Reaching the Goal:
The Applicability and Importance of the Common Core State Standards to College and Career Readiness

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The stated aim of the Common Core State Standards is to define the knowledge and skills students should achieve in order to graduate from high school ready to succeed in entry-level, credit-bearing academic college courses and in workforce training programs.

In June 2010, the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO) released the Common Core State Standards©. The stated aim of the Common Core State Standards is to define the knowledge and skills students should achieve in order to graduate from high school ready to succeed in entry-level, credit-bearing academic college courses and in workforce training programs (Common Core State Standards Initiative, 2010a).

The Common Core State Standards gave states an opportunity to voluntarily adopt common expectations in English language arts and literacy, and mathematics. With common standards in place, states could more easily and efficiently share best practices in curriculum and assessments, while still retaining flexibility on how best to teach these subjects locally (Phillips & Wong, 2010). As of July 2011, 44 states had taken up this invitation and had adopted the standards.

Major questions remain to be answered about these standards, chief among them the degree to which they reflect what is necessary to be ready for college and careers. To help answer this question, the Educational Policy Improvement Center (EPIC) designed and conducted this study. It examines the degree to which the knowledge and skills contained in the Common Core State Standards are applicable to and important for postsecondary readiness.

Our method was to have postsecondary instructors from a wide range of postsecondary courses and institutions rate each standard on its applicability and importance to their course. We began by recruiting a national sample of instructors from two- and four-year institutions in 25 course categories. A total of 1897 responses were received. First, we asked them to rate the applicability of each Common Core standard to their course. If the standard was applicable, we asked them to rate the standard's importance to success in the course.

Instructors Rate Applicability

The study examines the degree to which the knowledge and skills contained in the Common Core State Standards are applicable to and important for postsecondary readiness. The study asked postsecondary instructors from a wide range of postsecondary courses and institutions to rate each standard on its applicability and importance to their course.

Each instructor was given the opportunity to rate both (English language arts [ELA] and literacy, and mathematics). Responses to these two questions and several supplemental questions provide the basis for our findings.

The 25 course categories include 14 from courses commonly associated with general education requirements for a bachelor's degree and 11 that might be better considered as career-oriented, often required for two-year certificates or, in some cases, a bachelor's degree in a career area. EPIC has collected this type of self-reported information previously and has found 70% to 90% consistency of instructor ratings of the standards with independent third-party expert analysis of course syllabi from these instructors (Conley, Aspengren, Gallagher, Stout, & Veach, 2006; Educational Policy Improvement Center, 2008). Given the exploratory nature of this study, this method of data collection was deemed appropriate. Caution is taken throughout the report not to overgeneralize or place excessive weight on any individual data point. Instead, the findings and conclusions are summarized at a relatively high level of aggregation, while the interested reader can still examine the more detailed standards ratings.

We selected courses to be representative examples of common offerings in seven major subject areas: English language arts, mathematics, science, social science, business management, computer technology, and healthcare. The study does not cover the whole landscape of personnel who could provide information on college- and career-readiness, nor do the selected courses comprehensively cover all content areas. The data does, however, give insight on the Common Core standards from college instructors in a number of different fields and contexts.

Table ES.1. Course Categories Represented in Study

Content area	Course category
English language arts	Composition I
	Composition II
	English Literature
Mathematics	Calculus
	College Algebra
	Statistics
Science	Biology
	Chemistry
	Physics
Social science	Introduction to Economics
	Introduction to Psychology
	Introduction to Sociology
	U.S. History
	U.S. Government
Business management	Human Resource Management
	Introduction to Accounting
	Introduction to Business Management
	Introduction to Marketing
Computer technology	Computer Science I
	Database Management Systems
	Fundamentals of Programming
Healthcare	Anatomy and Physiology
	Foundations of Nursing
	Human Development
	Pharmacology

Study Overview

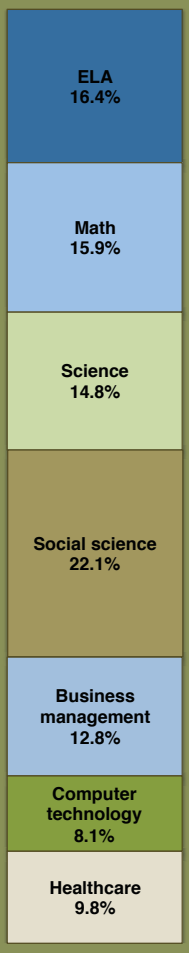
Participants

Data were collected from college instructors using an online instrument. In order to ensure the most suitable participants, we used a nomination process in which we asked liaisons — department chairs, deans, provosts, and/or chief academic officers — to nominate individuals who either currently taught or had recently taught a course or courses from one of the 25 course categories. The course categories are contained in Table ES.1 Liaisons nominated instructors for 3625 distinct courses. The study includes data from the 1815 instructors who rated 1897 separate courses.[1] Figure ES.1 shows the distribution of courses across the seven content areas.

Instructors from all states and the District of Columbia participated in the survey. Nearly 64% of respondents came from public institutions, with 36% from private institutions.

[1]There were 66 instructors (4% of the sample) who were nominated for and completed the survey for more than one course.

Figure ES.1. Percent of Participants by Subject Area



Responses were geographically well balanced across regions of the U.S. Approximately 60% of the courses were taught at four-year institutions, the other 40% at two-year institutions. More than 50% of respondents had taught the course 10 or more times. Participating instructors, therefore, knew their course and content area extremely well.

Because the Common Core standards were written with the intention of being broadly applicable across a range of coursework and content areas — not only to English and mathematics courses — we asked respondents to rate both the ELA and literacy standards and the mathematics standards, regardless of the subject area in which they taught. We grouped the Common Core standards such that respondents rated 113 statements for ELA and literacy and 200 statements for mathematics.

Survey

If respondents rated a standard as applicable (in other words, if it represented prerequisite knowledge and skills, content that would be reviewed in the course, or new information that would be introduced in the course), they were then asked to rate the importance of the standard on a 4-point scale that ranged from least to most important. They also had an opportunity to answer five optional questions that asked them to reflect on the standards as a whole. These questions focused on several dimensions, including cognitive challenge level of the standards, whether they included all of the important knowledge and skills used in their course, as well as their general impression of the standards.

Findings

How applicable are the Common Core standards to postsecondary courses?

In general, we found that for the ELA and literacy standards, applicability ratings for non-literary reading and writing standards are very high, particularly when results from the English language arts strands of Reading for Informational Texts and Writing are combined with results from the literacy, subject-specific versions of these same strands. With few exceptions, a large percent of instructors across all content areas rated the Speaking and Listening strand and Language strand as applicable. Given the broad applicability of these standards to a wide range of postsecondary courses, the Speaking and Listening standards seem particularly important to teach and assess at the classroom level and to be included in some form by the two consortia of states working on common assessments of the Common Core standards.

For the mathematics standards, the applicability ratings varied according to the categories included in the standards. For example, the Standards for Mathematical Practice were relevant to a large majority of the sample, whereas Functions and Geometry were applicable to a relatively small percentage of the sample.

For a majority of instructors in almost all content areas rated the Mathematical Practices as applicable.

Not every standard is applicable to every one of the 25 course categories. This should hardly be surprising given the wide range of courses we intentionally included in the study and the fact that we made all standards available for review by all respondents. Also not surprising, when applicability ratings are grouped by content area, they show that instructors of different content areas place varying degrees of emphasis on the eight ELA and literacy strands and the five mathematics

conceptual categories and Mathematical Practices.

How important are the Common Core standards to success in a wide range of postsecondary courses?

Almost every standard received a mean rating well above 2.5, the midpoint between "less important" and "more important" on the 4-point scale. Most exceeded 3, "more important." Therefore, interpretation of the importance ratings is relatively straightforward: respondents who considered a particular standard applicable also considered it to be important. The ELA and literacy standards on the whole received higher importance ratings than did the mathematics standards. Mathematics had more standards below 2.5, 25 of 200. Some of these were standards identified as being more specialized in nature. Only two of 113 English language arts (ELA) and literacy standards had means below 2.5.

Importance of the ELA and Literacy Standards

Instructors who taught courses in the English content area comprised the majority of respondents in all ELA and literacy strands except speaking and listening, and language for which responses were distributed more representatively across all course categories. Social science instructors made up the large majority of respondents in the Reading Standards in History/Social Studies, while respondents in the Reading Standards in Science and Technical Subjects were more broadly distributed, with about a quarter of respondents teaching science courses. The importance ratings for the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects were also distributed representatively, with social science and science instructors providing just over half of the responses. The Language strand, while receiving high applicability ratings, also received the lowest importance ratings. These standards relate to use of the English language and include spelling, punctuation, and usage conventions and are very specific in nature, more specific than other ELA and literacy standards.

Standards that relate to students mastering comprehension of nonfiction text with grade-appropriate complexity were highly rated, both generally and as they apply to specific content areas. Instructors placed relatively greater emphasis on standards that require students to extract key ideas and details from text, possess general writing skills — especially the writing process — use research to support written analysis, and write routinely over both extended and shorter periods of time.

Importance of the Mathematics Standards

Mathematics and science instructors comprise the majority of respondents in Number and Quantity, Algebra, Functions, and Geometry, in which they make up 85% of respondents. They are less than a majority in Statistics, where science and social science respondents make up a majority. Mathematical Practices had the widest range of respondents. For these standards, math and science instructors make up 43% of respondents, and social science instructors comprise an additional 17%, with three other content areas each contributing more than 10% of the responses.

Mathematics standards with the highest ratings include standards related to reasoning quantitatively and interpreting functions. Three algebraic concepts also received high ratings. These contain standards that expect students to create equations that describe numbers or relationships, interpret the structure of expressions, and solve problems with different equations. All respondents rated the Geometry category relatively lower. This finding suggests that the Geometry category may be a candidate for further review in order to increase its applicability and importance by eliminating or consolidating some standards. The Standards for Mathematical Practice, which authors of the Common Core standards stated should be applied across all applicable standards, are noteworthy because they received the highest importance ratings and because the ratings came from a very broad cross-section of respondents. These findings suggest that, as intended, the Standards for Mathematical Practice should indeed be implemented and assessed across subject

areas in a wide range of contexts and courses in secondary schools and in state and consortia assessments.

Supplemental Questions

Further reinforcing the conclusion that the standards were broadly applicable to entry-level courses were the results from the supplemental questions. When asked if the standards as a whole were sufficiently cognitively challenging to prepare students for their classes, nearly 96% of respondents said they were. In responses to the question of whether the standards omitted key knowledge and skills, nearly 84% responded no, they did not.

Of the more than 90% of respondents who answered the question asking whether the ELA and literacy standards were a coherent representation of the fields of knowledge necessary for success in their course, nearly 84% indicated they were, and 62% of the more than 90% of respondents answering the mathematics standards question indicated they were coherent. This somewhat lower number in mathematics suggests the mathematics standards, with their greater specificity and number of standards, may have sacrificed a modicum of coherence in the eyes of some postsecondary instructors.

A final open-ended question gave respondents an opportunity to offer opinions on the Common Core standards. The largest proportion of responses actually detailed ways that students are not well prepared for college, rather than commenting directly on the Common Core standards. The open-ended questions are one more place where questions about the applicability of the standards might have arisen but did not.

Conclusion

The study suggests that students who are generally proficient in the Common Core standards will likely be ready for a wide range of postsecondary courses, and the more Common Core standards in which they are proficient, the wider the range of postsecondary-level classes they will be ready to undertake.

We note the danger in assuming that this finding is synonymous with the idea that students who have learned the Common Core standards are fully ready for college and careers. Other important dimensions of readiness exist, upon which the Common Core standards are necessarily silent. Careful attention should be given to comprehensive conceptions of college and career readiness when considering which aspects of readiness the standards address.

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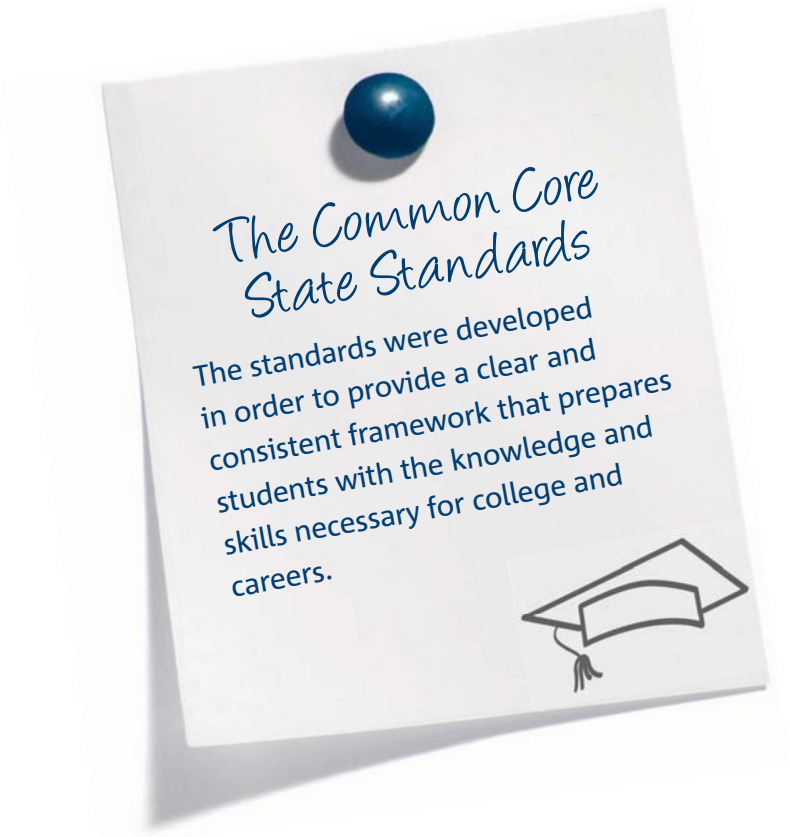
The effort by states to develop the Common Core State Standards© was coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). With involvement and participation from teachers, school administrators, and national experts, the organizations developed the Common Core State Standards in order to provide a clear and consistent framework that prepares students with the knowledge and skills necessary for college and careers. The Common Core State Standards were developed with the intention that states would be free to adopt them voluntarily.

According to the Common Core State Standards Initiative (2010a), the standards are designed to:

- Align with college and work expectations;
- Be clear, understandable, and consistent;
- Include rigorous content and application of knowledge through high-order skills;
- Build upon the strengths and lessons of current state standards;
- Be informed by other top-performing countries; and
- Be evidence based.



The standards aim to define the knowledge and skills students should achieve in order to graduate from high school ready to succeed in entry-level, credit-bearing academic college courses and in workforce training programs. They make no distinction between college and career readiness (King, 2011). To examine how well the standards achieve their stated aim of preparing students for college and careers, the Educational Policy Improvement Center (EPIC) undertook this study. It examines the relationship between the standards and the requirements and expectations set by instructors of entry-level postsecondary courses. The study is designed to examine the degree to which the knowledge and skills applicable to and important for postsecondary readiness are represented by the Common Core State Standards (called Common Core standards throughout the rest of this report).

We recruited a national sample of entry-level college instructors and asked them to rate each standard in the highest-grade band for each of the two subject areas that the Common Core standards currently cover: (a) English language arts and literacy and (b) mathematics. Data from their ratings address two research questions:

1. How applicable are the Common Core standards to college courses?
2. When they are perceived as applicable, how important are the Common Core standards to college courses?

Though there are a number of questions that we could have asked college instructors about the Common Core standards, in this study we asked instructors to make two straightforward determinations on a per-standard basis. First, we asked them to rate the applicability of the standard to their course. If the standard was applicable, we asked them to rate its importance. Given the number of statements the Common Core standards include and the number of course categories in the survey, these two basic questions provide a wealth of preliminary information about the validity of the Common Core standards in relation to the claims of its authors and sponsors that the standards prepare students well for a range of postsecondary futures.

The study analyzes ratings from instructors of courses from 25 categories at two- and four-year degree-granting institutions. Table 1 shows the categories. Fourteen of those course categories — in English language arts, mathematics, science, and social science — are common

general education requirements associated with a bachelor's degree. The other 11 — in business management, computer technology, and healthcare — have a stronger association with career pathways. Many courses with the same or similar titles can be found at both two- and four-year institutions and could be used to meet certificate, associate, or baccalaureate requirements. However, these 11 course categories present a test of the claim that the Common Core standards are valid in relation to career preparation. The study does not attempt to cover the entire range of career pathways available in postsecondary education. We sought to identify a range of courses associated with several career areas for which future job prospects are solid and that would require at least some mathematics and literacy skills. We established the overall content areas based on the most common bachelor's degrees identified in the National Center for Education Statistics report, The Condition of Education 2009 – Undergraduate Fields of Study (Planty, Kena, & Hanes, 2009). Then within each field, the most common entry-level, credit-bearing courses were identified (U.S. Department of Education, 2004). EPIC also explored undergraduate degree and certificate programs from a variety of institutions, including technical schools, community colleges, and universities, to identify course requirements for these fields. Although these requirements differed by institution, there was considerable overlap among degree programs (i.e., certificate, Associate, Baccalaureate), enabling us to pinpoint common entry-level courses that serve as central or core requirements. The course categories selected in the seven content areas were not intended to cover these areas comprehensively. In general, the courses represent classes of the type a student would be likely to take upon entry to a postsecondary institution. In some cases, however, the courses have prerequisites.

To make final selections of career and technical education courses, we used labor market data that identifies three fields of study in which growth is forecasted at a significant rate (greater than 20% over the next 10 years). These subject areas include business management, nursing, and computer technology (U.S. Department of Labor). Within the computer technology field of study, there are two distinct pathways: programming and information systems. The courses selected for computer technology represent the most common entry-level courses for each track.

Next, we describe the survey methods and findings and then return to answer the questions posed by the study. Chapter 2, Methodology, describes selection criteria for instructors, a profile of respondents, and decisions made about data inclusion and analysis. Chapter 3 provides summaries of key results of respondent ratings for the Common Core English language arts and literacy standards. Chapter 4 continues with the ratings for the mathematics standards. Next, Chapter 5 offers results from several open-ended questions respondents were asked and the comments they made regarding the Common Core standards. Finally, Chapter 6 considers the research questions the study was designed to answer and offers discussion of some of the key study findings and implications. Appendices provide more detailed information about the sample and further information on the ratings, including Appendices E and G, which provide descriptive statistics for the individual ratings for every standard.[1]

Table 1. Course Categories Represented in Study

Content area	Course category
English language arts	Composition I
	Composition II
	English Literature
Mathematics	Calculus
	College Algebra
	Statistics
Science	Biology
	Chemistry
	Physics
Social science	Introduction to Economics
	Introduction to Psychology
	Introduction to Sociology
	U.S. History
	U.S. Government
Business management	Human Resource Management
	Introduction to Accounting
	Introduction to Business Management
	Introduction to Marketing
Computer technology	Computer Science I
	Database Management Systems
	Fundamentals of Programming
Healthcare	Anatomy and Physiology
	Foundations of Nursing
	Human Development
	Pharmacology

[1] Whereas the current study compares content of the Common Core standards with expectations for college courses, another EPIC-conducted study compares content of the Common Core standards with content of existing high-school standards (see Conley, Drummond, Seburn, de Gonzalez, Stout, & Rooseboom, 2011).

Participants

Nomination Process

In order to identify college instructors to complete the survey, we used a nomination process. In this process, we asked department chairs, deans, provosts, and/or chief academic officers to nominate instructors who either currently taught or had recently taught at an entry level the course or courses for which the institution had been randomly selected to represent.

In the spring of 2009, a list was obtained from the Carnegie Classification of Institutions of Higher Education™ containing information for the 3468 institutions of higher education in the United States offering associate and undergraduate degrees at that time.[2] Project staff placed the names of the institutions on lists for each content area and then sorted the lists so the institutions would be in random order. Project staff began contacting relevant liaisons (e.g., a chemistry department head to identify a chemistry instructor) according to their order on the list. We also attempted to replicate, as closely as possible, Carnegie's percentage breakdown of the 3468 institutions of education in terms of size, whether they are private or public, and whether they are two-year or four-year institutions. Therefore, the lists were sometimes reordered to prioritize certain school characteristics (e.g., if enough four-year institutions had been attained for a certain course, we may have prioritized contacting additional two-year institutions even if they were not the next on the list). Appendix A shows the Carnegie percentage breakdowns that served as goals, compared with the breakdown of the actual sample attained.

Between December 2009 and November 2010, liaisons were contacted via email and phone. The purpose of the study was explained to them and, if they wished to participate, they were directed to a nomination webpage created to collect instructor information. Liaisons accessed the webpage by logging in with a unique password provided to them by project staff and then entered the nominated instructor's name, course, and contact information. We contacted over 7200 potential liaisons asking them to identify potential instructor participants. By the end of the study, 1758 liaisons responded. Liaisons, in turn, nominated instructors for 3625 courses.

Beginning in April 2010, nominees were contacted via email and phone to inform them of their nomination and request their participation in the upcoming survey. The final version of the Common Core standards was released in June 2010, and the survey opened for responses in July. Instructors who agreed to participate completed their survey online. They were offered a token of appreciation when they completed the survey. As an extra incentive for participation, at several times during the recruitment process, instructors were offered a chance at winning a handheld electronic device in a lottery. The study team continued contacting nominees to complete the survey until December 2010. The study includes data from 1815 instructors who rated 1897 courses. The instructors came from 944 different institutions. The fulfillment rate, or the percent of courses that had a survey completed after being nominated, ranged from 38% to 66% across courses with an average of 52%.

[2] We did not include institutions located in U.S. territories.

Figures 1 through 3 provide information about the distribution of participating instructors at public versus private institutions, institutions of different size, and institutions in different geographic regions. Nearly 64% of instructors came from public institutions, while the other 36% came from private institutions (see Figure 1). Figure 2 shows the geographic breakdown of the instructors' institutions. As the figure illustrates, 28% of the instructors came from institutions in both the South and Midwest, 16% of the instructors came from institutions in both the West and East, while 12% came from institutions in the Southwest.

In terms of the size of the institutions where the instructors worked, 11% were very small, 36% were small, 29% were medium, 16% were large, and 3% were very large.

The Carnegie size categories include slightly different size ranges depending on whether the school is a two- or four-year institution (see Table 2). Another 5% of instructors came from what Carnegie calls "special focus" institutions. These are four-year institutions for which more than 75% of degrees are a single field or set of related fields (e.g., a seminary school); they have no size specification.

Figure 1. Respondents (*n* = 1815) by Institution Type: Public vs. Private

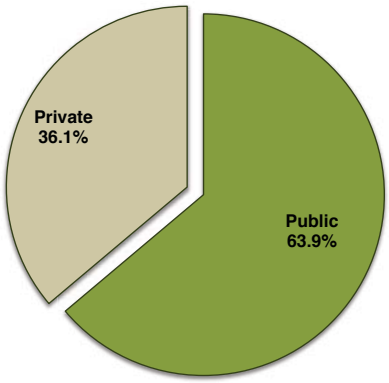


Figure 2. Breakdown of Respondents (*n* = 1815) by Geographic Location of Institution

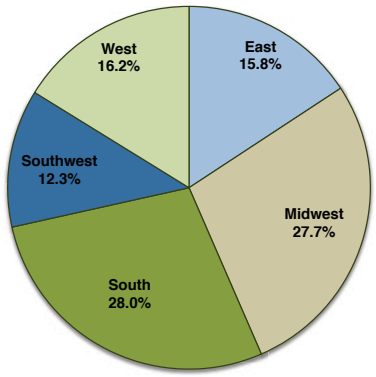


Figure 3. Breakdown of Respondents (*n* = 1815) by Size of Institution

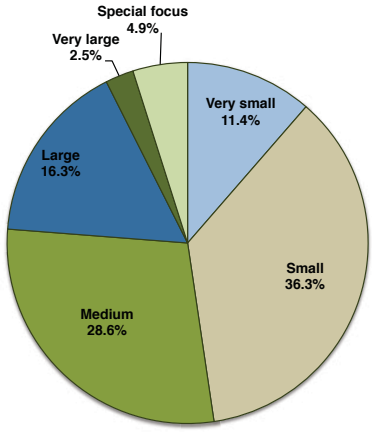


Table 2. Size Classifications for Postsecondary Institutions

	Institution type	
Size	2-year	4-year
Very small	0-500	0-1000
Small	501-1999	1001-2999
Medium	2000-4999	3000-9999
Large	5000-9999	10000+
Very large	10000+	N/A

Source. Carnegie Foundation (2011). Retrieved from http://classifications.carnegiefoundation.org/descriptions/size_setting.php

Figure 4 shows the location of respondents' institutions by state. All states and the District of Columbia were represented in the survey, with less populous states having fewer respondents (for example, Alaska, Delaware, Nevada, and Wyoming had between one and three respondents). More populous states had a greater number of respondents, such as California (99 respondents) and Texas (151 respondents).

