of professors from rural institutions and smaller institutions.

English Language Arts Demographics and School Type — High School

A greater number of female teachers (78%) participated in the high school survey than that of male teachers. A vast majority of the survey respondents (90%) indicated bachelor's or master's as their highest obtained degree, and over 70% of the teachers responded that they have been teaching for more than 10 years. Most of the teachers who participated in the ELA survey were from public schools, and from the schools with a total enrollment of 12th-grade students of less than 750. In the survey sample, the number of teachers from high schools in suburban areas was the highest followed by those from rural and urban areas.

The high school survey was intended to target high school teachers who taught students as they approached college in their junior and senior year. As with the higher education survey, the authors could not locate a source of data that distinguishes high school teachers by the year they teach. Instead, the survey sample was compared to the population of all high school teachers available through the National Center for Education Statistics (NCES). Compared to the statistical information in the *Digest of Education Statistics* (Snyder, Dillow, & Hoffman, 2009), the female gender distribution of survey respondents was very similar to the population of teachers (78% in the survey respondents, as compared to 75% in the NCES sample). On the other hand, the survey respondents had more education and more teaching experience than the NCES sample, as indicated by the lower percentage of high school teachers in the NCES 2009 report sample who received master's or doctoral degrees and had more than 10 years of teaching experience — about 54% and 53% (see Table 70 on page 107 of the NCES 2009 report). With respect to school type, geographic area, and total enrollment, the distribution of the current high school survey sample was consistent with the NCES 2009 report sample (see Table 4 and 160 of the NCES 2009 report).

English Language Arts Courses Taught

Table 4 shows the courses that the ELA survey respondents taught for both higher education and high school respondents. For the higher education survey, the number of college professors who taught English I was the largest followed by the number who taught a general writing course and the number who taught a developmental English course. For the high school survey, the largest number of high school teachers taught English language arts, with teachers of American literature and British literature being the second-largest and third-largest groups, respectively. As shown in Table 5, most college professors (91%) indicated that the majority of students in their courses were first- or second-year students. Approximately 70% of high school teachers responded that most of the students in their courses were 11th- or 12th-graders whereas 16% and 12% of high school teachers indicated that most of the students in their courses were ninth- and 10th-graders, respectively.

Table 4: English Survey Respondents by Course

	Higher Education (*n* = 1,910)	
Course	*n*	%
English I	546	29
English II	175	9
English III–IV	29	2
British Literature	137	7
American Literature	98	5
World Literature (in translation)	102	5
General reading course	30	2
General writing course	321	17
Developmental English course	239	13
General literature	68	4
Other	165	9
	High School (*n* = 1,254)	
Course	n	%
English Language Arts	514	41
Creative Writing	12	1
American Literature	214	17
British Literature	176	14
World Literature (in translation)	66	5
Composition/Writing	88	7
General Literature	80	6
Other	104	8

Table 5: Grade Level of Students in the Course English-Survey Respondents Taught

Higher Education			High School		
	n	%		*n*	%
First year	1,353	71	9th grade	151	12
Second year	382	20	10th grade	205	16
Third year	96	5	11th grade	415	33
Fourth year	13	1	12th grade	441	35
Other	66	3	Other	42	3

English Language Arts Overall Results of Coverage, Importance, Mastery of Topics

Table 6 summarizes the coverage, importance, and mastery of all 85 topics reviewed in Part II of the ELA survey, as well as the ratings for the subset of 60 ELA topics that were associated with the SAT. All of the ratings collected are important and provide valuable information about the topics covered on the SAT. Nonetheless, it should be kept in mind that the primary purpose of the SAT is for it to be used by colleges and universities while making admission decisions. Because of that function, the primary area of interest lies with the importance ratings from higher education officials.

Both high school and higher education teachers reported extensive coverage of the survey topics, with approximately 83% of the higher education teachers and 91% of the high school teachers stating that they either somewhat or substantially covered all of the topics listed.

Table 6: Average % of Coverage, Importance, and Mastery Ratings of Topics on the SAT

	All Topics		SAT	
	English	Mathematics	English	Mathematics
Number of Topics	85	132	60	71
HE				
Coverage[a]	83	66	86	70
Importance[b]	93	88	96	92
Mastery[c]	78	75	82	82
HS				
Coverage[a]	91	71	93	80
Importance[b]	97	90	98	94
Mastery[c]	78	69	79	80

Note
a : Average % of teachers who indicated coverage as "Some" or "Substantial"
b : Average % of teachers who indicated importance as "Somewhat" or "Essential"
c : Average % of teachers who indicated "Before" or "During" for when covered

The numbers were slightly higher for items associated with the SAT, with 85% of higher education teachers and 93% of high school teachers indicating somewhat or substantial coverage. In addition, 88% of the higher education teachers estimated that all of the topics were somewhat important or essential, with 90% of high school teachers also providing the same estimates. The results suggest that both high school teachers and college professors considered all of the topics surveyed to be important and that both high school teachers and college professors cover the topics measured by the SAT in their English courses. Topics associated with the SAT had slightly higher ratings in both coverage and importance.

English Language Arts Coverage of Content Areas in High School and College

Table 7: Mean Coverage Ratings for English Topics by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S
Total Topics	85	2.23	0.65		2.36	0.58	
Reading							
Comprehending Words and Sentences	4	1.92	0.66	-0.5	2.37	0.56	0.0
Understanding Literary Texts	8	2.21	0.72	0.0	2.63	0.52	0.5
Organizational Patterns, Textual Features, and Graphical Representations	2	1.97	0.70	-0.4	2.14	0.62	-0.4
Author's Purpose, Craft, and Message	10	2.31	0.63	0.1	2.4	0.58	0.1
Evaluating Informational Texts	7	2.25	0.65	0.0	2.18	0.62	-0.3
Writing							
Purposes of Writing	9	1.98	0.69	-0.4	2.17	0.65	-0.3
Writing an Essay	13	2.49	0.62	0.4	2.58	0.54	0.4
Writing Process	8	2.52	0.63	0.5	2.47	0.58	0.2
Grammar and Usage	14	2.08	0.66	-0.2	2.24	0.58	-0.2
Sentence Structure	7	2.09	0.65	-0.2	2.2	0.61	-0.3
Paragraph Unity Coherence	3	2.46	0.59	0.4	2.43	0.57	0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

This section provides a closer examination of the coverage ratings provided by the survey respondents. Table 7 provides the critical data for all 85 topics surveyed as a reference point, while Table 8 provides the same information on the 60 items that were associated with the SAT. Because the focus of this report is on the alignment of the SAT to high school and college curricula, the discussion of the results will focus on the subset of 60 topics that were tagged as associated with the SAT. One important caveat regarding the data should be noted here. Because respondents had the option to skip sections of Part II, the number of respondents was not consistent across each of the content areas. As such, the grand mean and a pooled standard deviation are reported here.

Table 8: Mean Coverage Ratings for English Topics by the SAT by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S
Total Topics in SAT	60	2.27	0.64		2.39	0.57	
Reading							
Comprehending Words and Sentences	3	2.04	0.67	-0.4	2.45	0.55	0.1
Understanding Literary Texts	3	2.13	0.73	-0.2	2.61	0.53	0.4
Organizational Patterns, Textual Features, and Graphical Representations	1	2.31	0.71	0.1	2.36	0.57	-0.1
Author's Purpose, Craft, and Message	8	2.45	0.61	0.3	2.51	0.55	0.2
Evaluating Informational Texts	6	2.29	0.64	0.0	2.22	0.62	-0.3
Writing							
Purposes of Writing	3	2.33	0.72	0.1	2.41	0.62	0.0
Writing an Essay	11	2.52	0.60	0.4	2.63	0.52	0.4
Writing Process	1	2.50	0.63	0.4	2.62	0.55	0.4
Grammar and Usage	14	2.08	0.66	-0.3	2.24	0.58	-0.3
Sentence Structure	7	2.09	0.65	-0.3	2.20	0.61	-0.3
Paragraph Unity Coherence	3	2.46	0.59	0.3	2.43	0.57	0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

In the higher education survey, the grand mean of coverage ratings on the 60 topics linked to the SAT was 2.27 with a pooled standard deviation of 0.64. The average coverage ratings on the content areas in Reading ranged between 2.04 and 2.45. The average coverage ratings on the content areas in Writing ranged between 2.08 and 2.52.

In order to compare the coverage ratings across the content areas, the effect size (E.S) for the difference between the grand mean for all 60 topics in the SAT and the average coverage rating on each content area was computed. The effect size is a standardized measure that shows the extent that differences in means between groups are practically meaningful. The effect size values of 0.2, 0.5 and 0.8 are usually associated with small, medium, and large effect sizes, respectively (Cohen, 1988). The effect size was calculated by using the formula, $(M_{Total} — M_{Content})/S.D_{Total}$, where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

All content areas in both Reading and Writing had coverage ratings of 2.0 or higher in the higher education survey. Two writing areas in the SAT — "Writing an Essay" (mean = 2.52, E.S = 0.4) and "Writing Process" (mean = 2.50, E.S = 0.4) — had the highest coverage rating by college professors. On the other hand, "Comprehending Words and Sentences" received

the lowest coverage rating (mean = 2.04, E.S = -0.4). However, the effect sizes for all content areas were small, suggesting that the difference between the average coverage rating on each and the grand mean of all topics is minimal. Thus, the results indicate that all of the content areas in the SAT were covered in higher education and that none of the content areas was notably higher or lower rated than the others.

In the high school survey, the grand mean of coverage ratings on the topics in the SAT was 2.39 (pooled S.D = 0.57). The average coverage ratings on the content areas in Reading ranged between 2.22 and 2.61. The average coverage ratings on the content areas in Writing ranged between 2.20 and 2.63. As with the higher education survey, all of the content areas received mean coverage ratings of 2.0 or higher. Among the content areas, high school teachers rated "Writing an essay" (mean = 2.63, E.S = 0.4) and "Writing process" (mean = 2.62, E.S = 0.4) the highest, followed by "Understanding Literary Texts" (mean = 2.61, E.S = 0.4). The effect sizes for all content areas were small, indicating that all of the content areas in the SAT were covered in the high school and that none of the content areas was notably higher or lower than the others.

The results of the coverage ratings were consistent with previous findings. Milewski et al. (2005) conducted a survey of English language art teachers and examined the alignment of the new SAT writing and reading sections to curricula in 2003. Using the same three-point scale, they analyzed the coverage ratings by college professors and high school teachers together and reported the mean ratings for the reading and writing topics in the SAT. For writing topics, they examined the mean ratings for writing process skills and grammar, usage, and sentence structure separately[1]. In the 2003 ELA survey, the grand means of the importance ratings for writing process, reading and grammar, and usage and sentence structure skills were 2.53, 2.36, and 2.19, respectively. Compared to the results of the 2003 survey, the current ELA survey has a similar level of coverage ratings (mean = 2.59, 2.40, and 2.36 for writing, reading and grammar, and usage and sentence structure, respectively).

Importance of Content Areas in High School and College

Tables 9 and 10 summarize the importance ratings for all 85 topics and for the 60 topics associated with the SAT by content area. As with the coverage ratings, the grand mean and a pooled standard deviation are reported for the importance rating. In the higher education survey, the grand mean of importance ratings on a total of 60 topics in the SAT was 2.61 with a pooled standard deviation of 0.52. All of the content areas had a mean importance rating of 2.0 or higher, which suggests that college professors considered all groups of the content areas in the SAT important. For the content areas in the SAT, college professors rated three writing content areas, "Writing process," "Writing an essay," and "Paragraph Unity/Coherence" as the highest. With the exception of the content area, "Understanding Literary Texts" (mean = 2.32, E.S = -0.6), all effect sizes for all content areas were small, indicating that the average importance rating on each content area was close to the grand mean of all topics.

The importance ratings in the high school survey were very consistent with the importance ratings in the higher education survey. All of the content areas had mean importance ratings of 2.0 or higher, which suggests that high school teachers also considered all groups of the content areas in the SAT important. Similar to the importance ratings in the higher education survey, "Writing an essay," "Writing process," and "Paragraph Unity/Coherence" received the highest importance ratings in the high school survey. As with the higher education responses, the effect sizes for the content areas were all small, so the differences by content area should not be viewed as particularly noteworthy.

1 In the current ELA survey, the writing process skills included three content areas: "Purposes of Writing," "Writing an Essay," and "Writing Process." The grammar, usage, and sentence structure included: "Grammar and Usage," "Sentence Structure," and "Paragraph Unity Coherence."