Figure 4. Breakdown of Respondents (*n* = 1815) by State

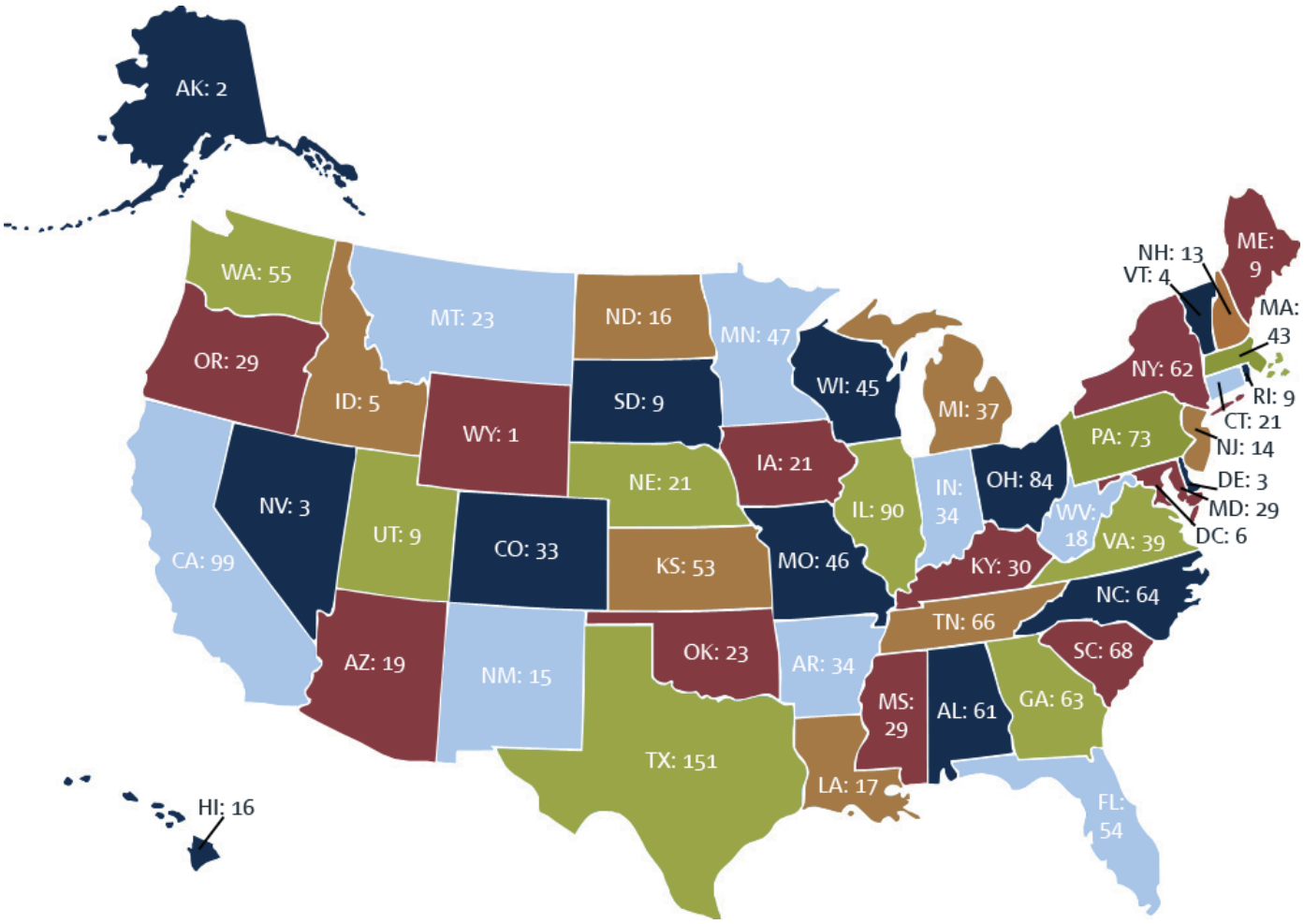


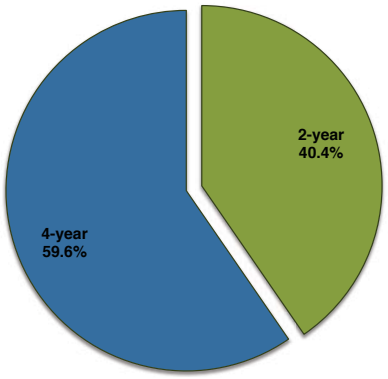
Table 3. Breakdown of Course Categories (*n* = 1897)

Content area	Course category	Number	Percent
English language arts	Composition I	129	6.8
	Composition II	94	5.0
	English Literature	89	4.7
Mathematics	Calculus	101	5.3
	College Algebra	108	5.7
	Statistics	93	4.9
Science	Biology	103	5.4
	Chemistry	100	5.3
	Physics	78	4.1
Social science	Introduction to Economics	61	3.2
	Introduction to Psychology	103	5.4
	Introduction to Sociology	73	3.9
	U.S. History	96	5.1
	U.S. Government	87	4.6
Business management	Human Resource Management	43	2.3
	Introduction to Accounting	79	4.2
	Introduction to Business Management	62	3.3
	Introduction to Marketing	59	3.1
Computer technology	Computer Science I	66	3.5
	Database Management Systems	40	2.1
	Fundamentals of Programming	47	2.5
Healthcare	Anatomy and Physiology	62	3.3
	Foundations of Nursing	55	2.9
	Human Development	31	1.6
	Pharmacology	38	2.0
Total		**1897**	**100.0**

Table 3 shows the number of each course type that was represented in the final sample. Six of the 25 courses had 100 or more respondents (Composition I, Calculus, College Algebra, Biology, Chemistry, and Introduction to Psychology). Seven courses had between 75 and 99 respondents (Composition II, English Literature, Statistics, Physics, U.S. Government, U.S. History, and Introduction to Accounting). An additional seven courses had between 50 and 74 respondents (Introduction to Economics, Introduction to Sociology, Introduction to Business Management, Introduction to Marketing, Computer Science I, Anatomy and Physiology, and Foundations of Nursing). Some courses that were more rare or harder to recruit, including Human Resource Management (*n* = 43), Database Management Systems (*n* = 40), Fundamentals of Programming (*n* = 47), Human Development (*n* = 31), and Pharmacology (*n* = 38).

A total of 66 instructors (4% of the sample) were nominated for and completed the survey for more than one course. Of these, 50 completed the survey for two courses and 16 for three courses. This occurred most frequently in mathematics (*n* = 20) and English language arts (*n* = 18). Some respondents from business management (*n* = 10) and computer technology (*n* = 10) also completed the survey for more than one course. Very few respondents for healthcare (*n* = 5), social science (*n* = 2), and science (*n* = 1) did so.

Figure 5. Breakdown of Courses (*n* = 1897) by Institution Type: 2-year vs. 4-year



Figures 5 and 6 provide information about the distribution by two- and four-year institutions for the courses as a whole and by content area. Approximately 60% of the courses came from four-year institutions, with the other 40% from two-year institutions. This pattern was fairly consistent for each content area as well, with two exceptions. For the social science courses, the percentage at four-year institutions was slightly higher (66% vs. 34% at two-year institutions). For healthcare courses, the percentage at two-year institutions was higher (55% vs. 45% at four-year institutions).

In order to obtain context for the perceptions of instructors in our sample, we asked several questions about the nature of the courses. Figures 7 through 9 and Table 4 show the demographic information about the courses. Figure 7 shows the level of the course. The survey was intended to capture perceptions of instructors of courses that students encounter at the beginning of their college careers; however, 10% of the respondents considered their course to be upper level. We conducted an analysis of their responses separately from the rest of the sample. We determined that their responses were not sufficiently different to warrant systematic exclusion from the sample and that excluding them would not affect the overall findings. Appendix B includes more detail about these analyses and shows the breakdown of course level by content area, and the information respondents gave about whether or not their course has prerequisites.

Figure 6. Breakdown of Courses (*n* = 1897) by Content Area and Type of Institution: 2-year vs. 4-year

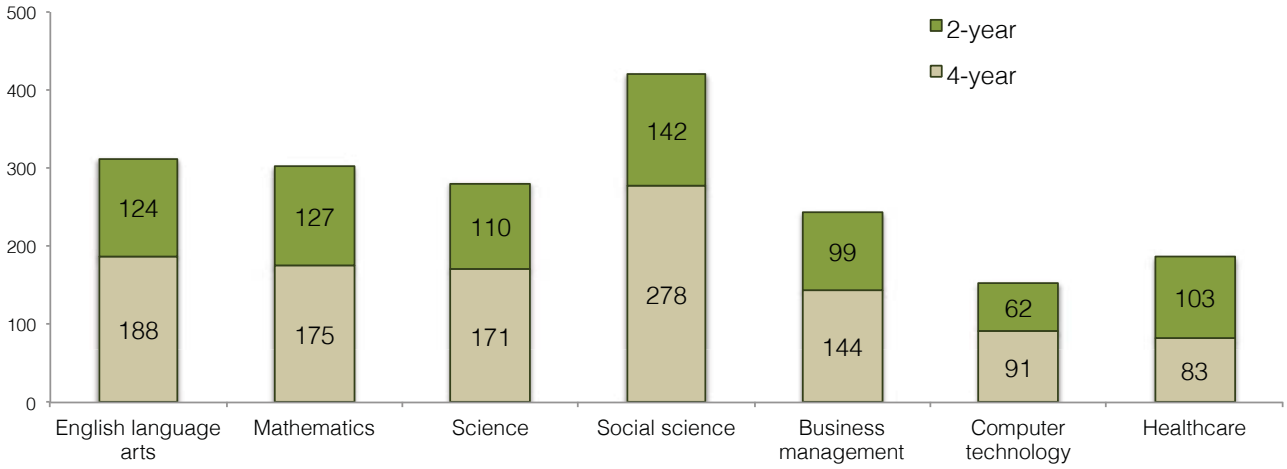


Figure 7. Level of Course, Reported by Respondent

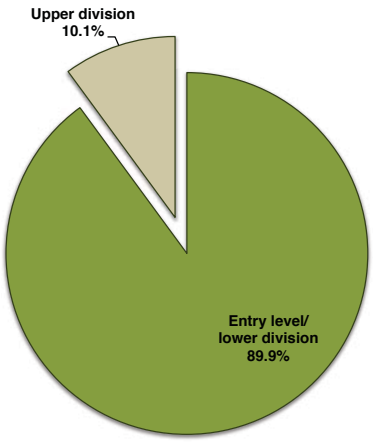


Figure 8. Number of Students Enrolled in Courses (*n* = 1897), Reported by Respondent

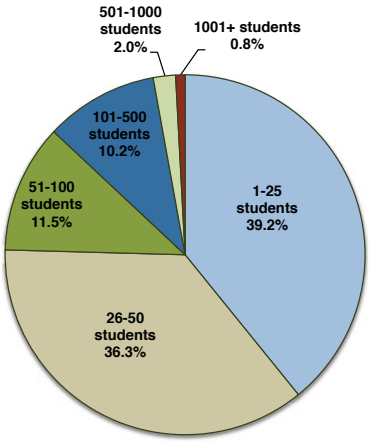


Figure 8 displays the range in the number of students in the courses of participating instructors.

A majority of courses fell in the two smallest ranges of class size, between 1 and 25 or 26 and 50 students. Appendix C shows the breakdown of class sizes by content area. There was a tendency for English language arts and computer technology classes to be smaller (between 64% and 73% of courses had fewer than 26 students). Science, social science, and healthcare courses tended to be larger (more than 25% of courses with more than 50 students).

Table 4 displays the method faculty reported they use for delivering instruction. Most courses include a lecture component. Laboratory and online modes of delivery are part of approximately one-third of courses. Respondents in many content areas listed "other" modes of delivery in addition to the choices provided. Many respondents listed interactive modes, such as group work or projects, class discussions, writing workshops, or peer tutoring. Some respondents mentioned activities such as clinical experiences or hands-on practice. Again, Appendix C shows the breakdown for modes of delivery by content area. The appendix also provides information about the modes of assessment that respondents report using in their course.

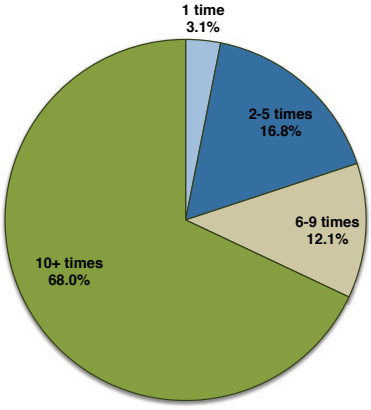
Table 4. Mode of Delivery for Course (*n* = 1897), Reported by Respondent

Mode of delivery	Number
Seminar	310
Lecture	1751
Lab	657
Online	614
Teleconference	32
Other	253

Note. Respondents could select all applicable modes.

Figure 9 shows the number of times the instructor had taught the course. For a majority of courses (68%), the instructor had taught it 10 or more times. For only 3% of courses, the instructor had taught the course once. Respondents, therefore, knew their course and content area relatively well. Appendix C shows the breakdown of teaching experience by content area.

Figure 9. Number of Times Teaching Course, Reported by Respondent



The Survey

The Common Core standards were written with the intention of being broadly applicable across a range of coursework and content areas. Therefore, we planned our survey so that respondents viewed both the English language arts and literacy standards and the mathematics standards, regardless of the course they taught.

Rating Common Core English Language Arts and Literacy Standards

First, respondents viewed content from the *Common Core English language arts (ELA) and literacy standards* for grades 11–12. They saw a summary of content from each of the eight groups of related standards (we use the term *strand* to refer to each of the eight groups).

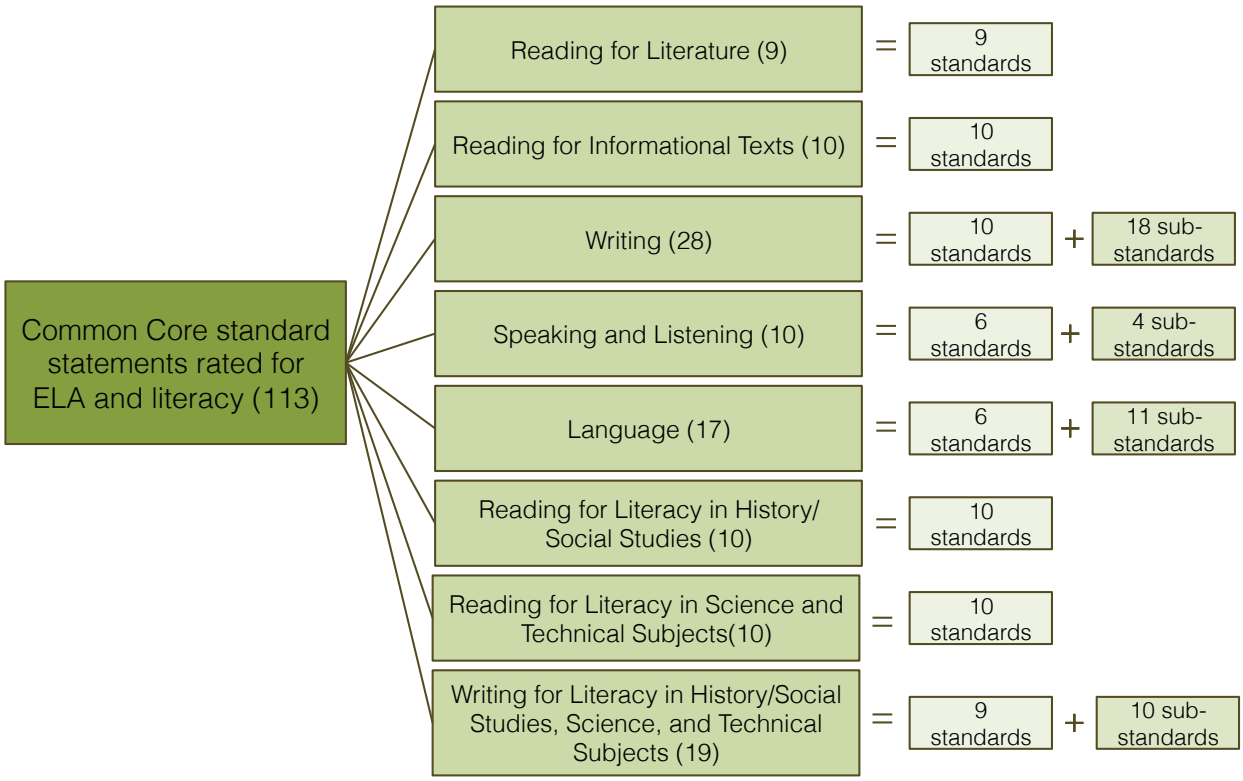
Within the Common Core standards, each ELA and literacy strand is based on 6 to 10 statements, called College and Career Readiness (CCR) Anchor Standards. The CCR Anchor Standards aim to describe cross-disciplinary literacy expectations that should be met in order for students to be prepared for success in college and workforce training programs. For each strand, the CCR standards present broad concepts (applied to all grade levels) that are broken up into two to four organizing categories or topics. For the different grade levels or grade bands, specific standards spell out how the CCR Anchor Standards should be approached.[3] Our study used the standards for the highest-grade band (grades 11–12).

Respondents read a summary of the strand along with the prompt "One or more of the statements below are relevant to my course." If respondents chose the "no" option, then the whole strand (and every standard within it) was considered to be not applicable. If respondents chose the "yes" option, then they were presented each standard to rate.

Figure 10 displays the eight strands, along with the number of ratings that respondents made if they deemed the strand relevant to their course. Half of the Common Core ELA and literacy strands contain statements that are organized below the standard level, as sub-standards. For the purposes of the study, these were rated as though they were on the same level as standards. Thus, the Common Core standards for ELA and literacy comprised 113 ratable statements.

[3] In some cases, the grade-specific standard is identical to the College and Career Readiness anchor standard.

Figure 10. Common Core English Language Arts and Literacy Standards for Grades 11 and 12: Number of Rated Statements



Rating Common Core Mathematics Standards

The process for rating mathematics standards was very similar. Respondents viewed content from the *Common Core mathematics standards* for high school. They saw a summary of content from each group of related standards. The Common Core authors refer to this largest category of related content as *conceptual categories*. The mathematics standards do not have anchor standards as do ELA and literacy. Mathematics is organized into groupings beneath the conceptual category level labeled *domains* and *clusters*. Because many mathematics topics and skills are interconnected across domains, standards from these groupings may sometimes be closely related.

Mathematics standards marked with a (+) represent advanced content and are intended to prepare students for higher-level courses. While not all students would be expected to complete these standards, their content might appear in courses designed for all students. The advanced content standards appear throughout the domains. One conceptual category, Modeling, is explained as being related to many other standards and therefore appears throughout the standards as indicated by a star symbol (★). Because of the way the Common Core standards organize the Modeling standards, we calculated ratings for them as part of the ratings for the category into which they are integrated, rather than as a separate conceptual category.

As with ELA and literacy, respondents read a summary of the conceptual category with the prompt about the content being relevant to their course. Only respondents who chose the "yes" option were presented with all the standards for the conceptual category to rate. There was one exception to this parent question approach for mathematics. The Common Core mathematics standards include eight Standards for Mathematical Practice. These hone in on "processes and proficiencies with longstanding importance in mathematics education" (Common Core State Standards Initiative, 2010b), such as problem solving, reasoning and proof, communication, representation, adaptive reasoning, strategic competence, conceptual understanding, procedural fluency, and the inclination to see mathematics as sensible and useful. The Standards for Mathematical Practice are explained at the beginning of the Common Core standards document and then presented again on each conceptual category overview page. Because the Mathematical Practices were designed to apply across all domains, each instructor rated each of the individual practices. They did not have the option to read a summary and deem the whole area as not relevant, although they could have rated each individual statement as not applicable.

Figure 11. Common Core Mathematics Standards for High School: Number of Rated Statements

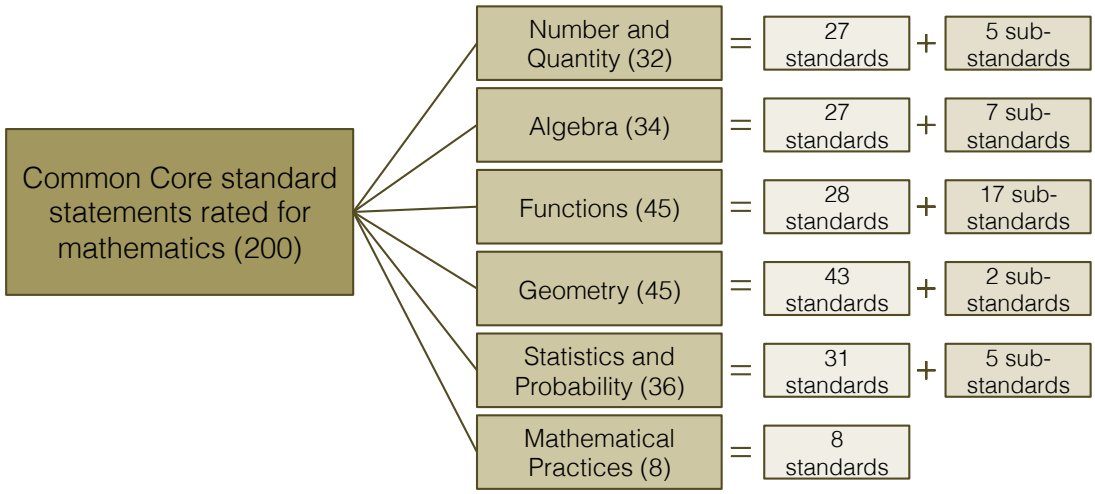


Figure 11 displays the five conceptual categories along with the number of ratings that respondents made if they deemed the category relevant to their course. All conceptual categories contain sub-standards that were rated as though they were on the same level as standards. Thus, together the Common Core standards for mathematics and the Mathematical Practices comprised 200 ratable statements.

Ratings of Applicability and Importance

Respondents rated each standard statement on applicability to their course using the following scale[4]:

- Prerequisite: Not covered in course. Prerequisite mastery of this standard is imperative for success in this course.
- Reviewed: Reviewed as a regular component of this course. Some prerequisite knowledge is helpful in succeeding in this course.
- Introduced: Standard is introduced as new material in this course.
- Subsequent: Standard is not required knowledge for this course because it will be covered later in a subsequent course in this course sequence.
- Not Applicable: Standard is not relevant to this course. It is neither a prerequisite nor covered in course material.

Respondents who marked a standard as falling into one of the first three categories — prerequisite, reviewed, or introduced — were then asked to rate the importance level of that standard using a 4-point scale:

- Most: This element is critical for success in the course.
- More: This element is important for success in the course.
- Less: Student knowledge of and familiarity with this element may be helpful.
- Least: Students need only minimal knowledge of and familiarity with this element.

Once respondents finished rating the individual Common Core standards statements, they were asked to answer five optional questions. These questions asked them to reflect on the standards as a whole and provide open-ended feedback. Each of the first four questions included a yes/no response and then an open text box for comments. Question 5 had only a text box.

1. Are the English standards, taken as a whole, a coherent representation of the fields of knowledge necessary for success in your course?
2. Are the mathematics standards, taken as a whole, a coherent representation of the knowledge and skills necessary for success in your course?
3. Do the standards reflect a level of cognitive demand sufficient for students who meet the standards to be prepared to succeed in your course?

[4] Another set of standards was also included in data collection. These were a set of "essential skills" that were created collaboratively by EPIC and the Center on Research and Evaluation of Standards and Student Testing (CRESST) to capture cognitive strategies beyond academic content knowledge that are necessary for college and career success. Results from these ratings are not found in this report but rather another EPIC-prepared report on the Essential Skills.

4. Do the standards you just reviewed omit key knowledge and skills?
5. Overall, please provide any additional comments you have about the standards, such as potential usefulness, content, or format, and any questions you have about the standards.

The majority of respondents took between 30 and 90 minutes to complete the survey (45% took 30 to 60 minutes and 24% took between 61 and 90 minutes). Another 15% took less than 30 minutes and 15% took more than 90 minutes[5]. The average time was one hour.

Next, Chapters 3 and 4 present the results of the standards ratings.

[5] A number of respondents logged over three hours. However, we assume that they remained logged into the survey while taking breaks and participating in other activities.

Respondents rated each standard statement on applicability to their course using the following scale:

- Prerequisite: Not covered in course. Prerequisite mastery of this standard is imperative for success in this course.
- Reviewed: Reviewed as a regular component of this course. Some prerequisite knowledge is helpful in succeeding in this course.
- Introduced: Standard is introduced as new material in this course.
- Subsequent: Standard is not required knowledge for this course because it will be covered later in a subsequent course in this course sequence.
- Not Applicable: Standard is not relevant to this course. It is neither a prerequisite nor covered in course material.

Respondents who marked a standard as falling into one of the first three categories — prerequisite, reviewed, or introduced — were then asked to rate the importance level of that standard using a 4-point scale:

- Most: This element is critical for success in the course.
- More: This element is important for success in the course.
- Less: Student knowledge of and familiarity with this element may be helpful.
- Least: Students need only minimal knowledge of and familiarity with this element.

Chapter 3 | Findings for Ratings of Common Core English Language Arts and Literacy Standards

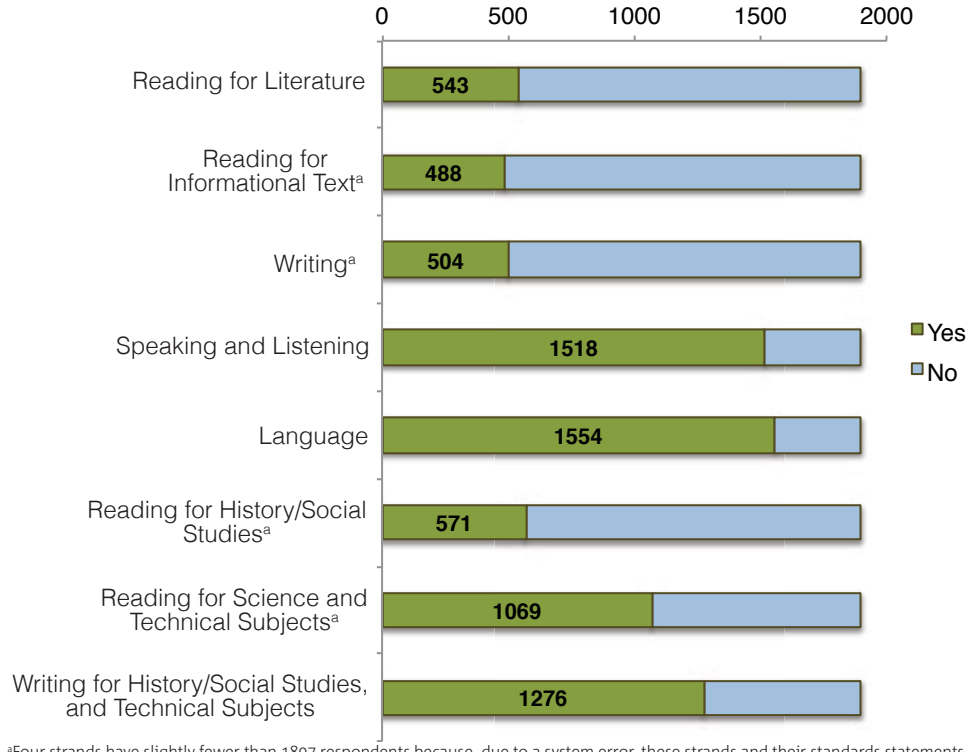
In the body of the report, we offer summary presentations of key data but do not present the frequencies for all applicability and importance ratings by standard. Ratings and related statistics at the individual standard level can be located in Appendix E.

Applicability for English Language Arts and Literacy Standards

Overall Applicability

We first present respondent answers[1] to the parent question for each strand. Figure 12 provides the number of respondents within the total sample who, after reading a summary of the strand, said the content was relevant to their course. Only respondents who answered yes were presented with all the standards within the strand to rate. Respondents who answered no bypassed that section.