Table 9: Mean Importance Ratings for English Topics by Content Area

		HE Importance			HS Importance		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S
Total Topics	85	2.54	0.55		2.60	0.51	
Reading							
Comprehending Words and Sentences	4	2.49	0.55	-0.1	2.62	0.49	0.0
Understanding Literary Texts	8	2.38	0.68	-0.3	2.69	0.49	0.2
Organizational Patterns, Textual Features, and Graphical Representations	2	2.24	0.67	-0.6	2.36	0.61	-0.5
Author's Purpose, Craft, and Message	10	2.49	0.57	-0.1	2.56	0.53	-0.1
Evaluating Informational Texts	7	2.51	0.58	-0.1	2.46	0.57	-0.3
Writing							
Purposes of Writing	9	2.20	0.64	-0.6	2.35	0.58	-0.5
Writing an Essay	13	2.73	0.46	0.4	2.77	0.43	0.3
Writing Process	8	2.70	0.51	0.3	2.67	0.50	0.1
Grammar and Usage	14	2.61	0.52	0.1	2.63	0.51	0.1
Sentence Structure	7	2.59	0.52	0.1	2.62	0.52	0.0
Paragraph Unity Coherence	3	2.73	0.45	0.4	2.72	0.46	0.2

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

Table 10: Mean Importance Ratings for English Topics by the SAT by Content Area

		HE Importance			HS Importance		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S
Total Topics in SAT	60	2.61	0.52		2.66	0.49	
Reading							
Comprehending Words and Sentences	3	2.60	0.53	0.0	2.69	0.48	0.1
Understanding Literary Texts	3	2.32	0.70	-0.6	2.68	0.50	0.0
Organizational Patterns, Textual Features, and Graphical Representations	1	2.52	0.60	-0.2	2.53	0.55	-0.3
Author's Purpose, Craft, and Message	8	2.60	0.53	0.0	2.65	0.50	0.0
Evaluating Informational Texts	6	2.55	0.56	-0.1	2.49	0.56	-0.4
Writing							
Purposes of Writing	3	2.48	0.62	-0.3	2.57	0.54	-0.2
Writing an Essay	11	2.75	0.44	0.3	2.80	0.40	0.3
Writing Process	1	2.76	0.46	0.3	2.78	0.44	0.2
Grammar and Usage	14	2.61	0.52	0.0	2.63	0.51	-0.1
Sentence Structure	7	2.59	0.52	0.0	2.62	0.52	-0.1
Paragraph Unity Coherence	3	2.73	0.45	0.2	2.72	0.46	0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

The results of the importance ratings were consistent with the findings in the 2003 ELA survey (Milewski et al., 2005). In the 2003 ELA survey, the grand means of the importance ratings for writing process, reading and grammar, and usage and sentence structure skills were 2.66, 2.57, and 2.64, respectively. Compared to the results of the 2003 survey, the current ELA survey has slightly higher importance ratings for writing process skills (mean obtained by averaging the grand means of importance ratings by college professors and high school teachers = 2.73) while it has a similar level of importance ratings for reading skills (mean = 2.57) and grammar, usage, and sentence structure (mean = 2.63).

It is of interest that the patterns of the importance ratings by college professors and the patterns of the coverage ratings by high school teachers were similar. For example, the two content areas in the SAT, "Writing process" and "Writing an essay," which received the highest coverage ratings by high school teachers, also had the highest importance ratings by college professors. In addition, the topics of *Writing a clear and coherent essay, Using supporting details and examples* and *Writing a unified essay* ranked within the top five in importance ratings as well as the top five in coverage ratings. These results suggest that the SAT topics college professors consider to be most important are also more likely to be covered in high schools. The next section will discuss the relationship between the importance ratings by college professors and coverage ratings by high school teachers in more detail.

English Language Arts Analysis by Topics

In developing and maintaining an assessment that colleges can use to make decisions about the readiness of students for college, it is essential that the topics that college professors consider to be important for entering college students be assessed. Furthermore, these important topics should be taught in the high school curricula. Ideally, all topics would have high ratings on both of these criteria. However, given that the high school and college curricula are not designed together, there are likely to be some discrepancies. For a test of college readiness such as the SAT, topics that are considered to be critical for success in college, but are not universally covered in high school, may still be suitable for inclusion on the test. Topics that fall into this category warrant further analysis as well as discussion with high school educators to determine why they may not currently be covered in their curricula. If a topic is not considered to be important by higher education and is not covered in the high school curriculum, the topic should undergo further analysis to determine if it is appropriate for the test. In order to investigate this question, the mean coverage and mean importance ratings were calculated for all topics included in the survey.

The topics areas covered on the survey had consistently high coverage and importance ratings in both the high school and the higher education surveys. Appendix A lists all of the topics covered in the curriculum survey, along with the source or reference material for each, and the mean coverage and importance ratings for both high school and higher education survey respondents. Fifty-seven of the 60 topic areas had mean coverage ratings greater than 2.0 amongst high school teachers, and all 60 items had mean importance ratings greater than 2.0. From the higher education survey, 50 of the 60 topic areas had mean coverage ratings greater than 2.0, while all 60 items had importance ratings greater than 2.0.

Mathematics

Response Rate and Characteristics of Respondents

The mathematics curriculum survey was sent out to 20,040 high school teachers and 23,990 college instructors. Overall, 1,017 high school teachers and 1,488 college instructors responded for response rates of 5.1% and 6.2%, respectively. Tables 2 and 3 summarize the key characteristics of the survey respondents and their institutions.

Mathematics Demographics and School Type — Higher Education

The distribution of survey respondents for the higher education mathematics survey was fairly consistent with that of the ELA respondents with a few notable exceptions. A majority of the professors who participated in the mathematics survey were male (55%). In addition, a slightly higher number of professors indicated that their highest degree obtained was a doctorate (54%), as compared to a master's degree (41%). With respect to teaching experience, nearly half of the survey respondents indicated that they have been teaching more than 20 years. The institutional characteristics of the mathematics survey sample was similar to the ELA survey sample; i.e., most of the mathematics professors were from public institutions with a total enrollment of undergraduate students greater than 5,000.

The higher education survey was intended for professors who taught students who were just entering higher education. As was mentioned in the description of the ELA survey results, the authors were unable to locate an accurate data source for the population of college professors by the class level they teach. Because of this, survey respondents were compared to the overall population of college professors (College Board, 2008). Data on teachers' demographic characteristics were not available through the handbook, but data on school type were reviewed. The distribution of the mathematics higher education survey respondents seems to closely resemble the data provided in the handbook, with similar distributions for geographic area and school type, while having a slight overrepresentation of professors from rural institutions and smaller institutions.

Mathematics Demographics and School Type — High School

The sample from the high school mathematics survey had similar characteristics as the ELA respondents. A majority of mathematics teachers who participated in the survey were females, held bachelor's or master's as their highest educational degree, and have been teaching for more than 10 years. In addition, most were from public schools (from high schools where the total enrollment of 12th-grade students was between 100 and 750) and from high schools in either urban or suburban areas.

The high school survey was intended to target high school teachers who taught students as they approached college in their junior and senior year. Because a source of data on teachers by grade level was not available, the survey respondents were compared to the overall high school teacher sample in the 2009 NCES report (Snyder, Dillow & Hoffman, 2009). The high school mathematics survey respondents were fairly representative of the overall NCES sample. Fifty-seven percent of survey respondents were female, which matches the numbers supplied by NCES. The survey did slightly overrepresent teachers with higher amount of education and experience (see Table 70 on page 107 of the NCES 2009 report). With respect to school type, geographic area, and total enrollment, the distribution of the current high school survey sample was consistent with the NCES 2009 report sample (see Table 4 and 160 of the NCES 2009 report).