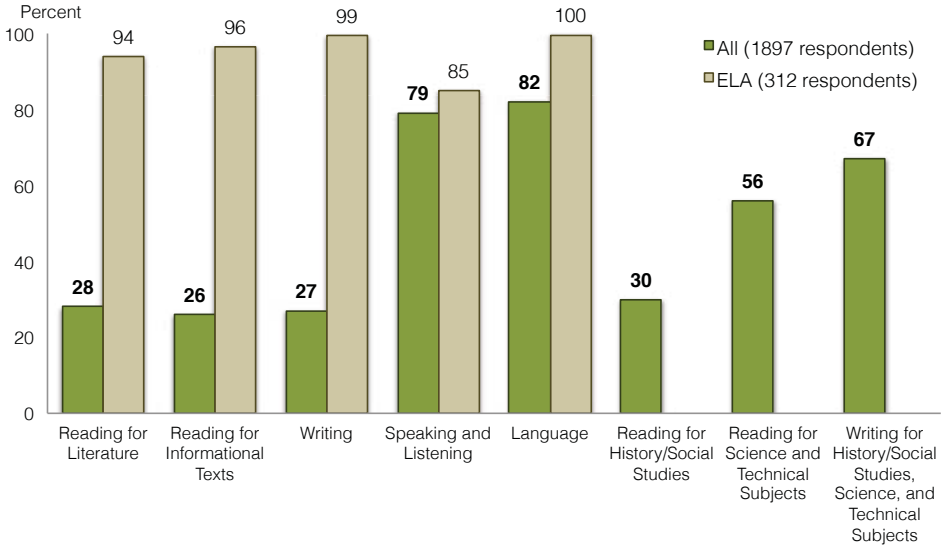
Figure 12. Response from Entire Sample (*n* = 1897) to Overall Relevancy Question for English Language Arts and Literacy Strands



[a]Four strands have slightly fewer than 1897 respondents because, due to a system error, these strands and their standards statements were not presented to one or two respondents.

[1] Although a sub-sample of respondents completed a survey for more than one course, from here to the end of the report, we use "respondents" or "the sample" to mean the sum of instructors for every unique course (n = 1897).

Figure 13. Percent of Respondents Rating at Least One Standard within the ELA and Literacy Strand as Applicable[a] to their Course



Note. The graphic shows ratings for the 312 respondents of English language arts courses separately for the five ELA strands.
[a] Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

Next, we present related data; Figure 13 presents the percent of all respondents who rated at least one standard as either prerequisite, reviewed, introduced, or subsequent, after indicating a strand was relevant. Nearly every respondent who answered yes to the parent question went on to rate at least one standard as applicable.

Four strands were applicable to 25–30% of the sample:

- Reading Standards for Literature
- Reading Standards for Informational Texts
- Writing Standards
- Reading Standards for Literacy in History/Social Studies

Two strands were applicable to 55–70% of the sample:

- Reading Standards for Literacy in Science and Technical Subjects
- Writing Standards for History/Social Studies, Science, and Technical Subjects

Two strands were applicable to approximately 80% of the sample:

- Speaking and Listening Standards
- Language Standards

Figure 13 also shows the percent of English language arts (ELA) respondents who rated at least one standard as applicable for the five ELA strands.

Applicability Criterion

In presenting summative data for this chapter, we chose to use the criterion of a minimum of one standard match within a strand as indicating applicability of the strand. This criterion has been established in alignment studies as appropriate (Cook, 2005; Cook & Wilmes, 2007) and it eliminates the need to set an arbitrary criterion point that must be met. In other words, if the criterion for achieving applicability is more than one standard per strand, it must either be a fixed number or a percent of all standard statements in the strand. Neither is adequate when the number of standards per strand varies as significantly as it does across the Common Core strands (from to 9 to 28 standard statements). For further context, Table 5 shows additional applicability information — the mean and modal number of standards that respondents for the strand rated as applicable. So, as an example, the 535 respondents who completed ratings in the Reading Standards for Literature strand rated, on average, six standards as applicable, with a mode response of nine standards (out of a possible nine standards). As the means and modes across all strands show, those respondents who completed ratings for a strand tended to rate a majority, if not all, of the standards in that strand as applicable. Appendix D contains additional information about the number of standards in each strand that were rated as applicable.

Table 5. Number of Standards Rated as Applicable for English Language Arts and Literacy Strands

Strand	Number of respondents	Number of standards					
		Total in strand	Rated as applicable				
			Mean	Standard deviation	Mode	Minimum	Maximum
Reading for Literature	535	9	5.7	2.55	9	1	9
Reading for Informational Texts	488	10	7.2	2.07	7	1	10
Writing	504	28	22.1	5.29	26	3	28
Speaking and Listening	1507	10	7.9	2.39	10	1	10
Language	1552	17	12.5	4.50	17	1	17
Reading for Literacy in History/Social Studies	571	10	8.6	1.94	10	1	10
Reading for Literacy in Science and Technical Subjects	1068	10	8.4	2.11	10	1	10
Writing for Literacy in History/Social Studies, Science, and Technical Subjects	1265	19	15.1	4.71	19	1	19

Applicability by Content Area

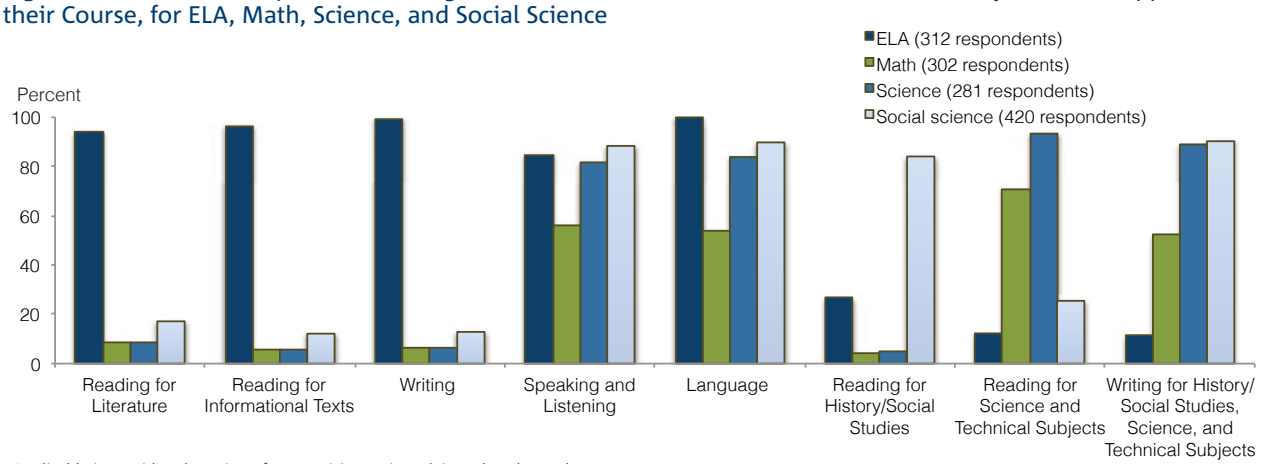
As would be expected, the percent of respondents who rated at least one standard as applicable shifts fairly dramatically when parsed out by the seven content areas included in the

Figures 14 and 15 require careful interpretation. The low ratings for Reading Standards for Informational Texts and Writing Standards by respondents outside of ELA do not necessarily mean these respondents do not value reading or writing. Rather, these two topics are captured explicitly in the discipline-specific standards for which these respondents indicated much higher applicability.

Figure 14 shows strand-level applicability ratings for content areas often associated with general education requirements to earn a bachelor's degree. Figure 15 represents strand-level applicability ratings for three content areas that are somewhat more directly associated with career pathways: business management, computer technology, and healthcare.

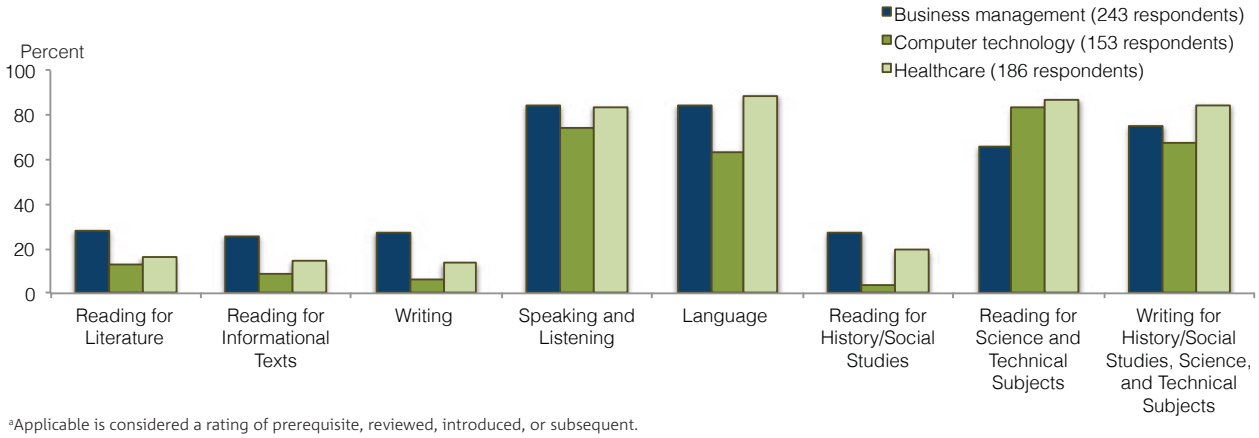
The overall pattern of ratings by healthcare respondents is similar to the pattern by science respondents in which they rate most highly the following two strands: Reading Standards in Science and Technical Subjects and Writing Standards in History/Social Studies, Science, and Technical Subjects strands. The pattern of ratings for computer technology respondents was somewhat similar; however, their applicability ratings were lower on the Writing Standards in History/Social Studies, Science, and Technical Subjects strand. Business management respondents were slightly more likely to rate

Figure 14. Percent of Respondents Rating at least One Standard within the ELA and Literacy Strand as Applicable[a] to their Course, for ELA, Math, Science, and Social Science



[a]Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

Figure 15. Percent of Respondents Rating at least One Standard within the ELA and Literacy Strand as Applicable[a] to their Course, for Business Management, Computer Technology, and Healthcare



[a]Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

as applicable the Reading Standards for Literature, Reading Standards for Informational Texts, and Writing Standards strands. They also placed somewhat more emphasis on the Reading Standards in History/Social Studies strand and slightly less emphasis on the Reading Standards in Science and Technical Subjects strand than instructors of other career-preparatory courses.

With few exceptions, a large percent (82–100%) of respondents across all content areas rated the Speaking and Listening Standards strand and Language Standards strand as applicable. For two content areas, mathematics and computer technology, fewer, though still a majority, rated these strands as applicable. For mathematics, 56% and 54% of respondents rated the Speaking and Listening Standards and Language Standards strands, respectively, as applicable. For computer technology, 74% and 63% rated the Speaking and Listening and Language strands, respectively, as applicable.

Mathematics and computer technology instructors were less likely, comparatively speaking, to rate writing skills as applicable to their courses than other content areas. Though a majority of respondents in these two content areas still rated one of the two writing strands as applicable, respondents (as many as 75%) in all other content areas rated at least one of the writing strands as applicable. For mathematics, 7% and 52% of respondents rated as applicable the Writing Standards strand and Writing Standards in History/Social Studies, Science, and Technical Subjects strand, respectively. For computer technology, 7% and 67% of respondents rated as applicable the Writing Standards strand and Writing Standards in History/Social Studies, Science, and Technical Subjects strand, respectively.

A majority of business management, healthcare, or computer technology respondents rated as applicable Reading Standards in Science and Technical Subjects and Writing Standards in History/Social Studies, Science, and Technical Subjects. Three ELA strands (Reading Standards for Literature, Reading Standards for Informational Texts, and Writing Standards) were rated as applicable by one-fourth or less of respondents in these three content areas.

More information on applicability ratings for each content area and each strand can be found in Appendix D.

Importance Ratings for English Language Arts and Literacy Standards

Importance ratings are presented below but with the following caveat. In all cases, the importance ratings come from a subset of respondents: those who rated a strand and then a standard as applicable. This is also a subset of all respondents within a content area. For this reason, importance ratings should be viewed with caution until they are situated relative to their proportion of all applicability responses and of responses in the content area. They are included here for informational purposes to help present an initial indication of the validity of the Common Core standards relative to a range of postsecondary course categories and not to reach a definitive conclusion regarding the importance of any given standard or strand.

Recall that if respondents selected a standard as *prerequisite, reviewed*, or *introduced*, they were then asked to rate the importance of that standard on a 4-point scale. The scale consisted of the options *most* (defined as critical for success in the course), *more* (important for success), *less* (familiarity may be helpful), and *least* (only minimal knowledge needed). Respondents who did not rate a standard's applicability in those three categories were not presented with the importance rating and instead were directed to the next standard. Although we present importance ratings as means, it is worth noting that the importance categories are ordinal. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical category underlying it.

Below, for each strand, we provide a descriptive summary of the importance ratings. We first show the breakdown by content area of those respondents who rated importance and their average ratings rolled up to the strand level. These are the averages of 9 to 28 standard statements, depending on the strand, weighted to account for the varying number of respondents for each standard. It was not our goal to look for statistically significant differences among the strands (nor do any likely exist). We include these results only to show general patterns in ratings.

Next, we show several summary-level presentations of the importance data. We present the average importance ratings at the topic level (the two to four organizing categories or sub-areas) within each strand. Then, we present the importance ratings for each standard. These are presented as dichotomous findings, showing percentage breakdown for the standard statement rated either (1) as more or most important or (2) as less or least important. In this view of the data, every standard is presented (in the order the standards appear in the Common Core standards documents), but the responses are collapsed into just two categories. Finally, to help provide a summary overview, we list individual standard statements that had means that were somewhat higher or lower than the mean of all standards in that strand. We include these results once again to illuminate general patterns, not to suggest that the comparison of these standards to others is statistically significant and not to suggest the need for specific actions based on these ratings.

We chose these presentations of the data to give summary-level information about the findings that would be relatively easy and meaningful to view. The body of the report does not present the frequencies for all importance categories for individual standards. This potentially important information is contained in Appendix E.

Reading Standards for Literature

Respondents to Importance Ratings for the Reading Standards for Literature Strand

Figure 16 shows how respondents who completed importance ratings for the Reading Standards for Literature strand are distributed across the seven content areas. Of the 532 respondents (28% of the sample) rating at least one standard in the strand as applicable and therefore conducting importance ratings, a majority (n = 292) were English language arts (ELA) respondents. Social science (n = 72) and business management (n = 69) respondents composed the next largest groups of respondents.

Figure 16. Respondents Rating importance for Reading Standards for Literature Strand (n = 532), Percent by Content Area

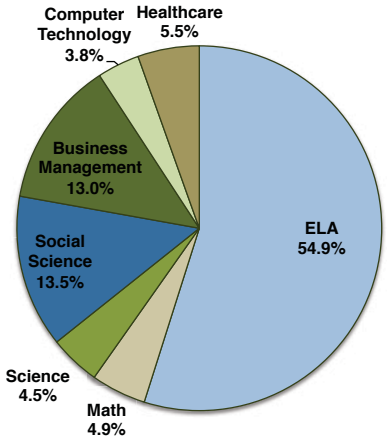
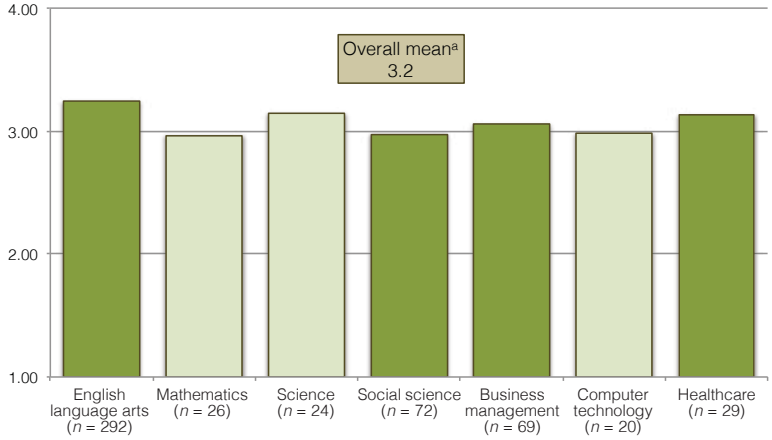


Figure 17. Mean Importance Ratings for Reading Standards for Literature Respondents (n = 532), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The nine standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Reading Standards for Literature Strand

The standard statements within the Reading Standards for Literature strand had an average importance rating of 3.2 (SD = .71), just above the "more important" rating. Figure 17 shows that importance ratings were similar across the content areas. The strand contains four topics with between one and three standards statements each. Table 6 shows the average rating for each of the four topics.

Table 6. Importance Ratings for Topics in Reading Standards for Literature Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Key Ideas and Details	3.3	0.67	3
Craft and Structure	3.1	0.71	3
Integration of Knowledge and Ideas	3.0	0.82	2
Range of Reading and Level of Text Complexity	3.3	0.72	1
Overall	3.2	0.71	9

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of those topics with the lowest and highest ratings, including a description of the type of standards they contain:

- Two topics, Key Ideas and Details (an average of three statements) and Range of Reading Level of Text Complexity (one statement), had the highest ratings. The Key Ideas and Details standards address issues such as providing textual evidence to support analysis and inferences, determining themes and central ideas of text, and analyzing the author's choices on developing and relating elements of a story. The Range of Reading Level of Text Complexity standard is a general one, ensuring that students can read and comprehend different types of literature with grade-appropriate complexity.
- The Integration of Knowledge and Ideas topic (an average of the two statements) had the lowest rating; however, importance was still perceived as high. The Integration of Knowledge and Ideas statements address analyzing multiple interpretations of literature compared to source text (including at least one Shakespeare play and one play by an American dramatist) and demonstrating knowledge of eighteenth-, nineteenth-, and early-twentieth-century works of American literature.

Importance Ratings by Standard Statement for the Reading Standards for Literature Strand

Next, we collapse the four importance ratings categories into a dichotomous ratings for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 7 in the order the standards appear in the Common Core standards documents. A large proportion (> 75%) of respondents rated most of the nine standard statements as being more or most important.

Table 7. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Reading Standards for Literature

Standard	More/most percent	Less/least percent
Key Ideas and Details		
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	92	8
2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.	89	11
3. Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).	78	22
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)	83	17
5. Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.	79	21
6. Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).	75	25
Integration of Knowledge and Ideas		
7. Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.)	75	25
9.[a] Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.	63	37
Range of Reading and Level of Text Complexity		
10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.	86	14

[a]For the Reading Standards for Literature, the eighth college and career readiness anchor standard is listed as not applicable to literature.

A review of the ratings of individual standard statements reveals that one statement, involving analysis of text, had a higher importance rating, and one statement, involving knowledge of particular American literature, had a lower importance rating. Table 8 shows the means and standard deviations of these two standards compared to the average of statements in the strand as a whole.

Table 8. Standard Statements with Means Above and Below[a] the Strand Average, for Reading Standards for Literature

	Mean[b]	Standard deviation
Strand average	3.2	0.71
Standard statements above average		
Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	3.4	0.65
Standard statements below average		
Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.	2.8	0.88

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Reading Standards for Literature

The importance ratings were high for the subset of instructors who responded that a Reading Standards for Literature standard was applicable to their course. Average ratings exceeded 3, the "more important" category. English language arts respondents composed approximately half of the respondent pool, with social science and business management composing another quarter. Ratings show that respondents emphasize general concepts such as providing textual evidence to support analysis and inferences. They place less emphasis on the importance of demonstrating knowledge of American literature works from particular time frames.

Reading Standards for Informational Texts

Respondents to Importance Ratings for the Reading Standards for Informational Texts Strand

Figure 18 shows how the respondents who completed importance ratings for the Reading Standards for Informational Text strand are distributed across the seven content areas. Of the 487 respondents (26% of the sample), a large majority were ELA respondents (*n* = 300). As with the Reading Standards for Literature strand, business management (*n* = 63) and social science (*n* = 51) respondents composed the next largest groups of respondents.

Figure 18. Respondents Rating Importance for Reading Standards for Informational Texts Strand (*n* = 487), Percent by Content Area

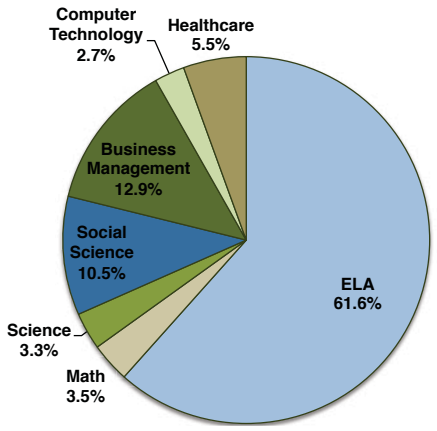
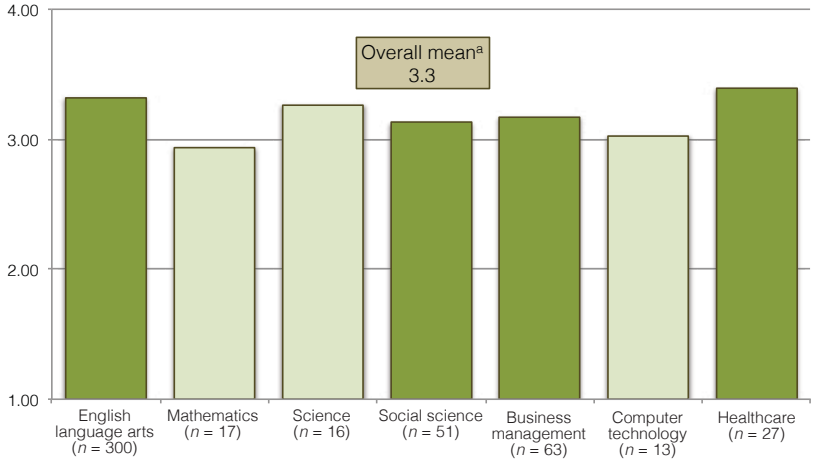


Figure 19. Mean Importance Ratings for Reading Standards for Informational Texts Respondents (*n* = 487), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The 10 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Reading Standards for Informational Texts Strand

The standard statements within the Reading Standards for Informational Texts strand had an average rating of 3.3 (*SD* = .71), above the "more important" rating. Figure 19 shows that importance ratings were similar across the content areas. The strand has four topics with between one and three standards statements each. Table 9 shows the average rating for each of the four topics.

Table 9. Importance Ratings for Topics in Reading Standards for Informational Texts Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[b]	Standard deviation	Number of standards
Key Ideas and Details	3.4	0.67	3
Craft and Structure	3.2	0.72	3
Integration of Knowledge and Ideas	3.1	0.79	3
Range of Reading and Level of Text Complexity	3.4	0.67	1
Overall	3.3	0.71	10

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of those topics with the lowest and highest ratings, including a description of the type of standards they contain:

- Similar to the Reading Standards for Literature, two topics, Key Ideas and Details (an average of three statements) and Range of Reading Level of Text Complexity (one statement), had the highest ratings. As with the Reading Standards for Literature, the Key Ideas and Details standards address issues such as citing textual evidence to support analysis and inferences, determining central ideas, and analyzing. The topic also includes reference to explaining how ideas and events develop over the course of the text. The Range of Reading Level of Text Complexity reads very identical to the standard under the Literature strand but with reference to nonfiction.
- One topic, Integration of Knowledge and Ideas (an average of the three statements), had the lowest rating, though respondents still considered importance to be high. The Integration of Knowledge and Ideas standards refer to specific genres of text and evaluating reasoning in seminal U.S. texts, including application of constitutional principles in works of public advocacy and analyzing seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents.

Importance Ratings by Standard Statement for the Reading Standards for Informational Texts Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 10 in the order the standards appear in the Common Core standards documents. Similar to the ratings for reading literature, a large majority (>75%) of respondents rated most of the 10 standards statements as being more or most important.

Table 10. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Reading Standards for Informational Texts

Standard	More/most percent	Less/least percent
Key Ideas and Details		
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	92	8
2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.	91	9
3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.	87	13
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).	85	15
5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.	85	15
6. Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.	82	18
Integration of Knowledge and Ideas		
7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	82	18
8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses).	69	31
9. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.	70	30
Range of Reading and Level of Text Complexity		
10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.	89	11

A review of ratings of individual standard statements reveals that two standards had lower importance ratings compared to other statements in the strand. These standards refer to specific United States documents or texts. Table 11 shows the means and standard deviations of those two standards compared to the average of statements in the strand as a whole. No standard statement that had a relatively higher rating compared to other statements.

Table 11. Standard Statements with Means Above and Below[a] the Strand Average, for Reading Standards for Informational Texts

	Mean[b]	Standard deviation
Strand average	3.3	0.71
Standard statements above average		
None		
Standard statements below average		
Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses).	3.0	0.82
Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.	3.0	0.81

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Reading Standards for Informational Texts

Overall, importance ratings of the Reading Standards for Informational Text were among the highest ELA and literacy ratings, with an average rating above the 3, or "more important," level. The ratings were completed predominantly by ELA respondents and, to a lesser degree, social science and business management respondents. These ratings again show that respondents tend to emphasize general concepts such as providing textual evidence to support analysis and determining central ideas of a text. They emphasize less the evaluation or analysis of specific U.S. texts and documents.

Writing Standards

Respondents to Importance Ratings for the Writing Standards Strand

Figure 20 shows how the respondents who completed importance ratings for the Writing Standards strand are distributed across the seven content areas. There were 504 respondents (27% of the sample) who rated at least one standard statement within the Writing Standards strand as applicable and therefore conducted importance ratings. A majority (n = 310) were once again ELA respondents. Social science (n = 54) and business management (n = 67) respondents again composed the next largest groups of respondents.