Mathematics Courses Taught

Tables 11 and 12 show the courses that the mathematics survey respondents taught and the grade levels of most of the students in their courses. For the higher education survey, the number of college professors who taught calculus was the largest followed by college algebra, other, and statistics courses. Over 90% of college professors reported that the majority of the students in their courses were first- or second-year students. For the high school survey, the number of high school teachers who taught algebra II was the largest followed by the number of high school teachers who taught geometry and the number of teachers who taught calculus. The grade levels of the students in the courses that high school teachers taught were fairly evenly distributed, with 27% of respondents indicating 11th grade and the same percentage indicating 12th grade.

Table 11: Mathematics Survey Respondents by Course

	Higher Education (n = 1,488)	
Course	n	%
College Algebra	356	24
Trigonometry	22	1
Precalculus	129	9
Calculus	487	33
Statistics	246	17
Other	248	17
	High School (n = 1,017)	
Course	n	%
Pre-Algebra or other mathematics course	20	2
Algebra I or equivalent	154	15
Geometry or equivalent	175	17
Algebra II or equivalent	210	21
Trigonometry	27	3
Precalculus	136	13
Calculus	167	16
Statistics	78	8
Integrated Curriculum	34	3
Other	16	2

Table 12: Grade Level of Students in the Course Mathematics Survey Respondents Taught

Higher Education			High School		
	n	%		*n*	%
First year	1,067	72	9th grade	198	19
Second year	315	21	10th grade	240	24
Third year	48	3	11th grade	273	27
Fourth year	7	0	12th grade	271	27
Other	51	3	Other	35	3

Mathematics Overall Results of Coverage, Importance, Mastery of Topics

Table 6 provides a summary of the coverage, importance, and mastery of the 132 topics surveyed in Part II of the mathematics survey. For these 132 topics, the coverage ratings were somewhat lower than the ratings observed on the ELA survey. The average number of teachers who rated some or substantial coverage for all topics was 66% and 71% for the higher education and high school survey respondents, respectively. In contrast, the importance ratings for the topics were considerably higher, with approximately 88% of higher education survey respondents and 90% of high school respondents rating all of the topics as somewhat important or essential.

Within these 132 topics, 71 of the topics were coded as being associated with, or covered on, the SAT. As with the ELA survey, items that were associated with the SAT had slightly higher ratings for both coverage and importance. For example, 92% of the higher education respondents rated the SAT topics as either somewhat important or essential.

Table 13: Mean Coverage Ratings for Mathematics Topics by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S*
Total Topics	132	1.93	0.69		2.01	0.70	
Number and Operations	17	1.51	0.66	-0.6	1.79	0.69	-0.3
Algebra and Functions	51	1.96	0.70	0.0	2.10	0.69	0.1
Geometry and Measurement	33	1.78	0.68	-0.2	2.04	0.71	0.0
Data Analysis, Statistics, and Probability	31	2.24	0.71	0.5	1.93	0.74	-0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

Mathematics Coverage of Content Areas in High School and College

This section examines the coverage ratings on the mathematics content areas that were associated with the SAT. Table 13 shows the average coverage ratings for all of the content areas in the survey, while Table 14 shows the average coverage ratings for the subset of content areas associated with the SAT. In the higher education survey, the grand mean of coverage ratings on the 71 SAT topics by college professors was 1.95 with pooled standard deviation of 0.69 (Table 15). Among the four content areas in the higher education survey, the coverage ratings by college professors on "Data Analysis, Statistics, and Probability" (2.32) were the highest followed by "Algebra and Functions" (2.06), "Geometry and Measurement" (1.86), and "Number and Operations" (1.54). The effect sizes for "Data Analysis, Statistics, and Probability" and "Number and Operations" were 0.5 and -0.6, respectively, suggesting that "Data Analysis, Statistics, and Probability" had moderately higher coverage ratings and "Number and Operations" had moderately lower coverage rating than the grand mean.

Table 14: Mean Coverage Ratings for Mathematics Topics by the SAT by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S*
Total Topics in SAT	71	1.95	0.69		2.14	0.68	
Number and Operations	13	1.56	0.68	-0.6	1.84	0.68	-0.4
Algebra and Functions	31	2.06	0.69	0.2	2.23	0.67	0.1
Geometry and Measurement	18	1.86	0.66	-0.1	2.21	0.69	0.1
Data Analysis, Statistics, and Probability	9	2.32	0.69	0.5	2.13	0.67	-0.0

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

Given that the SAT is designed to be taken by high school students and is not designed to cover topics taught in college classrooms, it was not surprising to find that the overall coverage rating in high school was higher than that in college (mean = 2.14, pooled S.D = 0.68). The ranking of the coverage ratings by high school teachers for the four content areas appeared to be slightly different from the coverage ratings by college professors. "Algebra and Functions" (2.23) received the highest coverage ratings, followed by "Geometry and Measurement" (2.21) and "Data Analysis, Statistics, and Probability" (2.13). "Number and Operations" (1.84) received the lowest rating. The effect sizes for all content areas were small, indicating that the average coverage rating on each content area was close to the grand mean.

One important point to note here is that it is likely that the results of the survey were impacted by the response patterns of respondents. While survey respondents were able to skip sections on content areas that they did not teach, all survey respondents were required to complete the Numbers and Operations area. The Number and Operations topic area is considered to be fundamental or comprised of basic topics that provide a foundation for much of the future mathematical knowledge that students will acquire. As such, coverage of these topics is usually limited to lower-level classes taught earlier in high school, though they still remain essential topics for students to understand in order to succeed in mathematics. Not too surprisingly, topics in this section tended to have lower overall ratings. As expected, the coverage ratings were lower than the ratings observed for the importance of the topics.

Mathematics Importance of Content Areas in High School and College

This section examines the importance ratings provided by the mathematic survey respondents. Table 15 shows the average importance ratings for the content areas of all topics in the mathematics survey Part II. Table 16 shows the average importance ratings for the content areas of the 71 topics that were associated with the SAT.

Table 15: Mean Importance Ratings for Mathematics Topics by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S*
Total Topics	132	2.36	0.61		2.39	0.59	
Number and Operations	17	2.09	0.67	-0.4	2.21	0.63	-0.3
Algebra and Functions	51	2.40	0.59	0.1	2.48	0.57	0.2
Geometry and Measurement	33	2.37	0.61	0.0	2.40	0.59	0.0
Data Analysis, Statistics, and Probability	31	2.44	0.60	0.1	2.33	0.62	-0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

Table 16: Mean Importance Ratings for Mathematics Topics by the SAT by Content Area

		HE Coverage			HS Coverage		
	Number of Topics	Mean	Pooled S.D	E.S*	Mean	Pooled S.D	E.S*
Total Topics in SAT	71	2.44	0.58		2.50	0.56	
Number and Operations	13	2.19	0.65	-0.4	2.30	0.62	-0.4
Algebra and Functions	31	2.51	0.55	0.1	2.58	0.53	0.1
Geometry and Measurement	18	2.45	0.58	0.0	2.53	0.55	0.1
Data Analysis, Statistics, and Probability	9	2.52	0.56	0.1	2.43	0.57	-0.1

Note. E.S: Effect Size is computed by $(M_{Total} - M_{Content})/S.D_{Total}$ where M_{Total} is the grand mean of total topics, $M_{Content}$ is the mean of each content area and $S.D_{Total}$ is the pooled standard deviation of total topics.

In the higher education survey, the grand means of the importance ratings on the 71 topics was 2.44 (pooled S.D = 0.58). With respect to the four content areas, the importance ratings by college professors on "Data Analysis, Statistics, and Probability" (2.52) was the highest followed by "Algebra and Functions" (2.51), "Geometry and Measurement" (2.45), and "Number and Operations" (2.19). The effect sizes for all content areas were small, indicating that the average importance rating on each content area was close to the grand mean.

In the high school survey, the grand means of the importance ratings on the 71 topics was 2.50 (pooled S.D = 0.58). For the importance ratings by high school teachers, "Algebra and Functions" (2.58); "Geometry and Measurement" (2.53); "Data Analysis, Statistics, and Probability" (2.43); and "Number and Operations" (2.30) were in descending order. Similar to the higher education survey, the effect sizes for all content areas were small, indicating that the average importance rating on each content area was close to the grand mean.

Analysis by Topics

The topics areas covered on the survey had consistently high coverage and importance ratings in both the high school and the higher education surveys. Appendix B lists all of the topics covered in the curriculum survey, along with the source or reference material for each, and the mean coverage and importance ratings for both high school and higher education survey respondents. Sixty-three of the 71 topics associated with the SAT had mean importance ratings higher than 2.0 in the higher education survey, while 52 of the 71 topics had mean coverage ratings of 2.0 or higher in the high school survey.

Conclusion

This research report presented the results of the ELA and mathematics curriculum surveys that were conducted by the College Board. The survey covered areas in English language arts and mathematics and covered topics pulled from the SAT, the SAT Subject Tests, and the CBSCS. The current paper focused on the extent to which the topics covered on the SAT were covered in high schools and were considered to be important by colleges. The main results suggest that both high school teachers and college professors consider the topics measured by the SAT to be important. Furthermore, the topics on the SAT are taught in high school classrooms.

In the ELA survey, every topic in the SAT was considered to be important by both the higher education and the high school survey respondents, while almost all of the survey topics also had high coverage ratings among high school survey respondents. College professors rated the overall importance of writing topics associated with the SAT to be slightly higher than reading topics, although both topics were identified to be important. The results were consistent with the findings in the 2003 ELA survey (Milewski et al., 2005).

In line with the results of the ELA survey, most of the topics in mathematics measured by the SAT were found to be important for entering college students and were covered by high school teachers. There were, however, some topics that had lower ratings in either high school coverage or higher education importance. While many of these topics had mean ratings at or near the ratings of all of the other areas, it is likely that a number of factors impacted the ratings for the mathematics topics. First, a number of the topics with lower ratings were within the Numbers and Operations content area. The Numbers and Operations content area was the one content area that all survey respondents were required to complete. On all others, respondents were able to skip items that did not ask about topics covered in their course. A second factor that may have influenced the ratings was that many of the topics were either very basic or assumed to be acquired prior to high school, while others seemed to be advanced and relevant to more advanced college classes. Such topics in mathematics are very course specific, however, and thus the level of mastery required for each course can vary.

While the survey results demonstrated strong support for the topics being assessed on the SAT, with both high school and higher education survey respondents rating the vast majority of the topics associated with the SAT as both important and covered in their classrooms, future steps will still be completed. In particular, the results will be further reviewed by the SAT Test

Development Committees, which are made up of English language arts and mathematics teachers from both the higher education and high school areas. Some of this work has already begun, and committee members have identified some topics that are likely to have notably different response patterns, depending upon the course or students being taught, as well as some other topics that have been misinterpreted to be asking about topics more advanced than was intended. As work with the committee continues, further analyses and discussions will continue to explore all of the topics on the survey to determine final recommendations. Future reports will detail the procedures and outcomes of this work, and will also summarize the results of the survey as they are associated with the SAT Subject Tests.

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Appendix A, Table A1: List of topics covered by the English Language Arts Curriculum Survey, source of each topic area, and mean coverage and importance ratings

ID	GRID	Source of Skills and Topics			High School		Higher Education	
		SAT1	SAT2	CB_ Standards	Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
	Reading							
	Comprehending Words and Sentences							
1	Using knowledge of word roots, prefixes, suffixes, and cognates to determine word meaning			X	2.14	2.38	1.56	2.17
2	Using context to determine word meaning	X		X	2.49	2.75	1.98	2.56
3	Determining from context the correct meaning of a word with multiple meanings	X		X	2.36	2.61	1.93	2.51
4	Using knowledge of vocabulary, grammar, and sentence structure to determine the meanings of sentences	X		X	2.50	2.72	2.20	2.72
	Understanding Literary Texts							
5	Analyzing plot structure and other narrative elements	X	X	X	2.69	2.77	2.22	2.43
6	Identifying themes and meanings		X	X	2.85	2.88	2.52	2.66
7	Employing basic literary terminology (alliteration, stanza, imagery, etc.)	X	X	X	2.65	2.69	1.95	2.14
8	Identifying techniques of characterization		X	X	2.50	2.59	1.94	2.13
9	Identifying narrative point of view	X	X	X	2.47	2.59	2.21	2.40
10	Analyzing figurative language, symbolism, meter and form, and other poetic elements		X	X	2.54	2.58	2.03	2.17
11	Using social, cultural, and historical context to interpret a text			X	2.61	2.65	2.47	2.59
12	Developing a basic interpretation of an entire short literary work		X	X	2.69	2.75	2.31	2.48
	Organizational Patterns, Textual Features, and Graphical Representations							
13	Recognizing standard organizational patterns (e.g., chronological, compare-contrast, cause and effect)	X		X	2.36	2.53	2.31	2.52
14	Understanding textual features and graphical representations in texts (e.g., tables of contents, sidebars, headings, tables, maps, timelines)			X	1.92	2.19	1.62	1.95
	Author's Purpose, Craft, and Message							
15	Summarizing the central argument or main idea of a text	X		X	2.72	2.84	2.67	2.83
16	Understanding and paraphrasing supporting ideas in a text	X		X	2.60	2.75	2.56	2.74
17	Making inferences and drawing conclusions from a text	X		X	2.77	2.85	2.65	2.79