Figure 20. Respondents Rating Importance for Writing Standards Strand (n = 504), Percent by Content Area

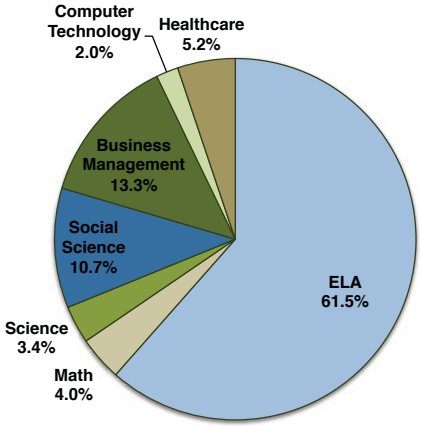
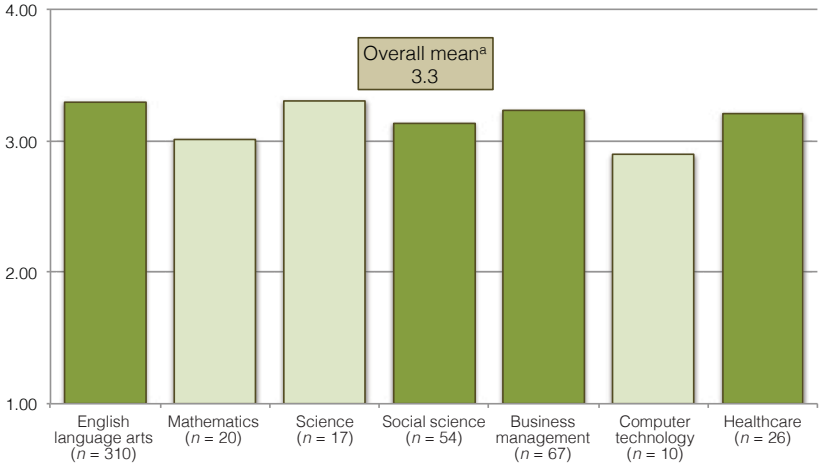


Figure 21. Mean Importance Ratings for Writing Standards Respondents (n = 504), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The 28 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Writing Standards Strand

The standard statements within the Writing Standards strand had an average rating of 3.3 (SD = .72), above the "more important" rating. Figure 21 shows that importance ratings were similar across the content areas. The strand contains four topics with between 1 and 19 standards statements each. Table 12 shows the average rating for each of the four topics.

Table 12. Importance Ratings for Topics in Writing Standards Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Text Types and Purposes	3.2	0.74	19
Production and Distribution of Writing	3.5	0.65	3
Research to Build and Present Knowledge	3.4	0.67	5
Range of Writing	3.4	0.73	1
Overall	3.3	0.72	28

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of those topics with the lowest and highest ratings, including a description of the type of standards they contain:

- Three topics tended to have higher ratings: Production and Distribution of Writing (an average of three statements), Research to Build and Present Knowledge (an average of five statements), and Range of Writing (one statement). The Production and Distribution of Writing topic generally outlines the writing process, referring to the production of clear and coherent writing appropriate to the task; using a planning, revising, editing, and rewriting process; as well as using technology to produce and update writing products. The Research to Build and Present Knowledge topic involves drawing evidence from different sources and analyzing and synthesizing them. The Range of Writing statement involves writing over extended and shorter time frames for a range of purposes.

The average of the 19 statements for Text Types and Purposes had the lowest rating in the strand, although the rating average is still above 3, "most important." The standard statements in Text Types and Purposes fall under three overarching standards: (1) writing arguments to support claims in the analysis of topics, using valid reasoning and sufficient evidence; (2) writing informative/explanatory text to examine and convey complex ideas; and (3) writing narratives to develop real or imagined experiences or events.

Importance Ratings by Standard Statement for the Writing Standards Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 13 in the order the standards appear in the Common Core standards documents. The Writing Standards have many more sub-standards for a total of 28 statements. All but three of the statements were rated as being more or most important by a large proportion (>70%) of respondents.

Table 13. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Writing Standards

Standard	More/most percent	Less/least percent
Text Types and Purposes		
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	97	3
a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	91	9
b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.	88	12
c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	84	16
d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	82	18
e. Provide a concluding statement or section that follows from and supports the argument presented.	81	19
2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	89	11
a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.	87	13
b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	94	6
c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	81	19

Continued on next page

Table 13. continued

Standard	More/most percent	Less/least percent
Text Types and Purposes		
d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.	74	26
e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	77	23
f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	81	19
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	64	36
a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.	70	30
b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.	50	50
c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).	59	41
d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.	70	30
e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	72	28
Production and Distribution of Writing		
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	97	3
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3, up to and including grades 11–12 on page 54 [of Common Core State Standards document].)	93	8
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	75	25
Research to Build and Present Knowledge		
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	94	6
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	92	8
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	92	8
a. Apply grades 11–12 Reading standards to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").	71	29
b. Apply grades 11–12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., The Federalist, presidential addresses]").	75	25
Range of Writing		
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	87	13

A review of the ratings of individual standard statements reveals that there were six standard statements that had higher importance ratings compared to other statements in the strand. Eight standard statements had lower importance ratings. Table 14 shows the means and standard deviations of those standards compared to the average of all statements in the strand.

Table 14. Standard Statements with Means Above and Below[a] the Strand Average, for Writing Standards

	Mean[b]	Standard deviation
Strand average	3.3	0.72
Standard statements above average		
Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	3.7	0.53
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	3.7	0.55
Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3, up to and including grades 11–12 on page 54 [of Common Core State Standards document].)	3.6	0.64
Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	3.6	0.63
Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	3.5	0.61
Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	3.5	0.62
Standard statements below average		
Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.	2.5	0.89
Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).	2.7	0.83
Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	2.9	0.90
Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.	2.9	0.85
Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.	2.9	0.80
Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	3.0	0.85
Apply grades 11–12 Reading standards to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").	3.0	0.85
Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.	3.0	0.79

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Writing Standards

Importance ratings of the Writing Standards, on average, were among the highest of the ELA and literacy ratings, with an average rating above the "more important" category. The ratings were completed predominantly by ELA instructors and, to a lesser degree, social science and business management instructors. The ratings show that respondents emphasize students' skills in writing arguments to support claims, produce clear and coherent writing, and use the writing process. They place less importance on students' use of narrative techniques to develop events and characters and to sequence events to build toward a particular tone.

Speaking and Listening Standards

Respondents to Importance Ratings for the Speaking and Listening Standards Strand

Figure 22 shows how the instructors who completed importance ratings for the Speaking and Listening Standards strand are distributed across the seven content areas. The 1500 respondents (79% of the sample) were fairly well distributed across the content areas with social science respondents (n = 370) composing the largest group of respondents. ELA instructors (n = 265), science instructors (n = 230), and business management instructors (n = 203) composed the next two largest groups of respondents.

Figure 22. Respondents Rating Importance for Speaking and Listening Standards Strand (n = 1500), Percent by Content Area

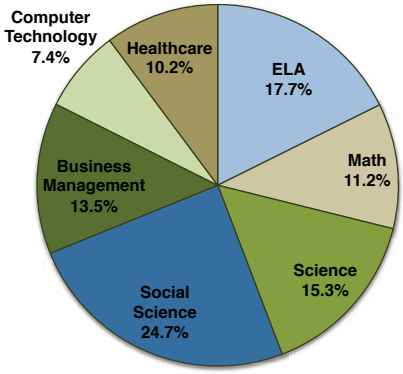
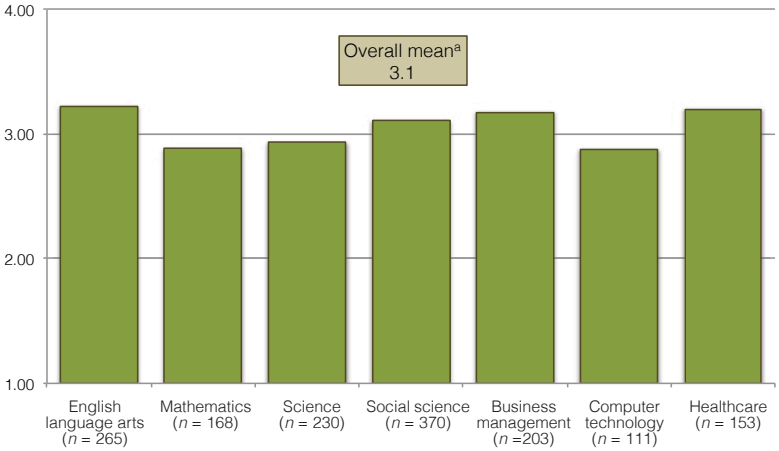


Figure 23. Mean Importance Ratings for Speaking and Listening Standards Respondents (n = 1500), by Content Area



[a]The 10 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Speaking and Listening Standards Strand

The standard statements within the Speaking and Listening Standards strand had an average rating of 3.1 (SD = .74), exceeding slightly the "more important" rating. Figure 23 shows that importance ratings were similar across the content areas. The strand has two topics with between three and seven standards statements each. Table 15 shows the average rating for each of the two topics.

Table 15. Importance Ratings for Topics in Speaking and Listening Standards Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Comprehension and Collaboration	3.1	0.73	7
Presentation of Knowledge and Ideas	3.0	0.79	3.0
Overall	3.1	0.74	10

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

The average of the two topics was similar:

- The Comprehension and Collaboration topic (an average of seven statements) includes standard statements relating to participating effectively in a range of discussions, integrating multiple sources of information, and evaluating a speaker's point of view. The Presentation of Knowledge and Ideas (an average of three standard statements) includes standards referring to the presentation of information with a clear perspective, making strategic use of digital media, and adapting speech to the context.

Importance Ratings by Standard Statement for the Speaking and Listening Standards Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 16 in the order the standards appear in the Common Core standards documents. A large proportion (>70%) of respondents rated 9 of the 10 standard statements as being more or most important.

Table 16. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Speaking and Listening Standards

Standard	More/most percent	Less/least percent
Comprehension and Collaboration		
1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own ideas clearly and persuasively.	78	22
a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	91	9
b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.	75	25
c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.	83	17
d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.	82	18
2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.	83	17
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.	71	29
Presentation of Knowledge and Ideas		
4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks.	82	18
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	61	39
6. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 [of Common Core State Standards document] for specific expectations.)	71	29

In terms of the ratings of individual standards, one statement, preparing for discussions and using evidence, had a higher average importance rating compared to other statements in the strand. One standard, use of digital media in presentations, had a lower-than-average importance rating (see Table 17).

Table 17. Standard Statements with Means Above and Below[a] the Strand Average, for Speaking and Listening Standards

	Mean[b]	Standard deviation
Strand average	3.1	0.74
Standard statements above average		
Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	3.4	0.67
Standard statements below average		
Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	2.8	0.83

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Speaking and Listening Standards

The standard statements within the Speaking and Listening Standards strand had an average rating just exceeding 3, the "more important" rating. Respondents were distributed fairly evenly across the content areas. The ratings show that respondents place importance on the skill or practice of coming to discussions having read and researched material and of using texts and research as evidence during discussions. The respondents do not place as much emphasis on using digital media during presentations to enhance understanding and add interest.

Language Standards

Respondents to Importance Ratings for the Language Standards Strand

Figure 24 shows how the respondents who completed importance ratings for the Language Standards strand are distributed across the seven content areas. There were 1549 respondents (82% of the sample) rating at least one standard statement as applicable and therefore conducting importance ratings. The breakdown of respondents across content areas was similar to the Speaking and Listening strand. Respondents were fairly well distributed across the content areas with social science instructors (*n* = 376) composing the largest group of respondents.

Figure 24. Respondents Rating Importance for Language Standards Strand (*n* = 1549), Percent by Content Area

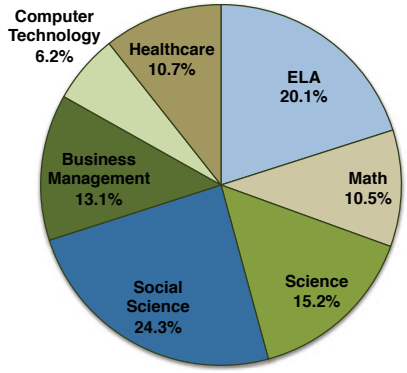
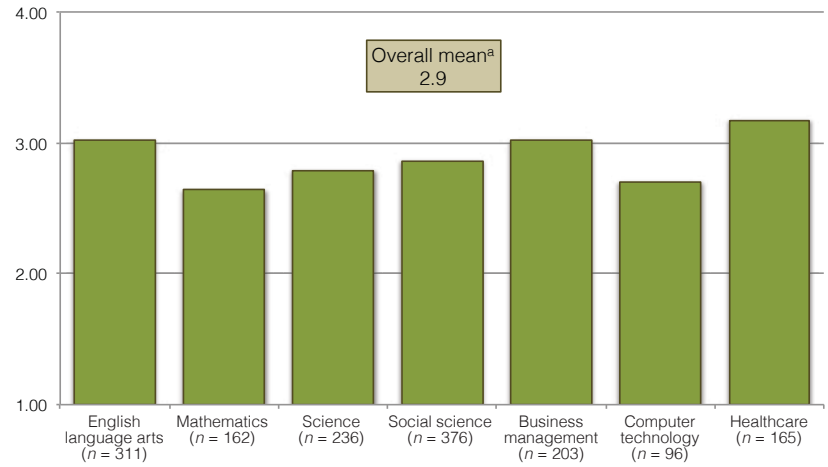


Figure 25. Mean Importance Ratings for Language Standards Respondents (*n* = 1549), by Content Area



[a]The 17 standard statements were weighted to account for the varying number of respondents for each standard.

English language arts (ELA) instructors (*n* = 311), science instructors (*n* = 236), and business management instructors (*n* = 203) composed the next three largest groups of respondents.

Average Importance Ratings for the Language Standards Strand

The standard statements within the Language Standards strand had an average rating of 2.9 (*SD* = .84), just below the "more important" rating. Figure 25 shows that importance ratings were similar across the content areas. The strand has three topics with between two and nine standards statements each. Table 18 shows the average rating for each topic.

Table 18. Importance Ratings for Topics in Language Standards Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Conventions of Standard English	3.0	0.87	6
Knowledge of Language	2.9	0.81	2
Vocabulary Acquisition and Use	2.9	0.83	9
Overall	2.9	0.84	17

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

As the means show, these topics are rated highly but on the lower end compared to topics in other strands (explaining why the strand as a whole has a relatively lower average). The averages of the three topics were similar to each other:

- The Conventions of Standard English topic (an average of six statements) includes standard statements that relate to demonstrating command of standard English grammar, resolving issues of complex or contested usage, and, when writing, demonstrating command of capitalization, punctuation, and spelling. The two Knowledge of Language statements refer to applying knowledge of language to make effective choices for meaning or style, including varying syntax for effect. The nine Vocabulary Acquisition and Use statements refer to determining the meaning of words, using a range of strategies, and demonstrating understanding of figurative language, word relationships, and word meaning nuances. This group of standards also includes acquiring general academic and domain-specific word knowledge and independence in gathering vocabulary knowledge.

Importance Ratings by Standard Statement for the Language Standards Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 19 in the order the standards appear in the Common Core standards documents. Compared to other strands, fewer of the Language Standards statements (7 of 17) were rated as being more or most important by a large proportion (>70%) of respondents.

Table 19. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Language Standards

Standard	More/most percent	Less/least percent
Conventions of Standard English		
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	84	16
a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.	64	36
b. Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage) as needed.	61	39
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	77	23
a. Observe hyphenation conventions.	37	63
b. Spell correctly.	76	24
Knowledge of Language		
3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	76	24
a. Vary syntax for effect, consulting references (e.g., Tufte's Artful Sentences) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.	57	43
Vocabulary Acquisition and Use		
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11-12 reading and content, choosing flexibly from a range of strategies.	74	26
a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	74	26
b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).	61	39
c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.	64	36
d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	64	36
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	63	37
a. Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.	55	45
b. Analyze nuances in the meaning of words with similar denotations.	58	42
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	89	11

Compared to other statements in the strand, two statements received higher importance ratings: acquiring and using vocabulary knowledge of academic words and phrases, and demonstrating command of standard English grammar and usage. One statement, applying hyphenation conventions, was rated by less than a majority of respondents as important (see Table 20). It should be noted that the hyphenation statement is a sub-statement of the standard referring to conventions of standard English capitalization and punctuation.

Table 20. Standard Statements with Means Above and Below[a] the Strand Average, for Language Standards

	Mean[b]	Standard deviation
Strand average	2.9	0.84
Standard statements above average		
Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	3.3	0.69
Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	3.3	0.78
Standard statements below average		
Observe hyphenation conventions.	2.3	0.96

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Language Standards

Although the standards were applicable to a wide range of respondents, importance ratings for the Language Standards were lower than other ELA and literacy strands. However, respondents still rated these standards as important, with the average falling just below the "more important" category. The ratings show that respondents tend to emphasize the use of academic words and phrases, including independence in acquiring vocabulary knowledge. They also consider command of standard English grammar and usage as highly important. They attribute the least importance to specific hyphenation conventions.

Reading Standards for Literacy in History/Social Studies

Respondents to Importance Ratings for the Reading Standards in History/Social Studies Strand

Figure 26 shows how the respondents who completed importance ratings for the Reading Standards in History/Social Studies strand are distributed across the seven content areas. There were 571 respondents (30% of the sample) who completed importance ratings. Not surprisingly, a majority (n = 353) were social science instructors. ELA (n = 83) and business management (n = 67) instructors composed the next largest groups of respondents.

Figure 26. Respondents Rating Importance for Reading Standards for Literacty in History/Social Studies Strand (n = 571), Percent by Content Area

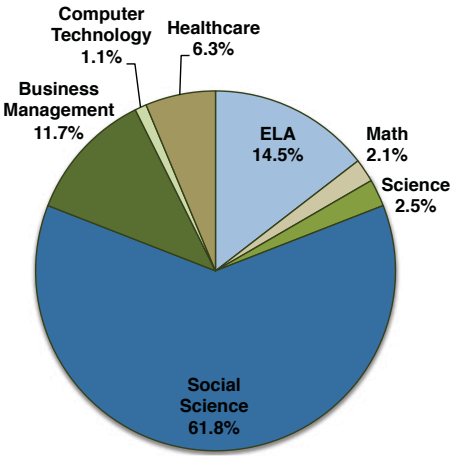
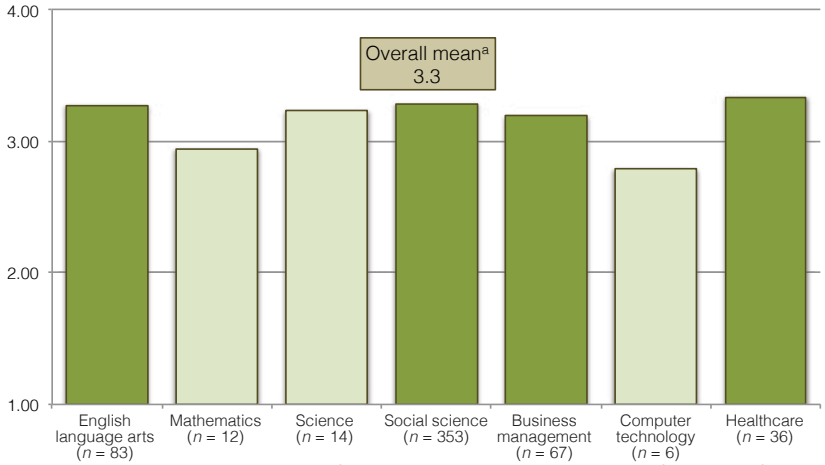


Figure 27. Mean Importance Ratings for Reading Standards for Literacy in History/Social Studies Respondents (n = 571), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The 10 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Reading Standards in History/Social Studies Strand

The standard statements within the Reading Standards for Literacy in History/Social Studies strand had an average rating of 3.3 (SD = .72), above the "more important" rating. Figure 27 shows that importance ratings were relatively similar across the content areas. Within the strand, four topics have between one and three standards statements each. Table 21 shows the average rating for each of the four topics.

Table 21. Importance Ratings for Topics in Reading Standards for Literacy in History/Social Studies Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Key Ideas and Details	3.4	0.69	3
Craft and Structure	3.1	0.75	3
Integration of Knowledge and Ideas	3.3	0.73	3
Range of Reading and Level of Text Complexity	3.5	0.68	1
Overall	3.3	0.72	10

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of those topics with the lowest and highest ratings, including a description of the type of standards they contain:

- Two topics were at the higher end of the ratings. These are the Range of Reading and Level of Text Complexity topic (one statement) and the Key Ideas and Details topic (average of three statements). The Range of Reading and Level of Text Complexity standard addresses students' ability to read and comprehend different types of science and technical texts with grade-appropriate complexity. This standard is similar to the Range of Reading and Level of Text Complexity topics within the literature and informational texts strands. The Key Ideas and Details topic expects students to cite specific textual evidence from science and technical texts, determine central ideas of the text, and follow complex, multistep procedures when carrying out experiments and analyzing results based on explanations in text.
- Although one topic, Craft and Structure (an average of three statements), had the lowest rating, the rating still exceeds 3, "more important." The Craft and Structure topic includes standards relating to determining the meaning of symbols, terms, and domain-specific words as well as analyzing text structures and the author's purpose in providing explanation or discussion.

Importance Ratings by Standard Statement for the Reading Standards in History/Social Studies Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 22 in the order the standards appear in the Common Core standards documents. With one exception, a large proportion (>75%) of respondents rate the 10 standard statements as being more or most important.

Table 22. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Reading Standards for Literacy in History/Social Studies

Standard	More/most percent	Less/least percent
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.	91	9
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.	92	8
3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.	85	15
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines faction in Federalist No. 10).	82	18
5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.	69	31
6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.	85	15
Integration of Knowledge and Ideas		
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.	84	16
8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.	84	16
9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.	87	13
Range of Reading and Level of Text Complexity		
10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–12 text complexity band independently and proficiently.	92	8

In terms of ratings of individual standard statements, one standard, analysis of the structure of a primary text, had a lower average importance rating. No standards had an importance rating above average (see Table 23).

Table 23. Standard Statements with Means Above and Below[a] the Strand Average, for Reading Standards for Literacy in History/Social Studies

	Mean[b]	Standard deviation
Strand average	3.3	0.72
Standard statements above average		
None		
Standard statements below average		
Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.	2.9	0.78

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Reading Standards in History/Social Studies

Overall, importance ratings of the Reading Standards for Literacy in History/Social Studies were among the highest ELA and literacy ratings, above the "most important" rating category. Within these standards, respondents tend to emphasize general concepts such as students being able to provide textual evidence to support analysis and to determine central ideas of a text (similar to the findings for Reading for Informational Standards). They place less emphasis on students' analysis of how primary sources are structured and how the parts contribute to a whole.

Reading Standards for Literacy in Science and Technical Subjects

Respondents to Importance Ratings for the Reading Standards in Science and Technical Subjects Strand

Figure 28 shows how the respondents who completed importance ratings for the Reading Standards in Science and Technical Subjects strand are distributed across the seven content areas. There were 1063 respondents (56% of the sample) rating at least one standard statement as applicable and therefore conducting importance ratings. Respondents were fairly well distributed across the content areas with science instructors (*n* = 262) composing the largest group of respondents. Mathematic instructors (*n* = 213) were the next largest group of respondents.

Figure 28. Respondents Rating Importance for Reading Standards for Literacty in Science and Technical Subjects Strand (*n* = 1063), Percent by Content Area

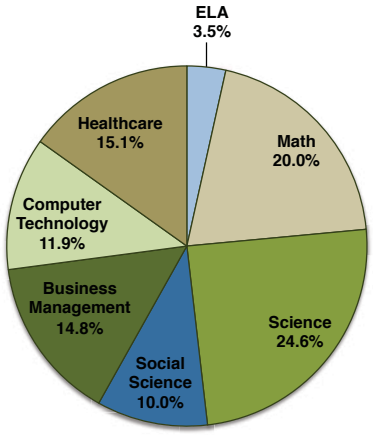
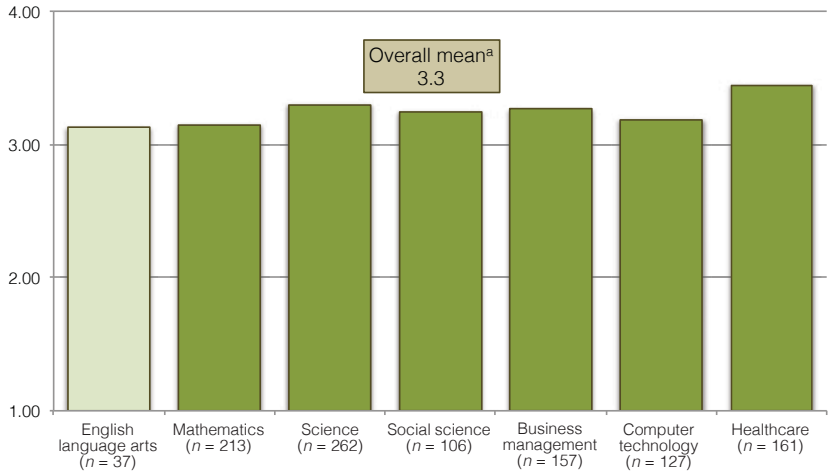


Figure 29. Mean Importance Ratings for Reading Standards for Literacy in Science and Technical Subjects Respondents (*n* = 1063), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The 10 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Reading Standards in Science and Technical Subjects Strand

The standard statements within the Reading Standards in Science and Technical Subjects strand had an average rating of 3.3 (*SD* =.71), above the "more important" rating. Figure 29 shows that importance ratings were similar across the content areas. The strand has four topics with between one and three standards statements each. Table 24 shows the average rating for each topic.

Table 24. Importance Ratings for Topics in Reading Standards for Literacy in Science and Technical Subjects Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Key Ideas and Details	3.3	0.68	3
Craft and Structure	3.2	0.73	3
Integration of Knowledge and Ideas	3.2	0.75	3
Range of Reading and Level of Text Complexity	3.5	0.61	1
Overall	3.3	0.71	10

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of the topics:

- Range of Reading and Level of Text Complexity had the highest average rating in this strand. As with similar topics in other strands, the Range of Reading and Level of Text Complexity statement involves reading and comprehending texts — in this case, history and social studies texts — with grade-appropriate complexity.
- Three other topics had averages that were similar to each other and above the "most important" category: Key Ideas and Details (the average of three statements), Craft and Structure (the average of three statements), and Integration of Knowledge and Ideas (the average of three statements).

Importance Ratings by Standard Statement for the Reading Standards in Science and Technical Subjects Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 25 in the order the standards appear in the Common Core standards documents. With only one exception, a large proportion (>75%) of respondents rated the 10 standard statements as more or most important.

One standard, following a multistep procedure when conducting experiments, measurements, or technical tasks, received a higher average importance rating than others. Two standards received lower-than-average importance ratings: analyzing the author's purpose in describing procedures or experiments and citing specific textual evidence to support analysis of science and technical texts. Table 26 shows the means and standard deviations of these three standards compared to the average of statements in the strand as a whole.