ID	GRID	Source of Skills and Topics			High School		Higher Education	
		SAT1	SAT2	CB_ Standards	Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
18	Identifying and describing an author's voice, persona, tone, and style	X	X	X	2.59	2.66	2.41	2.49
19	Inferring an author's purpose for writing and intended audience	X	X	X	2.58	2.70	2.58	2.66
20	Identifying rhetorical strategies (e.g., acknowledging the opposition, appeals to emotion, appeals to authority)	X		X	2.27	2.46	2.35	2.53
21	Comparing and contrasting two related texts	X	X	X	2.44	2.56	2.32	2.46
22	Understanding rhetorical elements in media communication (e.g., speeches, news stories, documentaries, films)			X	1.99	2.27	1.82	2.11
23	Understanding textual features and rhetorical elements in visual sources (e.g., photographs, paintings, advertisements)			X	1.89	2.12	1.74	1.99
24	Understanding application and analogy (i.e., applying a situation described in a text to a different context, inferring how one author would respond to another author's argument, citing hypothetical evidence that would strengthen an author's argument)	X		X	2.11	2.35	2.06	2.32
	Evaluating Informational Texts							
25	Identifying incomplete or misleading information	X		X	2.07	2.40	2.16	2.50
26	Discriminating between relevant and irrelevant information for a given task or purpose	X		X	2.19	2.47	2.25	2.53
27	Identifying bias in an author's perspective	X		X	2.32	2.55	2.37	2.58
28	Identifying logical flaws in an author's argument	X		X	2.15	2.45	2.27	2.55
29	Critiquing author's rhetorical choices (e.g., text structure, stylistic elements, appeals)	X		X	2.23	2.42	2.27	2.42
30	Evaluating media communication in light of audience and purpose			X	2.00	2.27	2.06	2.29
31	Distinguishing fact from opinion	X		X	2.33	2.64	2.41	2.71
	Writing							
	Purposes of Writing							
32	Writing personal narratives	X		X	2.07	2.25	1.91	2.03
33	Writing expository essays	X		X	2.53	2.69	2.49	2.66
34	Writing dialogues or scripts			X	1.52	1.69	1.19	1.34
35	Writing journal entries			X	2.05	2.08	1.73	1.86
36	Writing persuasive and/or argumentative essays	X			2.62	2.78	2.59	2.77

ID	GRID	Source of Skills and Topics			High School		Higher Education	
		SAT1	SAT2	CB_ Standards	Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
37	Writing analyses and evaluations of texts			X	2.59	2.72	2.44	2.65
38	Writing research papers			X	2.34	2.60	2.20	2.56
39	Writing synthesis essays			X	2.05	2.39	2.02	2.34
40	Creative writing			X	1.79	1.94	1.26	1.58
	Writing an Essay							
41	Writing a clear and coherent essay	X		X	2.86	2.96	2.81	2.96
42	Writing a unified essay	X		X	2.80	2.91	2.76	2.93
43	Responding to the needs of different audiences			X	2.29	2.53	2.29	2.54
44	Focusing on a purpose for writing	X		X	2.61	2.77	2.57	2.76
45	Using appropriate voice, tone, and style	X		X	2.59	2.75	2.48	2.70
46	Using topic sentences when necessary	X		X	2.51	2.79	2.40	2.72
47	Organizing paragraphs and using appropriate transitions	X		X	2.57	2.85	2.52	2.83
48	Using literal and figurative language appropriately	X		X	2.36	2.54	1.97	2.26
49	Using supporting details and examples	X		X	2.81	2.91	2.81	2.94
50	Developing a logical argument	X		X	2.64	2.82	2.59	2.84
51	Writing effective introductions and conclusions	X		X	2.65	2.84	2.58	2.80
52	Using sentence variety	X		X	2.50	2.72	2.19	2.51
53	Synthesizing elements and ideas in multiple texts to develop an original position			X	2.36	2.62	2.34	2.63
	Writing Process							
54	Using prewriting techniques to generate texts			X	2.40	2.62	2.39	2.58
55	Generating multiple drafts in the process of creating and completing texts			X	2.51	2.69	2.69	2.80
56	Identifying purpose, audience, occasion, and rhetorical mode for the composing task			X	2.39	2.62	2.47	2.68
57	Gathering information from a variety of appropriate sources			X	2.45	2.71	2.40	2.66
58	Learning strategies for revising, editing, and proofreading			X	2.56	2.79	2.68	2.86
59	Understanding writing as an open process that permits invention and rethinking for revision			X	2.47	2.71	2.64	2.79
60	Using Standard Written English except when using appropriate alternatives (e.g., slang, dialects) to achieve desired effect	X		X	2.62	2.78	2.50	2.76
61	Using peer groups for feedback and revision			X	2.34	2.41	2.41	2.45

ID	GRID	Source of Skills and Topics			High School		Higher Education	
		SAT1	SAT2	CB_ Standards	Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
	Grammar and Usage							
62	Controlling errors in subject–verb agreement	X		X	2.27	2.77	2.08	2.77
63	Avoiding dangling modifiers	X		X	2.02	2.48	1.91	2.47
64	Using connectives appropriately	X		X	2.11	2.56	2.06	2.62
65	Using appropriate idiomatic words, phrases, or structures	X		X	1.99	2.35	1.91	2.44
66	Avoiding wordiness	X		X	2.38	2.63	2.22	2.56
67	Avoiding errors in pronoun agreement, case, and reference	X		X	2.33	2.70	2.15	2.66
68	Avoiding pronoun shift	X		X	2.20	2.60	2.09	2.60
69	Using appropriate verb forms	X		X	2.26	2.72	2.07	2.71
70	Maintaining tense sequences	X		X	2.31	2.69	2.08	2.66
71	Making acceptable word choices	X		X	2.47	2.74	2.23	2.67
72	Using comparative modifiers appropriately	X		X	1.98	2.45	1.80	2.41
73	Using all punctuation appropriately	X		X	2.42	2.80	2.27	2.74
74	Avoiding illogical comparisons	X		X	2.05	2.48	1.99	2.52
75	Controlling errors in mechanics/ spelling, capitalization, and punctuation	X		X	2.50	2.82	2.27	2.77
	Sentence Structure							
76	Combining sentences appropriately	X		X	2.25	2.68	2.10	2.63
77	Avoiding sentence fragments	X		X	2.32	2.81	2.27	2.79
78	Avoiding run-on sentences	X		X	2.32	2.79	2.27	2.78
79	Maintaining parallel structure in sentences	X		X	2.28	2.60	2.08	2.53
80	Subordinating and coordinating ideas in sentences	X		X	2.20	2.59	2.09	2.60
81	Avoiding weak passive constructions	X		X	2.17	2.50	2.00	2.37
82	Avoiding faulty predication in sentences	X		X	1.88	2.37	1.81	2.44
	Paragraph Unity Coherence							
83	Using appropriate transitions	X		X	2.39	2.72	2.39	2.70
84	Adding or deleting content to improve coherence	X		X	2.45	2.72	2.48	2.74
85	Recognizing effective organizational structures	X		X	2.44	2.71	2.52	2.77

Appendix B, Table B1: List of topics covered by the Mathematics Curriculum Survey, source of each topic area, and mean coverage and importance ratings

		Source of Skills and Topics				High School		Higher Education	
ID	GRID	SAT1	SAT2	CB_ Standards	Other	Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
	Number and Operations								
1	Arithmetic word problems (including percent, ratio, and proportion)	X	X	X		1.98	2.56	1.72	2.55
2	Ratio, rate, proportion, and percent	X	X	X		1.98	2.53	1.68	2.51
3	Sets (union, intersection, elements)	X				1.62	1.98	1.54	1.97
4	Number systems (integers, rational numbers, real numbers)	X	X	X		2.05	2.56	1.75	2.47
5	Decimal representations for rational and irrational numbers	X	X	X		1.83	2.37	1.54	2.33
6	Properties of and operations with real numbers	X	X	X		2.04	2.65	1.70	2.65
7	Absolute value of real numbers	X	X	X		1.93	2.35	1.77	2.37
8	Operations with complex numbers		X	X		1.80	2.12	1.52	1.83
9	Graphical representation of complex numbers		X	X		1.53	1.79	1.25	1.58
10	Elementary number theory (primes, prime factorization, divisibility, number of divisors, odd/even)	X	X	X		1.70	2.35	1.45	2.13
11	Matrices (operations)		X	X		1.66	1.92	1.33	1.80
12	Arithmetic sequences (including sums of arithmetic sequences)	X	X	X		1.86	2.15	1.46	1.90
13	Geometric sequences	X	X	X		1.84	2.13	1.47	1.91
14	Sequences and series (including exponential growth)	X	X	X		1.94	2.29	1.69	2.13
15	Counting (fundamental counting principle, combinations, permutations, Venn diagrams)	X	X	X		1.76	2.14	1.41	1.92
16	Basic graph theory (networks or vertex-edge graphs)	X	X			1.41	1.78	1.17	1.56
	Algebra and Functions								
17	Vectors (representations and operations)		X	X		1.49	1.96	1.28	1.90
18	Evaluating algebraic expressions	X	X	X		2.43	2.86	2.13	2.84
19	Symbolic manipulation of algebraic expressions	X	X	X		2.41	2.80	2.18	2.81
20	Concept of absolute value	X	X	X		2.13	2.48	1.95	2.45

ID	GRID	Source of Skills and Topics			Other	High School		Higher Education	
		SAT1	SAT2	CB_ Standards		Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
21	Exponents and their properties	X	X	X		2.39	2.80	2.19	2.80
22	Roots	X	X	X		2.32	2.69	2.00	2.63
23	Logarithms and their properties		X	X		2.08	2.47	2.14	2.54
24	Linear equations	X	X	X		2.47	2.88	2.21	2.83
25	Quadratic equations	X	X	X		2.42	2.78	2.15	2.72
26	Polynomial equations		X	X		2.34	2.67	2.18	2.58
27	Factoring	X	X	X		2.38	2.76	2.02	2.70
28	Absolute value equations	X	X	X		2.07	2.33	1.85	2.23
29	Rational equations	X	X	X		2.26	2.54	2.06	2.45
30	Radical equations	X	X	X		2.13	2.46	1.91	2.32
31	Exponential/logarithmic equations		X	X		2.14	2.52	2.15	2.52
32	Systems of linear equations	X	X	X		2.27	2.63	1.86	2.41
33	Systems of nonlinear equations	X	X			1.78	2.24	1.46	1.91
34	Linear inequalities	X	X	X		2.13	2.46	1.93	2.37
35	Quadratic inequalities	X	X	X		1.74	2.14	1.74	2.12
36	Absolute value inequalities	X	X	X		1.85	2.14	1.79	2.17
37	Systems of inequalities	X	X	X		1.89	2.22	1.45	1.89
38	Direct and indirect variation	X	X	X		1.90	2.26	1.56	2.04
39	Use of technology to solve equations algebraically (e.g., computer algebra systems and CAS calculators)			X		2.13	2.42	1.79	2.01
40	Translating words into an algebraic expression or equation	X	X	X		2.34	2.82	2.25	2.79
41	Solving problems in a real-life context, which involves modeling with an algebraic expression or equation	X	X	X		2.50	2.81	2.29	2.68
42	Modeling with linear, polynomial and rational functions	X	X	X		2.31	2.64	2.16	2.52
43	Modeling with exponential/ logarithmic functions		X	X		2.09	2.46	2.12	2.44
44	Modeling with logistic functions			X		1.59	2.07	1.50	1.82
45	Modeling with trigonometric functions		X	X		1.94	2.45	1.70	2.22
46	Modeling with matrices				X	1.62	2.01	1.29	1.85
47	Linear programming				X	1.62	2.03	1.20	1.69
48	Mathematics of finance				X	1.60	2.20	1.56	1.99
49	Function notation, i.e., f (x) =	X	X	X		2.47	2.78	2.36	2.84