Table 25. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Reading Standards for Literacy in Science and Technical Subjects

Standard	More/most percent	Less/least percent
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	79	21
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	90	10
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	95	5
Craft and Structure		
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.	94	6
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	80	20
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	71	29
Integration of Knowledge and Ideas		
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	79	21
8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying data when possible and corroborating or challenging conclusions with other sources of information.	83	17
9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	87	13
Range of Reading and Level of Text Complexity		
10. By the end of Grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.	94	6

Table 26. Standard Statements with Means Above and Below[a] the Strand Average, for Reading Standards for Literacy in Science and Technical Subjects

	Mean[b]	Standard deviation
Strand average	3.3	0.71
Standard statements above average		
Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	3.6	0.60
Standard statements below average		
Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	2.9	0.81
Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	3.0	0.76

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Reading Standards in Science and Technical Subjects

Importance ratings of the Reading Standards for Literacy in Science and Technical Subjects, on average, were also among the highest ELA and literacy ratings, just above the 3, or "more important" level. Respondents were distributed across the content areas consistent with overall response patterns. Respondents' ratings show that they tend to emphasize skills relating to following complex multistep procedures when doing technical tasks and analyzing technical results based on explanations in the text. They emphasize less the importance of the author's purpose within the text and citing specific textual evidence while attending to the distinctions that the author makes.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects

Respondents to Importance Ratings for the Writing Standards in History/Social Studies, Science, and Technical Subjects Strand

Figure 30 shows how the respondents who completed importance ratings for the Writing Standards in History/Social Studies, Science, and Technical Subjects strand are distributed across the seven content areas. Of the 1257 respondents (66% of the sample), the largest group of respondents was social science instructors (n = 378). Science (n = 247) and business management (n = 182) instructors composed the next two largest groups of respondents.

Figure 30. Respondents Rating Importance for Writing Standards for Literacty in History/Social Studies, Science and Technical Subjects Strand (n = 1257), Percent by Content Area

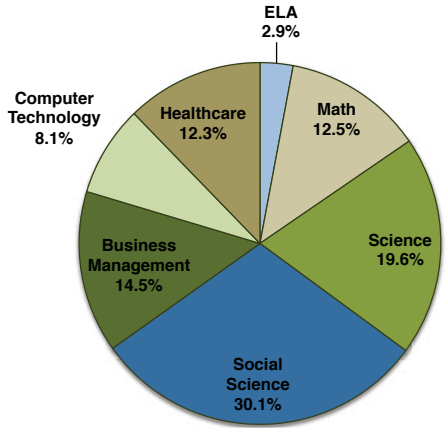
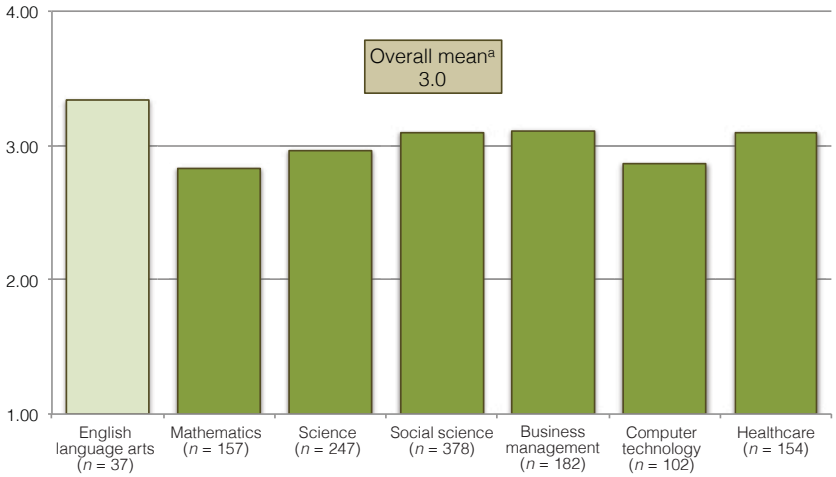


Figure 31. Mean Importance Ratings for Writing Standards for Literacy in History/Social Studies, Science and Technical Subjects Respondents (n = 1257), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the strand.
[a]The 19 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Writing Standards in History/Social Studies, Science, and Technical Subjects Strand

The standard statements within the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects strand had an average rating of 3.0 (SD =.78), at the "more important" level. Figure 31 shows that importance ratings were similar across the content areas. The strand has four topics with 1 to 12 standards statements each. As with the other writing strand, this one has many more sub-standards for a total of 19 statements. Table 27 shows the average rating for each topic.

Table 27. Importance Ratings for Topics in Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Strand, Presented as Weighted Means and Standard Deviations

Topic	Mean[a]	Standard deviation	Number of standards
Text Types and Purposes	3.0	0.78	12
Production and Distribution of Writing	3.1	0.79	3
Research to Build and Present Knowledge	3.1	0.77	3
Range of Writing	3.0	0.8	1
Overall	3.0	0.78	19

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Each of the topics had relatively similar ratings to each other: Text Types and Purposes (an average of 12 statements), Production and Distribution of Writing (an average of three statements), Research to Build and Present Knowledge (an average of three statements), and Range of Writing (one statement) all had average ratings at or very near the "more important" level.

In general, these topics contain standard statements that are similar to the Writing Standards in that they require students to produce clear and coherent writing appropriate to the task; to use a process to plan, revise, edit and rewrite; and to use technology to produce and update writing products. They expect students to write routinely over both shorter and extended periods of time and to gather relevant information, synthesize sources, and draw evidence from texts to support analysis. Because the strand is content specific, the Text Types and Purposes topic focuses on writing that is discipline specific, including the use of claims and counterclaims, formal style and objective tone, precise language, and domain-specific vocabulary.

Importance Ratings by Standard Statement for the Writing Standards in History/Social Studies, Science, and Technical Subjects Strand

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in Table 28 in the order the standards appear in the Common Core standards documents. The strand has a total of 19 statements. Because the writing strands make greater use of sub-standards, there are more and, in some cases, finer-grained statements than other strands.

Most of the statements (16) were rated as being more or most important by a large proportion (>70%) of respondents.

Table 28. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects

Standard	More/most percent	Less/least percent
Text Types and Purposes		
1. Write arguments focused on discipline-specific content.	84	16
a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.	82	18
b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.	79	21
c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	68	32
d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.	70	30
e. Provide a concluding statement or section that follows from or supports the argument presented.	79	22
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.	76	24
a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.	80	20
b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	80	20
c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	60	40
d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.	68	32
e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).	75	25
Production and Distribution of Writing		
4.[a] Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	83	17
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	75	25
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	70	30
Research to Build and Present Knowledge		
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	80	20
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	80	20
9. Draw evidence from informational texts to support analysis, reflection, and research.	82	18
Range of Writing		
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	72	28

[a]For the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects, the third standard is listed as not applicable as separate requirement.

One standard statement, on the use of varied transitions and sentence structures, had a lower rating. This is a sub-statement of the standard referring to writing informative/explanatory texts. Table 29 shows the mean and standard deviation of this standard statement compared to the average of statements in the strand as a whole.

Table 29. Standard Statements with Means Above and Below[a] the Strand Average, for Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects

	Mean[b]	Standard deviation
Strand average	3.0	0.78
Standard statements above average		
None		
Standard statements below average		
Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	2.7	0.81

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the strand average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the strand level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Writing Standards in History/Social Studies, Science, and Technical Subjects

The average importance rating across all importance ratings for the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects strand was "more important." Social science and science instructors comprised about half of the respondents for this strand, with the rest of the respondents distributed across the other content areas. Respondents tend to identify as important the writing of arguments on discipline-specific content that includes precise, knowledgeable, significant claims. Respondents also indicate as important students' ability to create organization that logically sequences the claim, counterclaims, reasons, and evidence. Respondents find student use of varied transitions and sentence structures not to reach the level of "more important."

Chapter 4 | Findings for Ratings of Common Core Mathematics Standards

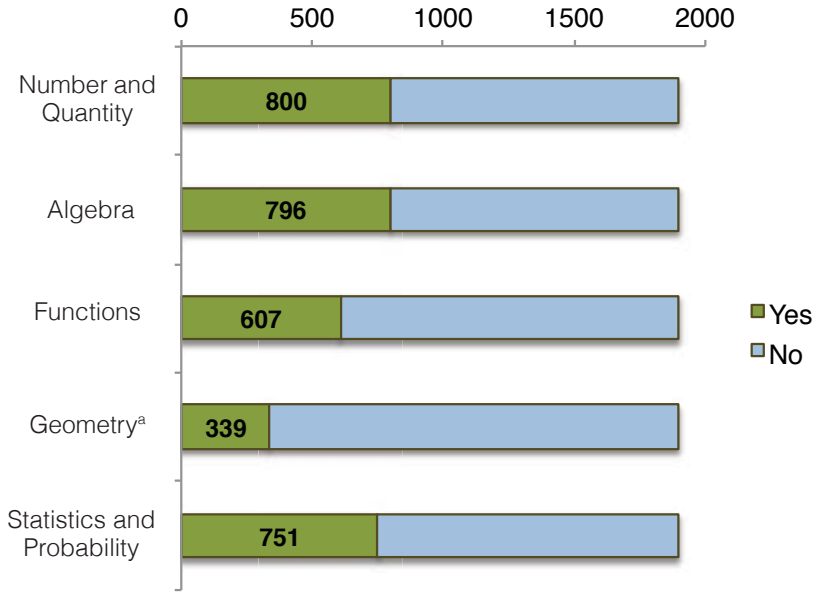
For mathematics, we organize the data presentation in the same fashion as we did for English language arts and literacy. Frequencies for applicability and importance categories for individual standards can be found in Appendix G.

Applicability for Mathematics Standards

Overall Applicability

Figure 32 shows how the study's 1897 respondents answered the overall relevancy question for each mathematics conceptual category. Respondents who, after reading a summary, said the conceptual category was relevant to their course were given the opportunity to rate all of the standards within the category. Only respondents who answered yes were presented with all the standards within the category to rate. Respondents who answered no bypassed the section. All respondents viewed each of the Standards for Mathematical Practice.

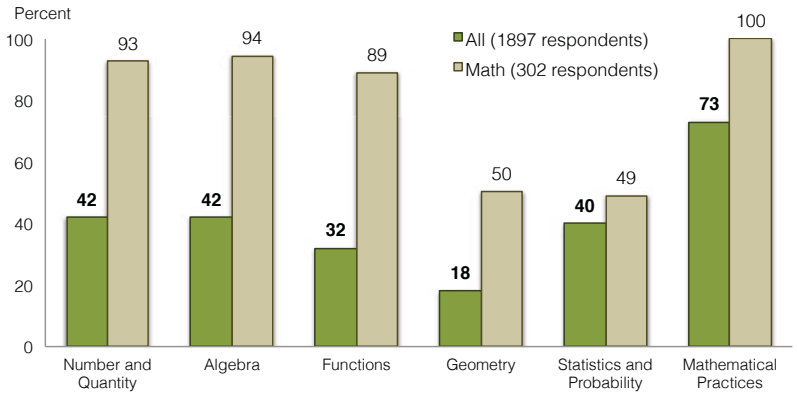
Figure 32. Response from Sample (*n* = 1897) to Overall Relevancy Question for Mathematics Conceptual Categories



[a]Geometry has 1896 rrespondents because, due to a system error, this conceptual category and its standards statements were not presented to one respondent.

Next, we present related data; Figure 33 shows the percent of all respondents who rated at least one standard within the mathematics conceptual category as either prerequisite, reviewed, introduced, or subsequent. Nearly every instructor who answered yes to the parent question (Figure 32) went on to rate at least one standard as applicable (Figure 33). Figure 33 also shows the percent of mathematics respondents who rated at least one standard as applicable in each category.

Figure 33. Percent of Respondents Rating at Least One Standard within the Mathematical Conceptual Categories and Mathematical Practices as Applicable[a] to their Course



Note. The graphic shows the ratings for the 302 respondents of mathematics courses separately.
[a]Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

Two categories were applicable to 18–32% of the sample:

- Functions
- Geometry

Three categories were applicable to approximately 40% of the sample:

- Number and Quantity
- Algebra
- Statistics and Probability

For the Mathematical Practices section, at least one standard was applicable to 73% of respondents. Recall that respondents did not see an overall relevancy question for Mathematical Practices. Instead, each respondent saw all eight individual standard statements in this category. This means that 73% of the sample rated at least one of the eight standards as applicable.

Applicability Criterion

In presenting summative data for this chapter, we chose to use the criterion of a minimum of one standard match within a conceptual category as indicating applicability of the category. This eliminates the need to set an arbitrary criterion point, either a fixed number or a percent of all standard statements in the category (which vary from to 8 to 45 standard statements). For example, Table 30 shows that the 797 respondents who completed ratings for Number and Quantity rated, on average, 14 standard statements as applicable, with a mode response of three standards (out of a possible 32 standard statements). Appendix F contains additional information about the number of standards in each conceptual category that were rated as applicable.

Table 30. Number of Standards Rated as Applicable for Mathematics Conceptual Categories

Conceptual category	Number of respondents	Number of standards					
		Total in category	Rated as applicable				
			Mean	Standard deviation	Mode	Minimum	Maximum
Number and Quantity	797	32	13.5	10.81	3	1	32
Algebra	793	34	19.7	10.46	34	1	34
Functions	606	45	26.9	14.39	45	1	45
Geometry	335	45	19.4	14.85	45	1	45
Statistics and Probability	751	36	19.5	11.81	36	1	36
Mathematical Practices	1380	8	6.5	2.20	8	1	8

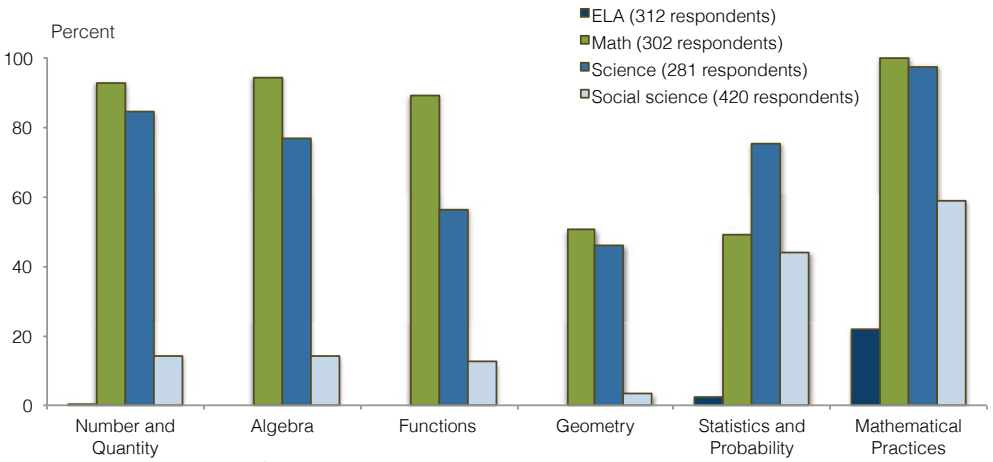
Applicability by Content Area

As with English language arts and literacy, when we divided results by the seven content areas included in the survey, contrasts were revealed in applicability ratings among respondents from different content areas (Figure 34 shows English language arts, mathematics, science, and social science; Figure 35 shows business management, computer technology, and healthcare). As Figure 34 shows and as would be expected, very few respondents from English language arts (ELA) courses find the mathematics conceptual categories applicable to their course. In contrast and predictably, 89–94% of mathematics respondents rate as applicable the Number and Quantity, the Algebra, and the Functions categories. Fewer mathematics respondents (49–50%) rate as applicable the Geometry and the Statistics and Probability categories.

For science, 75–84% of respondents rate as applicable the Number and Quantity, the Algebra, and the Statistics and Probability categories. Fewer science respondents (46–56%) rate as applicable the Functions and Geometry categories. Few social science respondents find the conceptual categories applicable, with the exception of Statistics and Probability, which 44% rated as applicable.

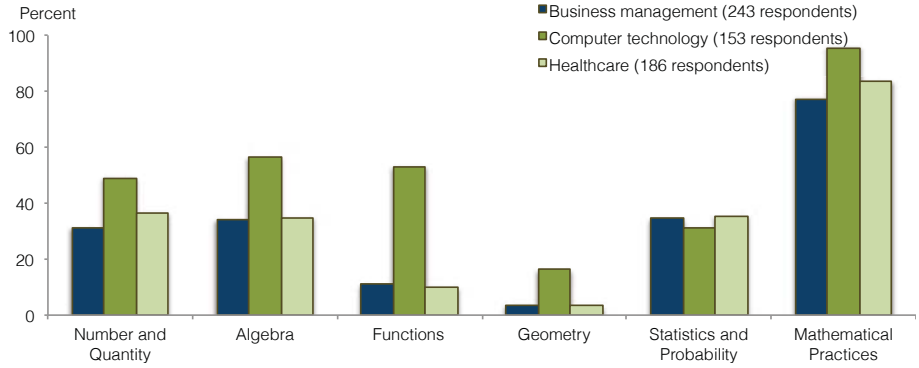
Figure 34 shows conceptual category-level applicability ratings for ELA, mathematics, science, and social science respondents — courses often associated with general education requirements to earn a bachelor's degree. Figure 35 shows conceptual category-level applicability ratings for the other three content areas that are somewhat more associated with career pathways: business management, computer technology, and healthcare.

Figure 34. Percent of Respondents Rating at Least One Standard within the Mathematics Conceptual Category as Applicable[a] to their Course, for ELA, Math, Science, and Social Science



[a]Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

Figure 35. Percent of Respondents Rating at Least One Standard within the Mathematics Conceptual Category as Applicable[a] to their Course, for Business Management, Computer Technology and Healthcare



[a]Applicable is considered a rating of prerequisite, reviewed, introduced, or subsequent.

Computer technology respondents indicated the highest applicability of mathematics of the three more application-oriented content areas. Most highly applicable were Number and Quantity, Algebra, and Functions, with about 50% each. Fewer computer technology respondents rated as applicable the Geometry and the Statistics and Probability categories (16% and 31%, respectively).

Respondents from business management and heatlhcare courses, on average, showed relatively similar patterns to each other, in that both found most applicable Number and Quantity, Algebra, and Statistics and Probability. Averages ranged from 31–35% for business management and from 35–37% for healthcare. Both content areas had low ratings for Functions (11% and 10%) and Geometry (4% and 3%).

As mentioned earlier, the Mathematical Practices standards were more widely applicable than any individual mathematics conceptual category. For almost all content areas, a large percent (77–100%) of respondents rated Mathematical Practices as applicable. The two content area categories with the lowest applicability rate were social science at 59% and ELA at 22%.

Appendix F contains more information on applicability ratings for each content area and each conceptual category.

Importance Ratings for Mathematics Standards

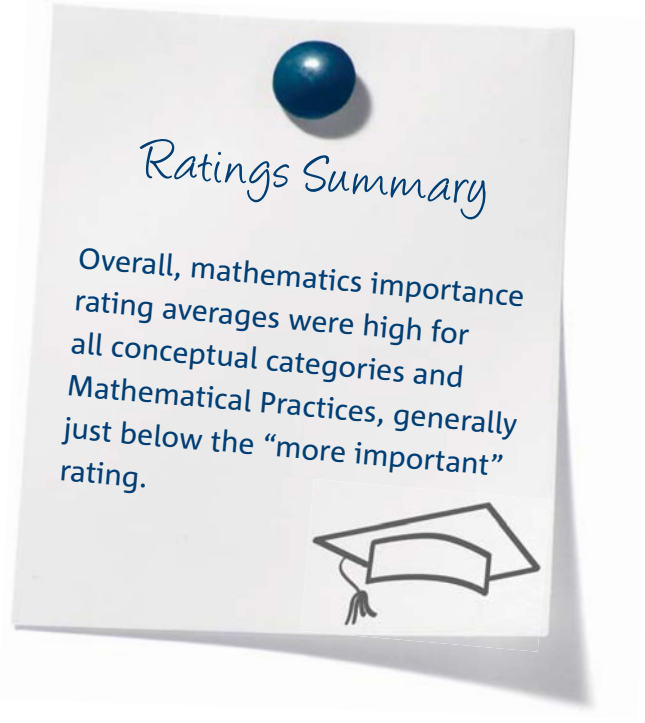
Importance ratings are presented below but with the same caveat that was given for the English language arts and literacy section. In all cases, the importance ratings come from a subset of respondents — those who rated a conceptual category and then a standard as applicable. This is also a subset of all respondents within a content area. For this reason, importance ratings should be viewed with caution until they are situated relative to their proportion of all applicability responses. They are included here for informational purposes to help present an initial indication of the validity of the Common Core standards relative to a range of postsecondary course categories and not to reach a definitive conclusion regarding the importance of any given standard or conceptual category.

If respondents selected a standard as prerequisite, reviewed, or introduced, they were then asked to rate the importance of that standard on a 4-point scale. The scale consisted of the options most (defined as critical for success in the course), more (important for success), less (familiarity may be helpful), and least important (only minimal knowledge needed). Respondents who did not rate a standard's applicability in those three categories were not presented with the importance rating and instead were directed to the next standard. Although we present importance ratings as means, it is worth noting that the importance categories are ordinal. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical category underlying it.

Below, for each conceptual category, we provide a descriptive summary of the importance ratings. We first show the breakdown by content area of those respondents who rated importance and their average ratings rolled up to the conceptual category level. These are the averages of 32 to 45 standard statements, depending on the category, weighted to account for the varying number of respondents for each standard. It was not our goal to look for statistically significant differences among the categories (nor do any likely exist). We include these results only to show general patterns in ratings.

As in the results section of the English language arts and literacy chapter, we then show several summary-level presentations of the importance data. We present the average importance ratings at the domain level (the four to six organizing categories or subareas) within each conceptual category. Then, we present the importance ratings for each standard. These are presented as dichotomous findings, showing percentage breakdown for the standard statement rated either (1) as more or most important, or (2) as less or least important. In this view of the data, every standard is presented (in the order the standards appear in the Common Core standards documents), but the responses are collapsed into just two categories. Finally, to help provide a summary overview, we list individual standard statements that had means that were somewhat higher or lower than the mean of all standards in that conceptual category. We include these results once again to illuminate general patterns, not to suggest that the comparison of these standards to others is statistically significant and not to suggest the need for specific actions based on these ratings.

The presentations of the data were designed to give summary-level information about the findings that would be relatively easy and meaningful to view. The body of the report does not present the frequencies for all importance categories for individual standards. This potentially important information is contained in Appendix G.



Number and Quantity Standards

Respondents to Importance Ratings for the Number and Quantity Conceptual Category

Figure 36 shows how the instructors who completed importance ratings for the Number and Quantity conceptual category are distributed across the seven content areas. Of the 796 respondents (42% of the sample) rating at least one standard statement within the Number and Quantity conceptual category as applicable and therefore conducting importance ratings, mathematics (n = 280) and science (n = 237) respondents composed the majority of respondents. The other content areas had a similar number of respondents to each other, just under 10%, with the exception of English language arts (ELA), which had only one respondent.

Figure 36. Respondents Rating Importance for Number and Quantity Conceptual Category (n = 796), Percent by Content Area

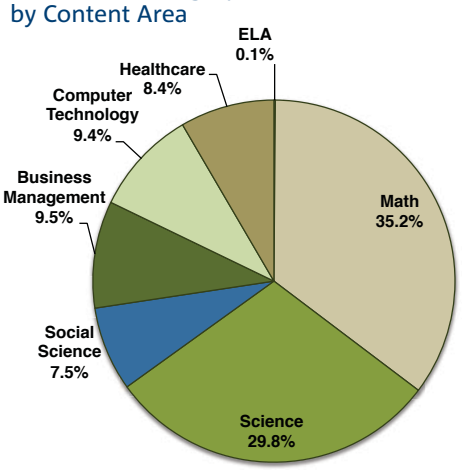
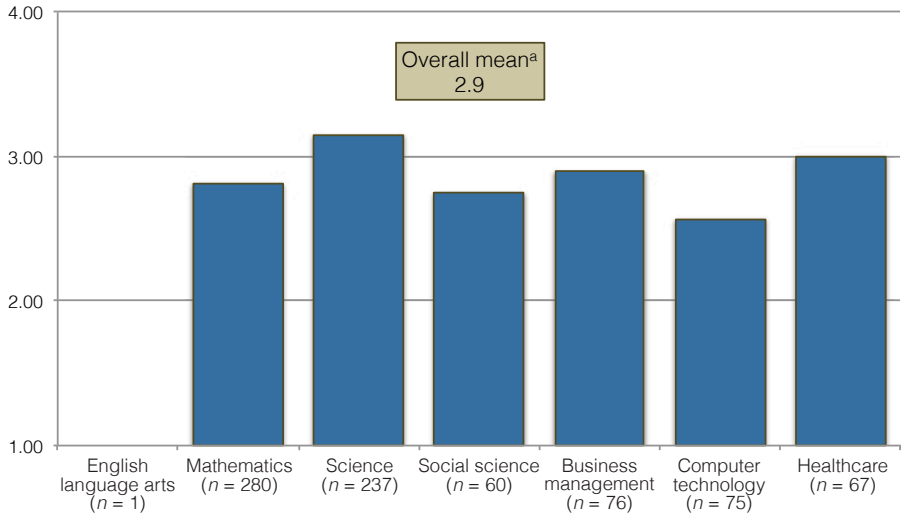


Figure 37. Mean Importance Ratings for Number and Quantity Respondents (n = 796), by Content Area



Note. Because there was only one English language arts respondent, the rating is not displayed.
[a]The 32 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Number and Quantity Conceptual Category

The standard statements within the Number and Quantity conceptual category had an average rating of 2.9 (*SD* = .89), just below the "more important" rating. Figure 37 shows the importance ratings across instructors from the different content areas. The conceptual category has four domains that have between 3 and 17 standards statements each. Table 31 shows the average rating for each domain.

Table 31. Importance Ratings for Domains in Number and Quantity Conceptual Category, Presented as Weighted Means and Standard Deviations

Domain	Mean[a]	Standard deviation	Number of standards
The Real Number System	2.9	0.89	3
Quantities	3.1	0.80	3
The Complex Number System	2.7	0.91	9
Vector and Matrix Quantities	2.9	0.94	17
Overall	2.9	0.89	32

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of the domain ratings, including a description of the type of standards they contain:

- One domain, Quantities (an average of three statements), had the highest rating. These standards refer to reasoning quantitatively and using units to solve problems.
- The Complex Number System domain (an average of nine statements) had the lowest rating, above the midpoint between "less important" and "more important." These standards (six of which are marked as advanced) refer to performing arithmetic operations with complex numbers, representing complex numbers and operations on the complex plane, and using complex numbers in polynomial identities and equations.

Importance Ratings by Standard Statement for the Number and Quantity Conceptual Category

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 32 in the order the standards appear in the Common Core standards documents. Many of the Number and Quantity statements (28 of 32) were rated as being more or most important by a significant proportion (between 50 and 75%) of respondents.