ID	GRID	Source of Skills and Topics			Other	High School		Higher Education	
		SAT1	SAT2	CB_ Standards		Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
50	Properties of functions (domain/range, symmetry, zeros, intercepts, asymptotes, max/min)	X	X	X		2.53	2.80	2.48	2.76
51	Sums, differences, products, and quotients of functions	X	X	X		2.24	2.57	2.21	2.58
52	Transformations of functions	X	X	X		2.29	2.56	2.13	2.42
53	Inverse functions		X	X		2.17	2.50	2.19	2.53
54	Linear functions	X	X	X		2.44	2.79	2.27	2.79
55	Polynomial functions	X	X	X		2.37	2.64	2.30	2.68
56	Rational functions	X	X	X		2.27	2.57	2.22	2.55
57	Exponential functions	X	X	X		2.31	2.61	2.33	2.69
58	Logarithmic functions			X		2.15	2.49	2.29	2.61
59	Logistic functions				X	1.56	2.00	1.46	1.79
60	Trigonometric and periodic functions		X	X		2.02	2.54	1.92	2.56
61	Piecewise-defined functions	X	X	X		1.99	2.32	2.05	2.31
62	Specially defined functions (e.g., step, greatest integer)		X	X		1.78	2.02	1.73	1.92
63	Recursively defined sequences/functions		X	X		1.63	2.03	1.39	1.86
64	Inverse trigonometric functions		X	X		1.87	2.33	1.80	2.28
65	Composition of functions	X	X	X		2.13	2.49	2.26	2.65
66	Concept of a limit		X	X		1.82	2.49	2.13	2.57
67	Functions defined parametrically		X	X		1.49	2.04	1.51	2.05
68	Concept of rate of change of a function			X		2.22	2.64	2.35	2.65
	Geometry and Measurement								
69	Points, lines, planes, and angles	X	X	X		2.32	2.71	1.85	2.62
70	Triangles and polygons	X	X	X		2.39	2.69	1.79	2.53
71	Special right triangles	X	X	X		2.40	2.69	1.81	2.50
72	Pythagorean Theorem	X	X	X		2.40	2.83	1.92	2.75
73	Congruence and similarity	X	X	X		2.36	2.66	1.62	2.42
74	Circles	X	X	X		2.30	2.59	1.89	2.57
75	Perimeter, circumference, and area	X	X	X		2.32	2.73	1.95	2.67
76	Logical reasoning and proof	X	X	X		2.25	2.58	1.84	2.51
77	Measurement topics (e.g., units and scales, precision, accuracy, approximate error, and unit analysis)	X	X	X		1.92	2.35	1.73	2.36
78	Use of geometric software, e.g., Cabri or Geometer's Sketchpad			X		1.60	1.86	1.10	1.46

ID	GRID	Source of Skills and Topics			Other	High School		Higher Education	
		SAT1	SAT2	CB_ Standards		Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
79	Equations of lines in the plane (including parallel and perpendicular)	X	X	X		2.34	2.71	2.16	2.72
80	Distance and midpoint formulas	X	X	X		2.21	2.59	1.89	2.46
81	Parabolas and circles	X	X	X		2.08	2.44	2.04	2.49
82	Ellipses and hyperbolas		X	X		1.61	2.13	1.58	2.09
83	Regions defined by algebraic conditions in the plane		X	X		1.71	2.17	1.66	2.13
84	Locus of points	X	X	X		1.57	1.96	1.41	1.90
85	Symmetry	X	X	X		2.10	2.38	1.96	2.29
86	Transformations (translations, reflections, rotations, dilations)	X	X	X		2.14	2.39	1.88	2.26
87	Polar coordinates		X	X		1.48	2.00	1.46	2.09
88	Polar representation of complex numbers			X		1.38	1.84	1.21	1.85
89	Graphing functions defined parametrically			X		1.44	1.95	1.46	2.02
90	Coordinates in three dimensions		X			1.69	2.04	1.92	2.48
91	Polyhedra and other geometric solids	X	X	X		2.02	2.27	1.57	2.13
92	Visualization in three dimensions	X	X	X		2.14	2.36	2.02	2.49
93	Surface area and volume of solids (e.g., cylinders, cones, spheres, pyramids, prisms)	X	X	X		2.47	2.64	2.06	2.47
94	Right triangle trigonometry ratios (sine, cosine, tangent)		X	X		2.49	2.80	2.04	2.79
95	Solving problems using right triangle trigonometry		X	X		2.45	2.78	2.02	2.70
96	Radian measure of angle		X	X		2.11	2.60	2.03	2.80
97	Fundamental trigonometric identities		X	X		2.14	2.52	2.03	2.65
98	Amplitude/period of graphs of trigonometric functions		X	X		2.03	2.45	1.95	2.48
99	Laws of Sines and Cosines		X	X		2.06	2.40	1.75	2.18
100	Double-angle and half-angle formulas		X	X		1.81	2.16	1.82	2.25
101	Vector analysis using trigonometry				X	1.59	2.03	1.45	1.99
	Data Analysis, Statistics, and Probability								
102	Mean, median, mode, range	X	X	X		2.22	2.63	2.65	2.83
103	Concept of standard deviation		X	X		1.87	2.39	2.61	2.78
104	Interquartile range		X	X		1.99	2.24	2.22	2.26

ID	GRID	Source of Skills and Topics			Other	High School		Higher Education	
		SAT1	SAT2	CB_ Standards		Mean Coverage	Mean Importance	Mean Coverage	Mean Importance
105	Understanding how linear transformations of univariate data affect measures of center and spread		X	X		1.73	2.17	1.94	2.15
106	Using dot plots, frequency charts, histograms	X	X	X		2.10	2.41	2.52	2.66
107	Using stem-and-leaf plots		X	X		1.95	2.16	2.14	2.17
108	Using box plots		X	X		1.97	2.19	2.24	2.35
109	Using scatterplots	X	X	X		2.25	2.49	2.39	2.55
110	Concept of trend line to a scatterplot	X	X	X		2.25	2.49	2.34	2.55
111	Outliers			X		2.02	2.32	2.30	2.50
112	Given data, find/choose model and make predictions		X	X		2.22	2.55	2.31	2.49
113	Linear regression		X	X		2.14	2.52	2.34	2.60
114	Quadratic regression		X	X		1.70	2.15	1.39	1.85
115	Exponential regression			X		1.75	2.22	1.34	1.83
116	Correlation coefficients			X		1.93	2.36	2.30	2.52
117	Concept of sampling distributions			X		1.86	2.33	2.47	2.65
118	Normal distribution/ Empirical Rule			X		1.81	2.37	2.65	2.78
119	Binomial Probability Distribution			X		1.72	2.23	2.28	2.43
120	Z-scores; standardizing data				X	1.72	2.29	2.59	2.73
121	Difference between a sample statistic and a population parameter			X		1.73	2.30	2.55	2.74
122	Understanding characteristics of well-designed studies, including the role of randomization in surveys and experiments			X		1.82	2.43	2.27	2.54
123	Elementary probability	X	X	X		2.20	2.52	2.37	2.56
124	Concept of sample space and probability distribution			X		2.01	2.38	2.32	2.47
125	Equally likely outcomes	X	X	X		2.05	2.37	2.19	2.38
126	Probability of compound events	X	X	X		2.06	2.34	2.14	2.32
127	Expected value of random variables				X	1.79	2.25	2.19	2.43
128	Use of probability simulations			X		1.86	2.24	1.82	2.05
129	Conditional probability	X	X	X		1.93	2.28	2.06	2.32
130	Bayes' Theorem, t-tests, and chi-square tests				X	1.58	2.20	2.18	2.44
131	Concept of independent events (multiplication rule)	X	X	X		2.09	2.37	2.24	2.47
132	Use of statistical software			X		1.60	2.15	2.12	2.36

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