Table 32. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Number and Quantity Standards

Standard	More/most percent	Less/least percent
The Real Number System: Extend the properties of exponents to rational exponents.		
1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.	72	28
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	71	29
The Real Number System: Use properties of rational and irrational numbers.		
3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	50	50
Quantities: Reason quantitatively and use units to solve problems.		
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	82	18
2. Define appropriate quantities for the purpose of descriptive modeling.	76	24
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	72	28
The Complex Number System: Perform arithmetic operations with complex numbers.		
1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b being real.	55	45
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	57	43
3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	52	48
The Complex Number System: Represent complex numbers and their operations on the complex plane.		
4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	46	54
5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(1 - \sqrt{3}i)^3 = 8$ because $(1 - \sqrt{3}i)$ has modulus 2 and argument 120°.	46	54
6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	53	47

Continued on next page

Table 32. continued

Standard	More/most percent	Less/least percent
The Complex Number System: Use complex numbers in polynomial identities and equations.		
7. Solve quadratic equations with real coefficients that have complex solutions.	68	32
8. (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.	54	46
9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	61	39
Vector and Matrix Quantities: Represent and model with vector quantities.		
1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, $\|\mathbf{v}\|$, $\|\|\mathbf{v}\|\|$, v).	69	31
2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	68	32
3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.	74	26
Vector and Matrix Quantities: Perform operations on vectors.		
4. (+) Add and subtract vectors.	69	31
a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.	68	32
b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.	70	30
c. Understand vector subtraction $\mathbf{v} - \mathbf{w}$ as $\mathbf{v} + (-\mathbf{w})$, where $-\mathbf{w}$ is the additive inverse of **w**, with the same magnitude as **w** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.	69	31
5. (+) Multiply a vector by a scalar.	69	31
a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.	64	36
b. Compute the magnitude of a scalar multiple c**v** using $\|\|c\mathbf{v}\|\| = \|c\|v$. Compute the direction of cv knowing that when $\|c\|v \neq 0$, the direction of c**v** is either along **v** (for $c > 0$) or against **v** (for $c < 0$).	68	32
Vector and Matrix Quantities: Perform operations on matrices and use matrices in applications.		
6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.	57	43
7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.	57	43
8. (+) Add, subtract, and multiply matrices of appropriate dimensions.	62	38
9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.	58	42
10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.	59	41
11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.	59	41
12. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.	55	45

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

A review of the ratings of individual standard statements reveals that one standard, the use and interpretation of units as a way to understand problems, received a higher average importance rating. Five statements (four of which were advanced standards) received lower average importance ratings. Table 33 shows those standards and their means and standard deviations compared to the average of statements in the conceptual category as a whole.

Table 33. Standard Statements with Means Above and Below[a] the Conceptual Category Average, for Number and Quantity

	Mean[b]	Standard deviation
Conceptual category average	2.9	0.89
Standard statements above average		
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	3.3	0.77
Standard statements below average		
(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	2.5	0.94
(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(1 - \sqrt{3}i)^3 = 8$ because $(1 - \sqrt{3}i)$ has modulus 2 and argument 120°.	2.5	0.91
(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	2.6	0.83
Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	2.6	0.89
(+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.	2.6	0.97

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for Number and Quantity

The standard statements within the Number and Quantity conceptual category had an average rating of 2.9, just below the "more important" level. Mathematics and science respondents comprised the large majority of respondents, with the remainder of respondents distributed across all content areas, except ELA. The importance ratings for Number and Quantity show that respondents find as most important quantitative reasoning standard using units as a way to understand problems that guides the solution of problems, including choosing and interpreting both units in formulas and scales in graphs. Respondents do not place as much importance on the three advanced standards in the complex numbers domain. They also do not find as important students' ability to explain sums and products of rational and irrational numbers, nor do they find as important the advanced standards relating to operations and matrices.

Algebra Standards

Respondents to Importance Ratings for the Algebra Standards Conceptual Category

Figure 38 shows how the instructors who completed importance ratings for the Algebra conceptual category are distributed across the seven content areas. Of the 792 respondents (42% of the sample), mathematics respondents (n = 285) and science respondents (n = 215) formed the majority of respondents. The other content areas had a similar number of respondents to each other, with the exception of ELA, which had no respondents.

Figure 38. Respondents Rating Importance for Algebra Conceptual Category (n = 792), Percent by Content Area

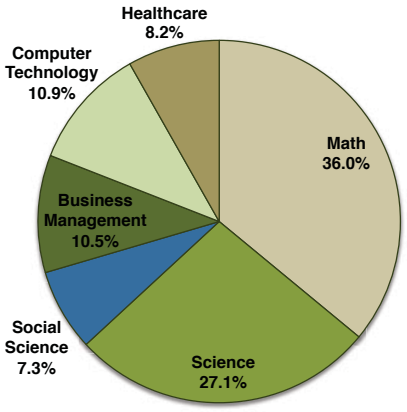
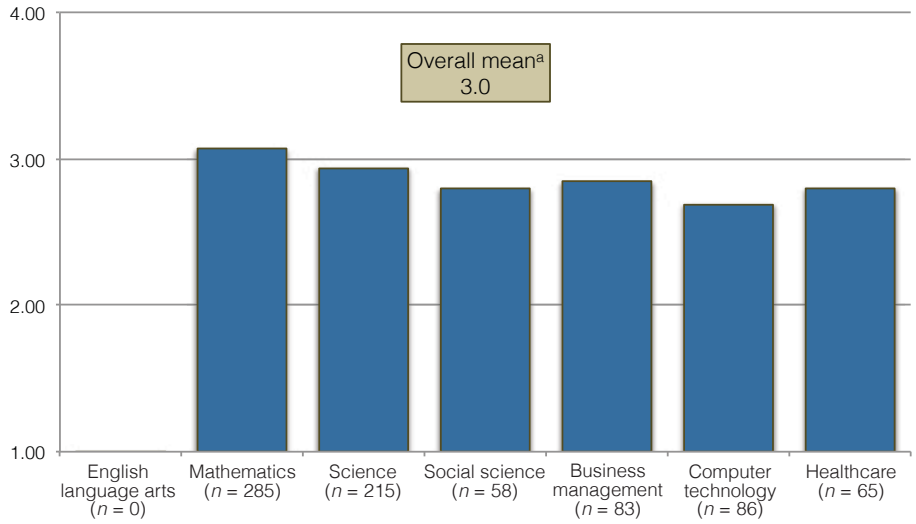


Figure 39. Mean Importance Ratings for Algebra Respondents (n = 792), by Content Area



[a]The 34 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Algebra Conceptual Category

The standard statements within the Algebra conceptual category had an average rating of 3.0 (SD = .87), at the "more important" level. Figure 39 shows the importance ratings across instructors from the different content areas. The conceptual category has four domains that comprise between 4 and 14 standards statements. Table 34 shows the average rating for these domains.

Table 34. Importance Ratings for Domains in Algebra Conceptual Category, Presented as Weighted Means and Standard Deviations

Domain	Mean[a]	Standard deviation	Number of standards
Seeing Structure in Expressions	3.0	0.85	9
Arithmetic with Polynomials and Rational Expressions	2.7	0.92	7
Creating Equations	3.1	0.82	4
Reasoning with Equations and Inequalities	3.0	0.88	14
Overall	3.0	0.87	34

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of the domain ratings and a description of each:

- Three domains tended to have ratings at or very near the "more important" level: Creating Equations, with four standards, had the highest average rating. Creating Equations standards, not surprisingly, focus on the creation of equations that describe numbers or relationships. Seeing Structure in Expressions (nine standards) and Reasoning with Equations and Inequalities (14 standards) have similar average ratings. Seeing Structure in Expressions includes standards that expect students to interpret the structure of expressions and write expressions in equivalent forms in order to solve problems. Reasoning with Equations and Inequalities involves solving equations. This includes solving equations as a process of reasoning and explaining the reasoning, solving equations and inequalities in one variable, solving systems of equations, and solving equations and inequalities graphically.
- Arithmetic with Polynomials and Rational Expressions, comprising seven statements, had the lowest average rating but was still above the midpoint (2.5) of the scale. Standards statements expect students to perform arithmetic operations on polynomials, understand the relationship between zeros and factors of polynomials, use polynomial identities to solve problems, and rewrite rational expressions.

Importance Ratings by Standard Statement for the Algebra Standards Conceptual Category

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 33 in the order the standards appear in the Common Core standards documents. Nearly 90% of the Algebra statements (30 out of 34) were rated as being more or most important by 50% or more of respondents.

Table 35. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Algebra Standards

Standard	More/most percent	Less/least percent
Seeing Structure in Expressions: Interpret the structure of expressions		
1. Interpret expressions that represent a quantity in terms of its context.★	83	17
a. Interpret parts of an expression, such as terms, factors, and coefficients.	79	21
b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.	70	30
2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	68	32
Seeing Structure in Expressions: Write expressions in equivalent forms to solve problems		
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	74	26
a. Factor a quadratic expression to reveal the zeros of the function it defines.	75	25
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	57	43
c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	64	36
4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.	60	40
Arithmetic with Polynomials and Rational Expressions: Perform arithmetic operations on polynomials		
1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	64	36
Arithmetic with Polynomials and Rational Expressions: Understand the relationship between zeros and factors of polynomials		
2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).	56	44
3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	68	32
Arithmetic with Polynomials and Rational Expressions: Use polynomial identities to solve problems		
4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	42	58
5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)	50	50
Arithmetic with Polynomials and Rational Expressions: Rewrite rational expressions		
6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	56	44
7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	58	42
Creating Equations: Create equations that describe numbers or relationships		
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	78	22

Continued on next page

Table 35. continued

Standard	More/most percent	Less/least percent
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	78	22
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.	66	34
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V =IR to highlight resistance R.	78	22
Reasoning with Equations and Inequalities: Understand solving equations as a process of reasoning and explain the reasoning		
1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	76	24
2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	73	27
Reasoning with Equations and Inequalities: Solve equations and inequalities in one variable		
3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	80	20
4. Solve quadratic equations in one variable.	79	21
a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	55	45
b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	73	27
Reasoning with Equations and Inequalities: Solve systems of equations		
5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	61	39
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	66	34
7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.	57	43
8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.	48	52
9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).	54	46
Reasoning with Equations and Inequalities: Represent and solve equations and inequalities graphically		
10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	73	27
11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★	71	29
12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	58	42

There were four statements (two of which were advanced standards) that had lower average importance ratings. Table 36 shows those standards, along with their means and standard deviations, compared to the average of statements in the conceptual category as a whole.

Table 36. Standard Statements with Means Above and Below[a] the Conceptual Category Average, for Algebra

	Mean[b]	Standard deviation
Conceptual category average	3.0	0.87
Standard statements above average		
None		
Standard statements below average		
Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	2.4	0.88
(+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)	2.5	0.88
Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	2.6	0.94
(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).	2.7	0.95

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for Algebra

The importance ratings for Algebra had an average rating at the "more important" level. Mathematics and science respondents composed the largest proportion of respondents with the rest of the respondents distributed across all content areas, except ELA. The rating means indicate that respondents found as most important interpreting expressions that represent a quantity in terms of their context, including interpreting parts of an expression such as terms, factors, and coefficients. They also rate as important creating equations that describe numbers or relationships, solving linear equations and inequalities in one variable, and solving quadratic equations in one variable. Respondents rate standards relating to the use of polynomial identities to solve problems between the "more important" and "less important" levels.

Functions Standards

Respondents to Importance Ratings for the Functions Conceptual Category

Figure 40 shows how the instructors who completed importance ratings for the Functions conceptual category are distributed across the seven content areas. Of the 603 respondents (32% of the sample), mathematics respondents (n = 268) and science respondents (n = 158) formed a majority of respondents. The next highest number of respondents (n = 79) came from the computer technology field. ELA had no respondents.

Figure 40. Respondents Rating Importance for Functions Conceptual Category (n = 603), Percent by Content Area

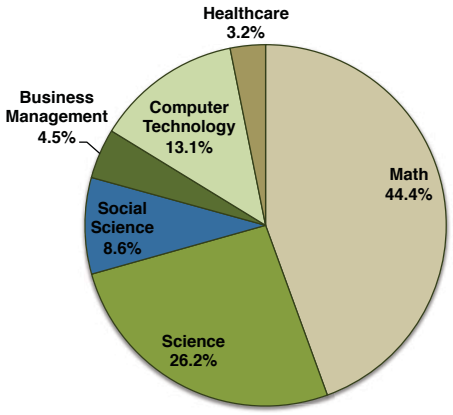
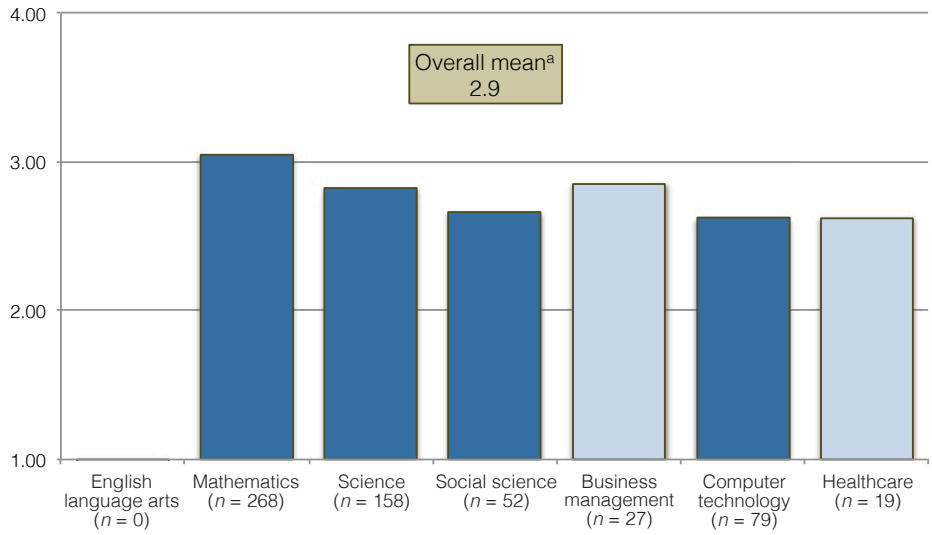


Figure 41. Mean Importance Ratings for Functions Respondents (n = 603), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the conceptual category.
[a]The 45 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Functions Conceptual Category

The standard statements within the Functions conceptual category had an average rating of 2.9 (SD = .86), just below the "more important" level. Figure 41 shows the importance ratings across instructors from the different content areas. The conceptual category has four domains that comprise between 8 and 16 standards statements each. Table 37 shows the average rating for these domains.

Table 37. Importance Ratings for Domains in Functions Conceptual Category, Presented as Weighted Means and Standard Deviations

Domain	Mean[a]	Standard deviation	Number of standards
Interpreting Functions	3.0	0.86	16
Building Functions	2.9	0.84	12
Linear, Quadratic, and Exponential Models	2.7	0.85	8
Trigonometric Functions	2.9	0.91	9
Overall	2.9	0.86	45

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Below is a summary of the domain ratings and a description of each:

- Three domains tended to have ratings very near the "more important" level. The Interpreting Functions domain includes standard statements relating to understanding the concept of a function and using function notation, interpreting functions that arise in applications in terms of the context, and analyzing functions using different representations. Building Functions (12 standard statements) involves standard statements surrounding building a function that models a relationship between two quantities and building new functions from existing functions. Trigonometric Functions (nine standard statements) involve extending the domain of trigonometric functions using the unit circle, modeling periodic phenomena with trigonometric functions, and proving and applying trigonometric identities.
- One domain, Linear and Exponential Models (comprising eight statements), had a slightly lower rating. The average was still above the midpoint of the scale. These standard statements expect students to construct and compare linear, quadratic, and exponential models and interpret expressions for functions in terms of the situation they model.

Importance Ratings by Standard Statement for the Functions Conceptual Category

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 38 in the order the standards appear in the Common Core standards documents. Nearly 90% of the Functions standard statements (40 of 45) were rated as being more or most important by 50% or more of respondents.

Table 38. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Functions Standards

Standard	More/most percent	Less/least percent
Interpreting Functions: Understand the concept of a function and use function notation		
1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	76	24
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	79	21
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.	62	38
Interpreting Functions: Interpret functions that arise in applications in terms of the context		
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	83	17
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★	70	30
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★	75	25
Interpreting Functions: Analyze functions using different representations		
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★	82	18
a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	78	22
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	69	31
c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	74	26
d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	70	30
e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	73	27
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	63	37
a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	67	33
b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.	64	36
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	56	44

Continued on next page

Table 38. continued

Standard	More/most percent	Less/least percent
Building Functions: Build a function that models a relationship between two quantities		
1. Write a function that describes a relationship between two quantities.★	82	18
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	76	24
b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.	70	30
c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.	72	28
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★	59	41
Building Functions: Build new functions from existing functions		
3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	68	32
4. Find inverse functions.	66	34
a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ for $x > 0$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.	68	32
b. (+) Verify by composition that one function is the inverse of another.	55	45
c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.	52	48
d. (+) Produce an invertible function from a non-invertible function by restricting the domain.	47	53
5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	74	26
Linear, Quadratic, and Exponential Models: Construct and compare linear and exponential models and solve problems		
1. Distinguish between situations that can be modeled with linear functions and with exponential functions.	62	38
a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	59	41
b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	62	38
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	60	40
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	61	39
3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	56	44
4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	64	36

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Table 38. continued

Standard	More/most percent	Less/least percent
Linear, Quadratic, and Exponential Models: Interpret expressions for functions in terms of the situation they model		
5. Interpret the parameters in a linear or exponential function in terms of a context.	67	33
Trigonometric Functions: Extend the domain of trigonometric functions using the unit circle		
1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	75	25
2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	71	29
3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for x, π+x, and 2π–x in terms of their values for x, where x is any real number.	73	27
4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	56	44
Trigonometric Functions: Model periodic phenomena with trigonometric functions		
5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.★	63	37
6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	65	35
7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.★	69	31
Trigonometric Functions: Prove and apply trigonometric identities		
8. Prove the Pythagorean identity $\sin^2(q) + \cos^2(q) = 1$ and use it to calculate trigonometric ratios.	60	40
9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	48	52

Four statements had higher average importance ratings. Three of these involve modeling. Four statements (three of which were advanced standards) had lower average importance ratings. Table 39 shows these standards, along with their means and standard deviations, compared to the average of statements in the conceptual category as a whole.

Table 39. Standard Statements with Means Above and Below[a] the Conceptual Category Average, for Functions

	Mean[b]	Standard deviation
Conceptual category average	2.9	0.86
Standard statements above average		
For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	3.2	0.81
Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	3.2	0.87
Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★	3.2	0.79
Write a function that describes a relationship between two quantities.★	3.2	0.79
Standard statements below average		
(+) Produce an invertible function from a non-invertible function by restricting the domain.	2.5	0.95
Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	2.6	0.85
(+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	2.6	0.87
(+) Read values of an inverse function from a graph or a table, given that the function has an inverse.	2.6	0.90

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for Functions

The importance ratings for Functions had an average rating at the "more important" level. Again, mathematics and science respondents composed the large majority of respondents and no ELA respondents contributed to the importance ratings. The importance ratings for Functions show that respondents tend to emphasize general concepts such as modeling the relationship between two quantities and interpreting key features of graphs and tables, graphing functions expressed symbolically, writing a function, and using function notation. They assign less importance to advanced standards related to inverse functions and proving addition and subtraction formulas for sine, cosine, and tangent. They also did not emphasize as much students' abilities to observe, in graphs and tables, quantities that increase exponentially versus quantities that increase linearly, quadratically, or as a polynomial function.

Geometry Standards

Respondents to Importance Ratings for the Geometry Conceptual Category

Figure 42 shows how the instructors who completed importance ratings for the Geometry conceptual category are distributed across the seven content areas. Of the 331 respondents (17% of the sample), mathematics respondents (*n* = 150) and science respondents (*n* = 129) formed the majority of respondents. There were very few social science (n = 13), business management (*n* = 8), or healthcare (*n* = 6) respondents; ELA again had no respondents.

Figure 42. Respondents Rating Importance for Geometry Conceptual Category (*n* = 331), Percent by Content Area

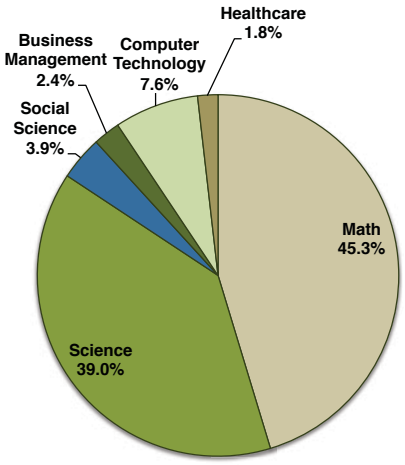
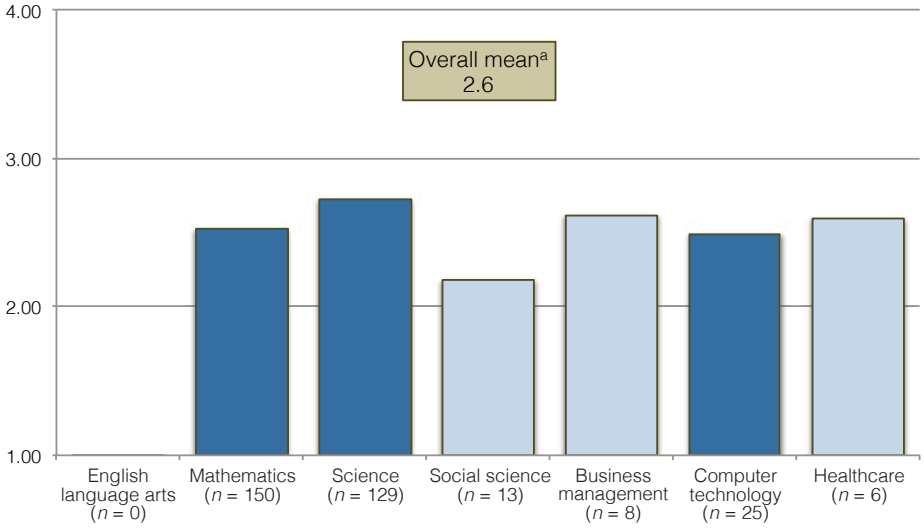


Figure 43. Mean Importance Ratings for Geometry Respondents (*n* = 331), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the conceptual category.
[a]The 45 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Geometry Conceptual Category

The standard statements within the Geometry conceptual category had an average rating of 2.6 (*SD* = .94), in between the "less important" and "more important" level. Figure 43 shows the importance ratings across instructors from the different content areas. The conceptual category has six domains that comprise between 3 and 13 standards statements. Table 40 shows the average rating for these domains.

Table 40. Importance Ratings for Domains in Geometry Conceptual Category, Presented as Weighted Means and Standard Deviations

Domain	Mean[a]	Standard deviation	Number of standards
Congruence	2.5	0.98	13
Similarity, Right Triangles, and Trigonometry	2.7	0.94	13
Circles	2.4	0.97	5
Expressing Geometric Properties with Equations	2.5	0.91	7
Geometric Measurement and Dimension	2.8	0.91	4
Modeling with Geometry	2.7	0.88	3
Overall	2.6	0.94	45

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Respondents tended to rate statements in three domains slightly higher and statements in three domains slightly lower.

- Higher: Similarity, Right Triangles, and Trigonometry (13 statements), Geometric Measurement and Dimension (four statements), and Modeling with Geometry (three statements). Statements for Similarity, Right Triangles, and Trigonometry pertain to understanding similarity transformations, proving theorems involving similarity, defining trigonometric ratios, and applying trigonometry to triangles. Geometric Measurement and Dimension standards involve explaining volume formulas and using them to solve problems as well as visualizing relationships between two-dimensional and three-dimensional objects and applying geometric concepts in modeling.
- Lower: Congruence (13 statements), Circles (five statements), and Expressing Geometric Properties with Equations (seven statements). The Congruence standard statements refer to experimenting with transformations in the plane, understanding congruence in terms of rigid motions, proving geometric theorems, and making geometric constructions. The Circles domain focuses on understanding theorems about circles and finding arc lengths and areas of sectors of circles. The Expressing Geometric Properties with Equations domain includes standards that require students to translate between the geometric description and the equation for a conic section and to use coordinates to prove simple geometric theorems algebraically.

Importance Ratings by Standard Statement for the Geometry Conceptual Category

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 41 in the order the standards appear in the Common Core standards documents. Of the 45 Geometry standard statements, 18 of the statements were rated as more or most important by a majority (>50%) of respondents; another 19 were rated as more or most important by 40–40% of respondents. No statements were rated as more or most important by a large majority of respondents.

Table 41. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Geometry Standards

Standard	More/most percent	Less/least percent
Congruence: Experiment with transformations in the plane		
1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	64	36
2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	55	45
3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	42	58
4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	48	52
5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	48	52
Congruence: Understand congruence in terms of rigid motions		
6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	43	57
7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	47	53
8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	45	55
Congruence: Prove geometric theorems		
9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; and points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	48	52
10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; and the medians of a triangle meet at a point.	46	54
11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	36	64
Congruence: Make geometric constructions		
12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Examples include: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	43	57
13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	34	66

Continued on next page

Table 41. continued

Standard	More/most percent	Less/least percent
Similarity, Right Triangles, and Trigonometry: Understand similarity in terms of similarity transformations		
1. Verify experimentally the properties of dilations given by a center and a scale factor:	40	60
a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	39	61
b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	41	59
2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	50	50
3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	40	60
Similarity, Right Triangles, and Trigonometry: Prove theorems involving similarity		
4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	44	56
5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	55	45
Define trigonometric ratios and solve problems involving right triangles		
6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	69	31
7. Explain and use the relationship between the sine and cosine of complementary angles.	71	29
8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	77	23
Similarity, Right Triangles, and Trigonometry: Apply trigonometry to general triangles		
9. (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	37	63
10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.	48	52
11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	57	43
Circles: Understand and apply theorems about circles		
1. Prove that all circles are similar.	30	70
2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; and the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	43	57
3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	35	65
4. (+) Construct a tangent line from a point outside a given circle to the circle.	48	52
Circles: Find arc lengths and areas of sectors of circles		
5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	52	48

Continued on next page

Table 41. continued

Standard	More/most percent	Less/least percent
Expressing Geometric Properties with Equations: Translate between the geometric description and the equation for a conic section		
1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	51	49
2. Derive the equation of a parabola given a focus and directrix.	42	58
3. (+) Derive the equations of ellipses and hyperbolas given foci and directrices.	37	63
Expressing Geometric Properties with Equations: Use coordinates to prove simple geometric theorems algebraically		
4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).	36	64
5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	64	36
6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	41	59
7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★	45	55
Geometric Measurement and Dimension: Explain volume formulas and use them to solve problems		
1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	53	47
2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	55	45
3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★	68	32
Geometric Measurement and Dimension: Visualize relationships between two-dimensional and three-dimensional objects		
4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	63	37
Modeling with Geometry: Apply geometric concepts in modeling situations		
1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★	57	43
2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★	64	36
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★	62	38

Two standards, involving trigonometric ratios for acute angles and volume formulas for three-dimensional figures, had higher importance ratings compared to other statements in the domain. Four statements had lower importance ratings. Table 42 shows these standards, along with their means and standard deviations compared to the average of the conceptual category.

Table 42. Standard Statements with Means Above and Below[a] the Conceptual Category Average, for Geometry

	Mean[b]	Standard deviation
Conceptual category average	2.6	0.94
Standard statements above average		
Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	2.9	0.91
Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★	2.9	0.93
Standard statements below average		
Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	2.2	1.02
Prove that all circles are similar.	2.2	1.04
(+) Derive the equations of ellipses and hyperbolas given foci and directrices.	2.3	0.96
Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).	2.3	0.89

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for Geometry

In general, the importance ratings for Geometry were lower than other mathematics conceptual categories, with an average rating in between the "less important" and "more important" levels. Mathematics and science respondents composed nearly 85% of respondents; no ELA respondents contributed to the importance ratings. Within Geometry, respondents tend to place more importance on standards related to defining trigonometric ratios and solving problems with right triangles in addition to the modeling standard of using volume formulas to solve problems. There was less emphasis on students' skills related to proving all circles are similar or constructing geometric figures inscribed in a circle. Respondents did not place as much emphasis on the advanced standard relating to deriving equations of ellipses and hyperbolas or on the standard about using coordinates to prove geometric theorems.

Statistics and Probability Standards

Respondents to Importance Ratings for the Statistics and Probability Standards Conceptual Category

Figure 44 shows how the instructors who completed importance ratings for the Statistics and Probability Standards conceptual category are distributed across the seven content areas. There were 739 respondents (39% of the sample) rating at least one standard statement within Statistics and Probability as applicable and therefore conducting importance ratings. The respondent pool was predominantly comprised of science (*n* = 212), social science (*n* = 183), and mathematics respondents (*n* = 146). Business management (*n* = 83) respondents composed the next largest group of respondents. A small number of ELA instructors (*n* = 8) responded.

Figure 44. Respondents Rating Importance for Statistics and Probablity Conceptual Category (*n* = 739), Percent by Content Area

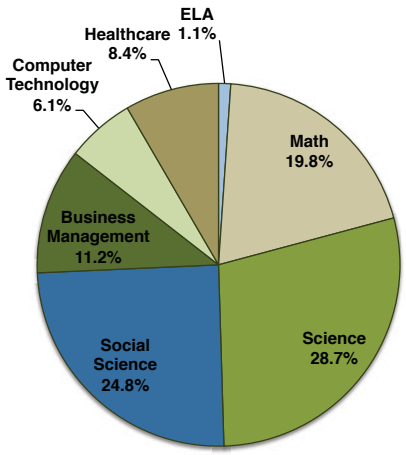
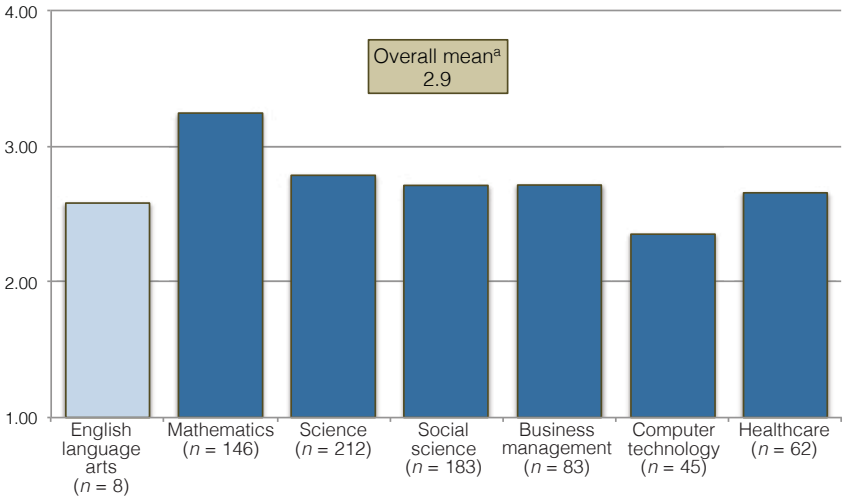


Figure 45. Mean Importance Ratings for Statistics and Probability Respondents (*n* = 739), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the conceptual category.
[a]The 36 standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Ratings for the Statistics and Probability Conceptual Category

The standard statements within the Statistics and Probability conceptual category had an average rating of 2.9 (*SD* = .89), just below the "more important" level. Figure 45 shows the importance ratings across instructors from the different content areas. The conceptual category has four domains that comprise between 6 and 12 standards statements. Table 43 shows the average rating for these domains.

Table 43. Importance Ratings for Domains in Statistics and Probability Conceptual Category, Presented as Weighted Means and Standard Deviations

Domain	Mean[a]	Standard deviation	Number of standards
Interpreting Categorical and Quantitative Data	2.9	0.90	12
Making Inferences and Justifying Conclusions	2.9	0.88	6
Conditional Probability and the Rules of Probability	2.9	0.91	9
Using Probability to Make Decisions	2.7	0.87	9
Overall	2.9	0.89	36

[a]Respondents rated importance on an ordinal scale. Means are presented only to summarize trends; caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.

Respondents tended to rate standard statements in three domains slightly higher and statements in three domains slightly lower.

- Three domains tended to have higher ratings: Interpreting Categorical and Quantitative Data (12 statements), Making Inferences and Justifying Conclusions (six statements), and Conditional Probability and the Rules of Probability (nine statements). The Interpreting Categorical and Quantitative Data domain standards expect students to summarize, represent, and interpret data on a single count or measurement variable and on two categorical and quantitative variables. They also involve the interpretation of linear models. The Making Inferences and Justifying Conclusions domain focuses on student understanding and evaluating random processes underlying statistical experiments, and making inferences and justifying conclusions from sample surveys, experiments, and observational studies. The Conditional Probability and the Rules of Probability standard statements refer to understanding independence and conditional probability and using them to interpret data and using the rules of probability to compute probabilities of compound events in a uniform probability model.
- The domain Using Probability to Make Decisions (the average of nine statements) tended to have lower ratings, though still very near the "more important" level. These standards (all of which are marked as advanced) involve calculating expected values and using them to solve problems, using probability to evaluate outcomes of decisions.

Importance Ratings by Standard Statement for the Statistics and Probability Standards Conceptual Category

In Table 44, we collapse the four importance ratings categories into a dichotomous rating for each standard; (1) more or most important, or (2) less or least important. Every standard is presented in the order the standards appear in the Common Core standards documents. Of the 36 Statistics and Probability standard statements, all statements were rated as being more or most important by >50% of respondents.

Table 44. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Statistics and Probability Standards

Standard	More/most percent	Less/least percent
Interpreting Categorical and Quantitive Data: Summarize, represent, and interpret data on a single count or measurement variable		
1. Represent data with plots on the real number line (dot plots, histograms, and box plots).★	72	28
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.★	67	33
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).★	61	39
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.★	68	32
Interpreting Categorical and Quantitive Data: Summarize, represent, and interpret data on two categorical and quantitative variables		
5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.★	64	36
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.★	69	31
a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.	68	32
b. Informally assess the fit of a function by plotting and analyzing residuals.	60	40
c. Fit a linear function for a scatter plot that suggests a linear association.	74	26
Interpreting Categorical and Quantitive Data: Interpret linear models		
7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.★	74	26
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.★	68	32
9. Distinguish between correlation and causation.★	73	27
Making Inferences and Justifying Conclusions: Understand and evaluate random processes underlying statistical experiments		
1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.★	70	30
2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?★	59	41
Making Inferences and Justifying Conclusions: Make inferences and justify conclusions from sample surveys, experiments, and observational studies		
3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.★	70	30
4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.★	70	30
5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.★	68	32
6. Evaluate reports based on data.★	73	27

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Table 44. continued

Standard	More/most percent	Less/least percent
Conditional Probability and the Rules of Probability: Understand independence and conditional probability and use them to interpret data		
1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").★	64	36
2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.★	64	36
3. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.★	66	34
4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among mathematics, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.★	62	38
5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.★	63	37
Conditional Probability and the Rules of Probability: Use the rules of probability to compute probabilities of compound events in a uniform probability model		
6. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.★	65	35
7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.★	67	33
8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.★	68	32
9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.★	61	39
Using Probability to Make Decisions: Calculate expected values and use them to solve problems		
1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.★	65	35
2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.★	67	33
3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.★	65	35
4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?★	60	40
Using Probability to Make Decisions: Use probability to evaluate outcomes of decisions		
5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.★	54	46
a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.	56	44
b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.	54	46
6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).★	57	43
7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).★	63	37

One statement had relatively lower importance ratings compared to other statements in the domain. The statement relates to assigning probabilities to payoff values to weigh possible outcomes of a decision. It is marked as both an advanced standard and one that involves modeling. Table 45 shows the standard and its mean and standard deviation compared to the average of the conceptual category.

Table 45. Standard Statements with Means Above and Below[a] the Conceptual Category Average, for Statistics and Probability

	Mean[b]	Standard deviation
Conceptual category average	2.9	0.89
Standard statements above average		
None		
Standard statements below average		
(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.★	2.6	0.90

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for Statistics and Probability

The standard statements within the Statistics and Probability conceptual category had an average rating just below the "more important" rating category. Respondents for the category were distributed across all course categories, but very few ELA respondents contributed to the importance ratings. Respondents place less emphasis on students' skills in weighing the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

Standards for Mathematical Practices

Respondents to Importance Ratings for the Mathematical Practices

Figure 46 shows the distribution across the content areas of respondents rating at least one statement within the Mathematical Practices as applicable (n = 1339; 71% of the sample). The respondents were fairly well distributed across the content areas, with mathematics respondents (n = 302), science respondents (n = 273), social science respondents (n = 223), and business management respondents (n = 187) composing the largest groups of respondents. Even for ELA, there was a modest group of respondents (n = 63).

Figure 46. Respondents Rating Importance for Mathematical Practices (n = 1339), Percent by Content Area

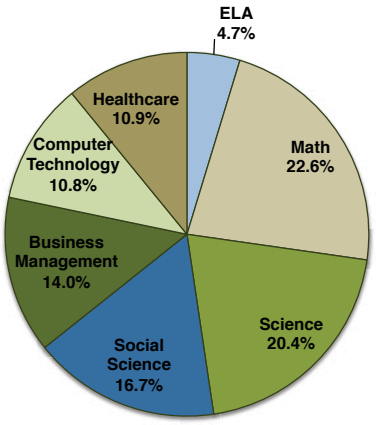
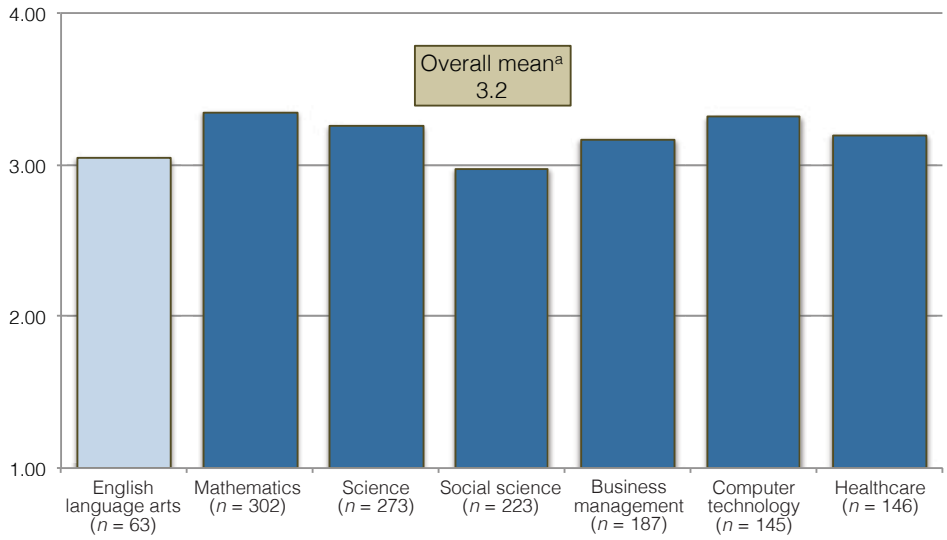


Figure 47. Mean Importance Ratings for Mathematical Practice Respondents (n = 1339), by Content Area



Note. Lighter shading indicates that respondents from the content area compose less than 5% of respondents for the conceptual category.
[a]The eight standard statements were weighted to account for the varying number of respondents for each standard.

Average Importance Rating for Standards for the Mathematical Practices

The eight standard statements within the Mathematical Practices had an average rating of 3.2 (SD = .88), just above "more important" level. Figure 47 shows the importance ratings across instructors from the different content areas. Since the Practices are not a conceptual category, there is no breakdown into domains.

Importance Ratings by Standard Statement for the Mathematical Practices

Next, we collapse the four importance ratings categories into a dichotomous rating for each standard: (1) more or most important, or (2) less or least important. Every standard is presented in Table 46 in the order the standards appear in the Common Core standards documents. For the Mathematical Practices, all of the statements were rated as being more or most important by a large majority (>75%) of respondents.

Table 46. Percent of Respondents with Importance Ratings of More or Most versus Less or Least, for Standards for Mathematical Practices

Standard	More/most percent	Less/least percent
1. Make sense of problems and persevere in solving them.	90	10
2. Reason abstractly and quantitatively.	86	14
3. Construct viable arguments and critique the reasoning of others.	78	22
4. Model with mathematics.	83	17
5. Use appropriate tools strategically.	81	19
6. Attend to precision.	84	16
7. Look for and make use of structure.	78	22
8. Look for and express regularity in repeated reasoning.	75	25

Compared to other Mathematical Practices, there was one standard about making sense of problems and persevering in solving them that tended to receive higher importance ratings. Table 47 shows the mean and standard deviation of the statement compared to the average of statements in the Mathematical Practices.

Table 47. Standard Statements with Means Above and Below[a] the Average, for Mathematical Practices

	Mean[b]	Standard deviation
Standards for Mathematical Practices Average	3.2	0.77
Standard statements above average		
Make sense of problems and persevere in solving them.	3.5	0.71
Standard statements below average		
None		

Note. Values assigned to the scale were 4 = most, 3 = more, 2 = less, and 1 = least.
[a]Statements that are .33 standard deviations above or below the mean of the conceptual category average are displayed. This metric was selected as a way to systematically view trends in the dispersion of standard ratings. Overall, differences in ratings were minimal; displaying standards here does not indicate that comparing their ratings to the overall mean is statistically significant.
[b]Means and standard deviations at the conceptual category level are weighted to account for the different number of respondents for each standard statement.

Summary of the Importance Ratings for the Mathematical Practices

The Mathematical Practices had an average rating above the "more important" level, which was higher than any of the conceptual categories. They were also considered more applicable to a wider variety of respondents; respondents for the ratings were distributed across the different content areas. Respondents placed high importance on every Mathematical Practice, with the standard about making sense of problems and persevering in solving them rated the most highly.

Chapter 5 | Findings from Additional Questions About the Common Core Standards

After rating standards, respondents had the opportunity to answer five general questions regarding the content coverage and cognitive demand of the Common Core standards. The first four included a dichotomous (yes/no) question and space for comments. These questions covered (a) the English language arts and literacy standards, (b) the mathematics standards, (c) the cognitive demand of the standards, and (d) whether the standards omit key knowledge and skills. The final question was an opportunity to give additional comments. All five questions were optional and, as a result, the number of responses varied for each question.

Process for Coding Open-Ended Comments

We used a grounded theory approach to code the open-ended questions. Three coders initially reviewed approximately one-quarter of the responses for each question. They independently identified themes and developed code categories. The coders then met to compare their separate processes and resulting codes. The categories were edited, renamed, and sometimes combined in order to attain the fewest, clearest number of codes that adequately covered the variety of responses. A codebook was developed and turned over to a fourth coder who coded the same responses to check the codes. Edits were made in this process.

A pilot coding phase was then initiated, wherein six individuals practiced coding and then met to discuss. Additional minor edits were made to the codebook. Then two coders were assigned to each question. First, both coders independently coded the entire set of responses to a particular question. Then the two coders talked through any discrepant codes until a final coding decision was reached. Throughout the process, responses that did not fit any existing category were tagged and new codes were developed when necessary.

During the development process, coders noticed that, although there were differences in the respondents' answers based on the particular question, there were similar patterns across all questions. Therefore, we were able to place all comments into one of four categories, either (1) reiterates answer (respondent reiterated their answer to the dichotomous yes/no question), (2) mismatch with course (respondent said that some aspect of the standards did not fit with their course), (3) deficiency/weakness (respondent said that some aspect of the standards could be improved), or (4) strength (respondent praised some aspect of the standards). Depending on the primary code, up to two secondary codes were assigned in order to further detail the answer. Comments that simply reiterated the yes or no answer ("the standards seem appropriate") were not given a secondary code. Many of the secondary codes were unique, occurring only once. For some questions, a surprisingly large number of respondents addressed issues other than the Common Core standards, such as aspects of the individual instructor's course. In some cases, it was unclear what the response was addressing. We placed any response that fell outside the scope of the question into an "uncodeable" category.

Respondent Views of the English Language Arts and Literacy Standards

The first question asked respondents about the Common Core English language arts and literacy standards: are the English standards, taken as a whole, a coherent representation of the fields of knowledge necessary for success in your course? There were 1769 responses, which are shown in Figure 48.

There were 502 respondents who gave comments. Of these, 174 respondents gave 181 comments that were deemed codeable. The other comments did not speak directly to the question about the English language arts (ELA) and literacy Common Core standards.

Figure 48. Answer from Respondents (n = 1769) to Question "Are the English standards, taken as a whole, a coherent representation of the fields of knowledge necessary for success in your course?"

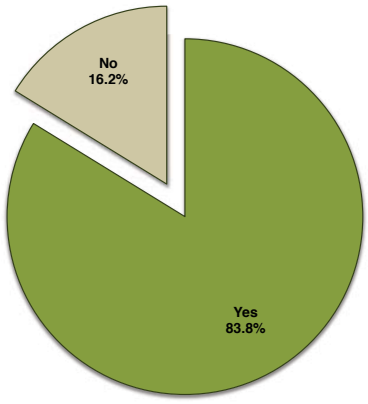
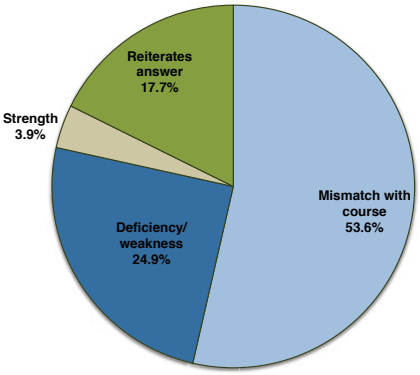


Figure 49. Percent of Comments (*n* = 181) Four Primary Code Categories for Open-Ended Question about English Language Arts and Literacy Standards



Regardless of whether they answered yes or no, many respondents commented that there was a mismatch between their course and the standards or that they saw a particular deficiency of the Common Core ELA and literacy standards. A small number noted a particular strength. There was not necessarily a correlation between answering no to the coherence question and then identifying a deficiency or answering yes to the coherence question and then identifying a strength. If answers fell into three of the four primary categories (mismatch with course, deficiency/weakness, or strength), they were then coded with one or more secondary codes in order to further describe the nature of the comment. Comments that simply reiterated the answer to the dichotomous question were not given a secondary code. Figure 49 shows how comments were divided among the four primary code categories.

Mismatch Codes

Responses coded in the mismatch category indicate that some portion of the standards were either not relevant or not a match to their course. In these comments, respondents mentioned that the standards did not apply to their course because of the type of course they taught and included remarks about some portion of the ELA and literacy standards being not applicable or beyond what was required for their course or field of study. For example:

- "There is very little language knowledge required for this course. The most important thing is to be able to understand technical texts with lots of new vocabulary."
- "The class has an emphasis on argumentative writing; therefore, any kind of narrative writing standard does not really apply. Further, the class is more interdisciplinary than literature-based."
- "Many of the English standards were not applicable. In the course, students do not write a formal scientific paper."
- "Those standards were not applicable to my course."
- "This particular course does not require a research or a significant writing component."
- "This is not extremely critical for chemistry."

Example Comments: ELA and literacy

- The class has an emphasis on argumentative writing; therefore, any kind of narrative writing standard does not really apply. Further, the class is more interdisciplinary than literature-based.
- I find some of them a bit difficult to understand, and I'm not always clear on what they're trying to measure.
- The view of language standards as nuanced, artful, and requiring constant evaluation by writers and readers matches well with the knowledge and understanding I expect my students to grasp to succeed in my class, yes.

Deficiency/Weakness Codes

Approximately 25% of the codeable responses fit into the deficiency category. Here, respondents named aspects of the standards that they thought were missing from, underemphasized in, or weak within the standards. These aspects were coded into the secondary categories shown in Table 48.

Table 48. Deficiencies Named by Respondents for Open-Ended Question about English Language Arts and Literacy Standards

Deficiency/weakness	Number	Percent
Wording of standards	9	20.0
Problem solving/critical thinking/ reasoning	4	8.9
Affective learning[a]	2	4.4
Cross-disciplinary skills	2	4.4
Technical writing	2	4.4
Worldview/international awareness	2	4.4
Argumentation	1	2.2
Author critique	1	2.2
Complex sentences	1	2.2
Composition	1	2.2
Creative thinking	1	2.2
Data analysis/research skills	1	2.2
Essay writing	1	2.2
Information interpretation and summarization	1	2.2
Literary interpretation	1	2.2
Non-fiction reading	1	2.2
Non-literary texts	1	2.2
Objective argumentation	1	2.2
Practical application	1	2.2
Practical perspective	1	2.2
Psychomotor skills	1	2.2
Reading for information	1	2.2
Relationship between literature and society	1	2.2
Rhetoric	1	2.2
Scientific language	1	2.2
Sentence structure and essay writing	1	2.2
Technical and historical elements of English	1	2.2
Vocabulary	1	2.2
World literature	1	2.2
Writing instruction	1	2.2
Total	**45**	**100.0**

[a]Aspects related to attitudes, motivation or values.

These responses ranged from naming broader ideas (e.g., creative thinking or international awareness) to very specific ELA concepts (e.g., technical and historical elements of English). In some cases, the Common Core standards do address the concept that the instructor mentioned (e.g., essay writing, literary interpretation, reading for information, writing instruction). Presumably, the instructor felt that further depth or breadth was needed in the domain; however, the answers were not generally precise enough to understand the exact intention. As Table 48 shows, most comments had very low frequencies with only one or two respondents naming the particular area. There were two domains with slightly higher frequencies: criticisms about the wording of the standards and criticisms that they do not contain enough problem-solving or critical-thinking components.

Some examples from this category include:

- "I have to be honest: I find some of them a bit difficult to understand, and I'm not always clear on what they're trying to measure." (wording of standards)
- "Too much literature, not enough critical thinking, not NEARLY enough emphasis on reading to obtain, use, and evaluate information." (problem solving/critical thinking/reasoning and reading for information)
- "Some relate to skills not needed in this class. There appears to be a lack of intellectual life-of-mind standards...most appear mechanical more than intellectual." (affective learning)

Strengths Codes

For responses coded in the strength category (approximately 4% of codeable responses), respondents praised specific areas of content within the standards or the approach of the standards. Table 49 presents the secondary categories for the named strengths. While not many respondents used this as an opportunity to name strengths of the standards, some of the strengths respondents mentioned were the exact dimensions that other faculty had mentioned as weaknesses.

Table 49. Strengths Named by Respondents for Open-Ended Question about English Language Arts and Literacy Standards

Strength	Number	Percent
Information interpretation and summarization	2	28.6
Analysis	1	14.3
Constant evaluation	1	14.3
Grammar	1	14.3
Reading comprehension	1	14.3
Problem solving/critical thinking/ reasoning	1	14.3
Total	**7**	**100.0**

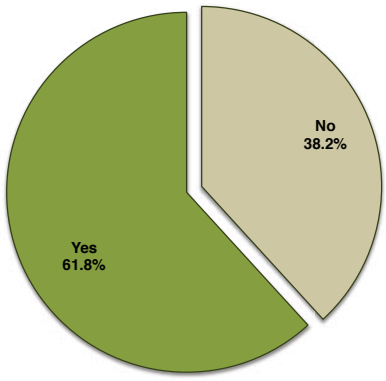
Some examples from this category include:

- "The view of language standards as nuanced, artful, and requiring constant evaluation by writers and readers matches well with the knowledge and understanding I expect my students to grasp to succeed in my class, yes." (constant evaluation)
- "The standards related to reading comprehension, vocabulary, grammar and usage, writing in different disciplines, and reasoning are especially important skills for success in English Composition I." (grammar and problem solving/critical thinking/reasoning)
- "Reading comprehension is most important." (reading comprehension)

Respondent Views of the Mathematics Standards

The next question was similar to the first but pertained to the Common Core mathematics standards: are the mathematics standards, taken as a whole, a coherent representation of the knowledge and skills necessary for success in your course? There were 1706 responses; these are shown in Figure 50.

Figure 50. Answer from Respondents (n = 1706) to Question "Are the mathematics standards, taken as a whole, a coherent representation of the fields of knowledge necessary for success in your course?"

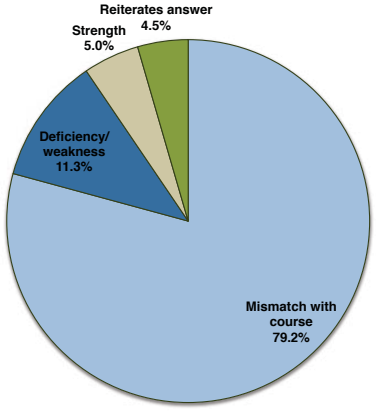


Within the 615 comments, 374 respondents provided 382 comments that were codeable. As before, the other comments did not speak directly to the question about the mathematics Common Core standards.

For the dichotomous question, a greater percentage of respondents selected no (not coherent) than for the ELA and literacy question (38% vs. 16%). Furthermore, the percentage of comments that indicated a mismatch between the standards and the course was 79% (vs. 54% of respondents on the ELA and literacy question), reiterating that the mathematics standards were viewed as less applicable to courses included in this study than the English language arts and literacy standards.

Again, regardless of how they answered the yes/no question, many respondents (303 of the codeable responses) commented that there was a mismatch in some way between their course and the standards. Some respondents (43) noted a particular deficiency of the standards. A small number (19) noted a particular strength they perceived in the standards. As with the first question, some comments (17) reiterated the answer to the parent question; these were not given a secondary code. Figure 51 shows the primary categories broken down as percentages.

Figure 51. Percent of Comments (n = 382) Four Primary Code Categories for Open-Ended Question about Mathematics Standards



Mismatch Codes

For comments coded in the mismatch category, respondents indicated that they thought the mathematics standards, or certain portions of the standards, were inapplicable or beyond what was called for in their course or field of study. Some examples from this category include the following:

- "While I expect my students to be logical and attentive to detail, they do not need to have math knowledge per se to be successful in the course."
- "Most of the mathematic standards listed were not applicable. For my course, students need to be able to graph data, calculate means and standard deviations, use Chi-square, solve Hardy-Weinberg equilibrium equations, and perform metric conversions, and use very basic algebra to solve for unknowns."
- "I do not rely on quantitative analysis in this lower-level history course."

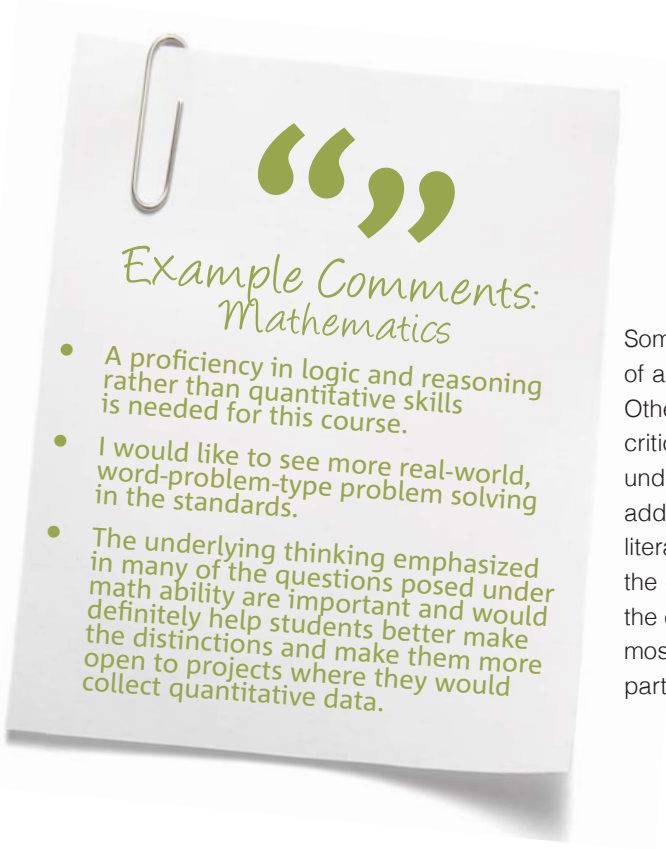
Deficiency/Weakness Codes

In comments coded in the deficiency category (11%), respondents either named specific areas of content they thought were missing from the standards or noted other weaknesses of the standards (see Table 50).

Table 50. Deficiencies Named by Respondents for Open-Ended Question about Mathematics Standards

Deficiency/weakness	Number	Percent
Problem solving/critical thinking/reasoning	12	27.9
Cross-disciplinary skills	4	9.3
Calculus	3	7.0
Practical application	3	7.0
Academic behaviors[a]	2	4.7
Functions	2	4.7
Wording of standards	2	4.7
Accounting calculations	1	2.3
Marketing: assessing price elasticity and predicting sales	1	2.3
Clearer separation between understanding and usage	1	2.3
Cognitive demand	1	2.3
Discrete math	1	2.3
Formal reasoning and abstract algebraic representation	1	2.3
Information interpretation and summarization	1	2.3
Logarithms	1	2.3
Probability	1	2.3
Proportional reasoning	1	2.3
Psychomotor skills	1	2.3
Ratio interpretation	1	2.3
Set theories	1	2.3
Trigonometry	1	2.3
Word problems	1	2.3
Total	**43**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).



Some of the comments about weaknesses related to wanting to see more representation of a particular type of math (e.g., calculus, discrete math, probability, trigonometry). Other comments related to the way mathematics is applied (e.g., problem solving/critical thinking/reasoning, cross-disciplinary skills, clearer separation between understanding and usage). Again, in some cases, the Common Core standards do address the concept that the instructor mentioned (e.g., functions). As with ELA and literacy, the instructor presumably felt that further depth or breadth was needed in the domain; however, the answers were not generally precise enough to understand the exact intention. Also similar to the question about the ELA and literacy standards, most comments had very low frequencies, with only one or two respondents giving the particular answer. The types of answers that tended to have slightly higher occurrence

were criticisms that the standards do not contain enough problem-solving or critical-thinking components and that they should be more cross-disciplinary in nature.

Some examples from the deficiency category include the following:

- "General problem-solving skills are not emphasized enough." (problem solving/critical thinking/reasoning)
- "A proficiency in logic and reasoning rather than quantitative skills is needed for this course." (problem solving/critical thinking/reasoning)
- "I would like to see more real-world, word-problem-type problem solving in the standards. Students need more practice using math to solve real problems as well as being able to do a typical math problem that only deals with numbers and not real physical quantities." (practical application)

Table 51. Strengths Named by Respondents for Open-Ended Question about Mathematics Standards

Strength	Number	Percent
Problem solving/critical thinking/reasoning	8	42.1
Information interpretation and summarization	3	15.8
Cross-disciplinary skills	2	10.5
Application of course content	1	5.3
Apply algebra and trigonometry to physical situation	1	5.3
Data analysis and probability	1	5.3
Graphs	1	5.3
Interpret and analyze quantitative data	1	5.3
Statistics	1	5.3
Total	**19**	**100.0**

Strengths Codes

For responses categorized in the strength category, respondents praised specific areas of content within the standards or the approach of the standards (see Table 51).

Some examples from this category include:

- "They translate into critical-thinking components applicable to the English class and assignments." (problem solving/critical thinking/reasoning)
- "Yes, they incorporate a lot of logic and problem-solving skills, which is a very underrated topic in writing circles." (problem solving/critical thinking/reasoning)
- "The conceptual understanding of research designs and the ability to interpret the types of conclusions drawn from studies is very important to this class. Therefore, the underlying thinking emphasized in many of the questions posed under math ability are important and would definitely help students better make the distinctions and make them more open to projects where they would collect quantitative data." (information interpretation and summarization)

Interestingly, the same types of responses were sometimes given as both a deficiency and a

strength (by different respondents). For instance, comments about how well the mathematics standards involve problem-solving, critical-thinking, and/or reasoning content were both the most commonly mentioned deficit and most commonly mentioned strength.

Respondent Views of Cognitive Demand

The third question addressed the general topic of cognitive demand: do the standards reflect a level of cognitive demand sufficient for students who meet the standards to be prepared to succeed in your course? Respondents answered for 1798 courses (95% of the sample); Figure 52 shows the frequencies for each response. Most respondents (96%) said that the standards were sufficiently cognitively demanding. There were 279 respondents who gave comments; of those, 120 respondents gave 126 comments that were deemed codeable.

This question differed from the first two in that it asked respondents to assess the level of cognitive demand of the standards in general as opposed to considering specific subject matter; however, respondents once again gave the same type of answers. That is, respondents named specific areas of deficiency or strength, and general mismatches between the standards and the course they teach. The percent breakdown of the four primary categories is shown in Figure 53.

Mismatch Codes

In the instances of mismatch, respondents mostly noted that the standards were at a higher level than what was required:

- "They are actually much higher than what is needed for students to succeed in my course."
- "The standards exceed the expectation for a successful student."

Deficiency/Weakness Codes

For responses coded in the deficiency category, respondents named specific knowledge or

Figure 52. Answer from Respondents (n = 1798) to Question "Do the Standards Reflect a Level of Cognitive Demand Sufficient for Students Who Meet the Standards to be Prepared to Succeed in Your Course?"

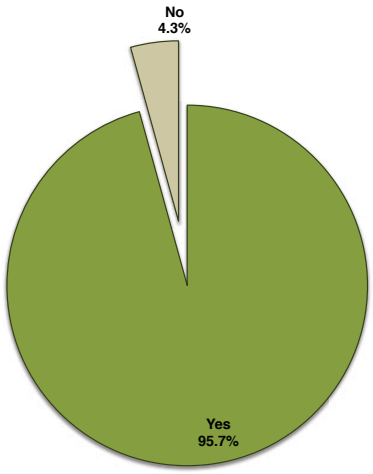


Figure 53. Percent of Comments (n = 126) Four Primary Code Categories for Open-Ended Question about Cognitive Demand of Standards

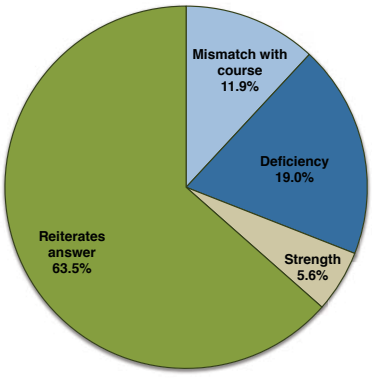


Table 52. Deficiencies Named by Respondents for Open-Ended Question about Cognitive Demand

Deficiency/weakness	Number	Percent
Wording of standards	4	16.7
Problem solving/critical thinking/reasoning	2	8.3
Data analysis and research skills	2	8.3
Academic behaviors[a]	1	4.2
Basic math	1	4.2
Cognitive demand	1	4.2
Computation	1	4.2
Confidence intervals	1	4.2
Factoring	1	4.2
General nonfiction needs more emphasis	1	4.2
Hypothesis testing	1	4.2
Information interpretation and summarization skills	1	4.2
Affective learning[b]	1	4.2
Prediction	1	4.2
Process skills need more emphasis	1	4.2
Too much emphasis on graphing calculators	1	4.2
Trigonometry	1	4.2
Word problems need more emphasis	1	4.2
Worldview/ international awareness	1	4.2
Total	**24**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).
[b]Aspects related to attitudes, motivation or values.

skills they thought were missing from the standards or other weaknesses of the standards. Some respondents commented on subject-specific (math or ELA) content. Table 52 shows the codes and frequencies for the deficiencies/weaknesses.

Examples for this category include:

- "While both sets of standards sum to a list of detailed mechanistic elements beyond what is needed, what is missing is the intellectual context, the love of learning, etc. You are trying to put numbers on Picasso. I am interested in students developing love of field and interests and skills from the intellectual company they keep (teacher and classmates.) It is not here. What is here, is deadening." (affective learning)
- "Some standards reflect a sufficient level of cognitive demand, some standards were confusingly worded, other standards were not applicable." (wording of standards)
- "There's a lot of excellent materials. One component that is missing is prediction." (prediction)

Table 53. Strengths Named by Respondents for Open-Ended Question about Cognitive Demand

Strength	Number	Percent
Problem solving/critical thinking/ reasoning	4	57.1
Academic Behaviors[a]	1	14.3
Collaboration and Teamwork	1	14.3
Metacognitive skills	1	14.3
Total	**7**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).

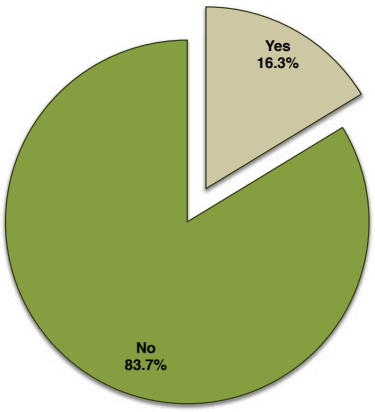
Strengths Codes

Again, the responses categorized in the strength category were ones where faculty named specific areas of content within the standards or the approach of the standards. Table 53 shows codes and frequencies of strengths. The most common (*n* = 4) fell into the problem solving/critical thinking/reasoning category.

An example from the strength category:

- "These standards appropriately address areas of identifying problems, researching solutions, taking into account the opinions of team members, and being willing to explore alternative explanations — all vital to management." (problem solving/critical thinking/ reasoning and collaboration and teamwork)

Figure 54. Answer from Respondents (*n* = 1785) to Question "Do the Standards You Just Reviewed Omit Key Knowledge and Skills?"

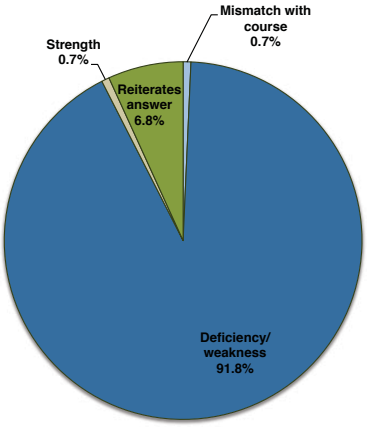


Respondent Views of Omitted Components

The fourth open-ended question specifically asked respondents whether the standards omitted components: do the standards you just reviewed omit key knowledge and skills? Of the 1785 respondents answering the question, 16% said that the standards did omit key knowledge or skills. The other 84% said they did not (see Figure 54).

There were 313 respondents who gave comments. Of those, 232 provided 278 comments that could be coded. Figure 55 shows how these comments were coded.

Figure 55. Percent of Comments (*n* = 278) Four Primary Code Categories for Open-Ended Question about Omitting Key Knowledge and Skills



Mismatch Codes

Just two responses indicated a mismatch with the course. Both responses are provided here:

- "It was hard to relate the standards to this course."
- "Really does not reflect a nursing course."

Deficiency/Weakness Codes

The vast majority of responses indicated one or more deficiencies in the Common Core standards as a whole. Approximately 40% of responses fell into four categories (see Table 54). The first was problem solving/critical thinking/reasoning, in which the respondents mentioned the lack of logical, systematic, problem-solving, or critical-reasoning skills. This was a weakness mentioned for previous questions as well. The second was affective learning, in which the respondents mentioned a lack of behaviors or items related to attitudes, motivations, or values (i.e., opinions or assessment of worth). The third was the academic behaviors category, in which the respondents mentioned lack of general skills related to academic success (i.e., study habits, memorization skills). The fourth most commonly mentioned category was computer literacy.

Table 54. Deficiencies Named by Respondents for Open-Ended Question about Omitting Key Knowledge and Skills

Deficiencies		
Response	Number	Percent
Problem solving/critical thinking/ reasoning	41	16.1
Affective learning[a]	26	10.2
Academic behaviors[b]	23	9.0
Computer literacy	15	5.9
Basic math	12	4.7
Data analysis and research skills	12	4.7
Collaboration and teamwork	11	4.3
Practical application	9	3.5
Cross-disciplinary skills	8	3.1
Information interpretation and summarization	8	3.1
Reading comprehension	6	2.4
Wording of standards	5	2.0
Worldview/international awareness	5	2.0
Cognitive demand	4	1.6
Rhetoric	4	1.6
Calculus	3	1.2
Word problems	3	1.2
Computer programming skills	2	0.8
Factoring	2	0.8
Functions	2	0.8
Presentation skills	2	0.8
Psychomotor skills	2	0.8
Algorithms/algorithmic thinking and	2	0.8
Social awareness	2	0.8
Audience and purpose	1	0.4
Aural comprehension	1	0.4
Basic writing	1	0.4
British literature	1	0.4
Classical works	1	0.4
Comprehension	1	0.4
Computational thinking	1	0.4
Confidence intervals	1	0.4
Contextual thinking	1	0.4
Correctly use mathematical symbols	1	0.4
Creativity	1	0.4
Cultural awareness	1	0.4
Current events	1	0.4
Determinants (calculus)	1	0.4
Discrete math	1	0.4
Distributions	1	0.4
Diverse literature	1	0.4
Drawing/sketching	1	0.4
Emphasis on dimensional analysis	1	0.4
Essay writing	1	0.4
Grammar	1	0.4
Graphing (with and without technology)	1	0.4
Historical and social context	1	0.4
Identifying main idea	1	0.4
Imagination	1	0.4
Integration and synthesis	1	0.4
Interpersonal interaction	1	0.4
Interpretation of controls	1	0.4
Inventiveness	1	0.4
Knowledge of key texts and authors	1	0.4
Literary currents and theory	1	0.4
Maturity	1	0.4
Meta-cognitive skills	1	0.4
Non-literary nonfiction interpretation	1	0.4
Paragraph writing	1	0.4
Proofs	1	0.4
Properties of real numbers, set operations	1	0.4
Ratios	1	0.4
Relational operators	1	0.4
Revision in writing	1	0.4
Sentential logic and predicate logic	1	0.4
Sentence and paragraph writing	1	0.4
Systems of equations	1	0.4
Think and speak statistically	1	0.4
Vector multiplication	1	0.4
Writing across genre and for a variety of purposes	1	0.4
Total	**255**	**100.0**

[a]Aspects related to attitudes, motivation or values.
[b]General skills related to academic success (i.e., study habits, memorization skills).

Some example deficiencies/weaknesses include:

- "I believe that the portion on responsibility and self-initiation should be reviewed. Many of our students expect you to keep track of their grade and assignments without taking any ownership of the course." (affective learning)
- "Planning study time; reading assignment instructions; self-awareness of study demands (i.e., how long it takes to read a page of text, etc.). Intercultural and/or worldview differences could be highlighted better." (academic behaviors and worldview/international awareness)
- "Some basic standards for how to use technology would be useful, as there are a number of NPR, PBS, APM, and BBC clips that I assign for the class. It would also be nice to see some standards in global awareness. Many students come into the class (which has a strong global focus) unaware of the world around them. The earth is shrinking economically, politically, and socially, so it is important for students to make contact with, or at least understand, people in other parts of the world." (computer literacy and worldview/international awareness)
- "Basic computer skills and understanding." (computer literacy)

Strengths Codes

Although the question asked if skills were omitted, two responses actually gave strengths of the standards. These are presented in Table 55.

Table 55. Strengths Named by Respondents for Open-Ended Question about Omitting Key Knowledge and Skills

Strength	Number	Percent
Cross-disciplinary skills	1	50.0
Problem solving/critical thinking/ reasoning	1	50.0
Total	**2**	**100.0**

Responses were the following:

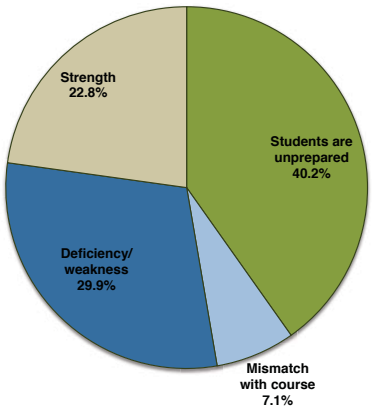
- "Logical thinking is so useful in accounting. I think the standards often related to students thinking things through and coming up with a solution. My students often don't seem to have that skill and just want to be told what numbers to write or where to put them." (problem solving/ critical thinking/reasoning)
- "All elements are covered and are broad enough to allow wide interpretation in different disciplines." (cross-disciplinary skills)

Respondent Additional Comments

The final question simply asked for any remaining comments and questions on the Common Core standards: overall, please provide any additional comments you have about the standards, such as potential usefulness, content, or format, and any questions you have about the standards. There were 447 respondents who provided additional comments. Of these, 159 respondents gave 184 comments that were deemed codeable. The other comments did not speak directly about the Common Core standards.

The codeable responses fell into the same pattern as other questions in which respondents identified deficiencies, strengths, and mismatches with their courses. In addition, there were a significant number of responses (40%) identifying ways in which students are currently entering courses underprepared for success (see Figure 56). Many of the skills that respondents noted aligned with secondary categories in the coding scheme, such as academic behaviors, problem solving/critical thinking/reasoning, and grammar, among others (see Table 56). In some cases, respondents stated or implied that implementation of the Common Core or standards like them would likely help prepare students in ways that they currently are not.

Figure 56. Type of Response to Open-Ended Question about Additional Comments and Questions on the Common Core Standards (*n* = 184)



Students are Unprepared Codes

Table 56. Ways in Which Students are Unprepared, Named by Respondents in Open-Ended Question about Additional Comments on the Common Core Standards

Unprepared Area	Number	Percent
Academic behaviors[a]	7	14.9
Problem solving/critical thinking/reasoning	7	14.9
Affective learning[b]	6	12.8
Basic math	4	8.5
Grammar	3	6.4
Basic writing	2	4.3
Practical application	2	4.3
Reading comprehension	2	4.3
Cognitive demand	1	2.1
Collaboration and teamwork	1	2.1
Computer literacy	1	2.1
Data analysis/research skills	1	2.1
In-depth reading skills	1	2.1
Interpret meanings of words in context	1	2.1
Math skills	1	2.1
Presentation skills	1	2.1
Process skills	1	2.1
Purpose of reading	1	2.1
Sentence and paragraph writing	1	2.1
Synthesis and analysis	1	2.1
Transfer of knowledge	1	2.1
Verbal communication and writing	1	2.1
Total	**47**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).
[b]Aspects related to attitudes, motivation or values.

Some example quotes that identified ways in which students are underprepared include:

- "I find that most students have reasonably adequate academic skills, but only about half have adequate work ethic, motivation, and organizational skills." (academic skills)
- "The key thing missing from incoming students: proficiency in basic computation/ manipulation (solving equations in one variable, adding fractions, basic triangle trig, etc…). Perhaps in crafting and implementing global standards, we don't do enough 'drills' or other activities aimed at the core skills, as opposed to the global standards that the skills fit into?" (basic math)
- "My experience with high school graduates is that even the good ones lack some of the basics: grammar, use of sources without plagiarizing, the math skills mentioned above. The standards in this survey are not at all what my college freshmen enter with." (grammar and data analysis/research skills)

- "I do not see any standards missing, but the primary issue we encounter with students is the challenge of critical thinking and applying knowledge to specific situations. Students are very good at memorizing, but need more help with synthesis, analysis, and application of information." (problem solving/critical thinking/reasoning, and practical application)

Deficiency/Weakness Codes

As with other questions, comments that were coded in the deficiencies category (30% of codeable responses) tended to criticize the wording of the Common Core standards or mention specific missing content (see Table 57).

Table 57. Deficiencies Named by Respondents for Open-Ended Question Soliciting Additional Comments

Deficiency/weakness	Number	Percent
Wording of standards	17	30.9
Problem solving/critical thinking/reasoning	4	7.3
Academic behaviors[a]	3	5.5
Computer literacy	3	5.5
Affective learning[b]	2	3.6
Cognitive demand	2	3.6
Continuing education/non-traditional students	2	3.6
Grammar	2	3.6
Basic math	1	1.8
Cultural awareness/issues	1	1.8
Different documentation/citation styles	1	1.8
Discrete math	1	1.8
Distinction between fact, opinion and interpretation	1	1.8
Information interpretation and summarization	1	1.8
Information literacy	1	1.8
Integrate standards into a conceptual whole	1	1.8
Interconnection among math problems	1	1.8
Math standards need to be broken out for different sciences	1	1.8
Mathematical maturity	1	1.8
Maturity	1	1.8
Need focus on process over product	1	1.8
Objectives need to be more defined	1	1.8
Practical application	1	1.8
Reading needs more emphasis	1	1.8
Technology standards should be separate	1	1.8
Thesis writing	1	1.8
Worldview/international awareness	1	1.8
Writing needs more emphasis	1	1.8
Total	**55**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).
[b]Aspects related to attitudes, motivation or values.

Examples of the deficiencies respondents noted include:

- "Standards could be written in more concise language." (wording of standards)
- "In general, the language here does not quite fit the way I think and talk about these concepts. This may simply reflect the difficulty of defining in general terms the practices of critical reading and interpretation, which don't easily boil down to simple language." (wording of standards)
- "There is too much emphasis on innate or mostly intuitive skills and not enough on the basics of grammar and composition." (grammar)
- "Although I do not feel the standards omitted key knowledge, I felt there was a lack of emphasis on time management, effective study skills, etc. In my experience, students are capable of succeeding even in the absence of some of the educational standards listed. They have a much greater risk of failing if they do not effectively manage their time or realize that the increased level of difficulty in a college-level course requires more time be spent studying." (academic behaviors)
- "The standards themselves are quite exhaustive. However, they miss some of the more significant issues with regard to student readiness for success at the collegiate level. The biggest deficiency I find in my students has less to do with the breadth of their technical preparation, and more to do with the rigor. In other words, students are held to very low standards in high school. Hence, they come to college expecting it to be an extension of high school, with, for example, target dates for assignments instead of due dates, and professors who will continually remind them about course requirements and expectations (surrogate parents, if you will). In addition, students' expectations with regard to workload are woefully inadequate. Thus, while students may have taken the prerequisites for my course, their facility with such material is simply insufficient for continued success (despite receiving an 'A' in their H.S. coursework). And, they are quite disappointed when they realize that success at the collegiate level requires *gasp* up to 40 hours per week of studying..." (academic behaviors and cognitive demand)
- "Technology should be separated from other questions and standards, in case the course is taught without it. (I do encourage and require the students to use technology in higher-level courses, but in the very basic courses, I prefer them to learn without it.)" (technology standards should be separate)

Strengths Codes

Table 58 displays responses coded in the strengths category. These praised specific areas of content within the standards or the approach of the standards. The highest number of responses (24%) focused on reasoning skills/content. The next most frequent category of answers (17%) focused on academic behaviors.

Table 58. Strengths Named by Respondents for Open-Ended Question Soliciting Additional Comments

Strength	Number	Percent
Problem solving/critical thinking/ reasoning	7	24.1
Academic behaviors[a]	5	17.2
Metacognitive skills	2	6.8
Affective learning[b]	1	3.4
Analyze and synthesize primary source text	1	3.4
Cognitive demand	1	3.4
Expressing situation, methods, results and conclusions (math)	1	3.4
Individual work	1	3.4
Information interpretation and summarization	1	3.4
Language skills	1	3.4
Presentation skills	1	3.4
Read critically	1	3.4
Reading skills	1	3.4
Rhetoric	1	3.4
Skills list is very detailed	1	3.4
Technology	1	3.4
Address content and processes	1	3.4
Rigorous competencies appropriate for business literacy	1	3.4
Total	**29**	**100.0**

[a]General skills related to academic success (i.e., study habits, memorization skills).
[b]Aspects related to attitudes, motivation or values.

Examples in this category include:

- "I want my students to be able to read critically and think critically about a reading, empathize with other points of view, and understand that most of our knowledge is provisional. I think the standards reflect those ideals." (read critically and problem solving/critical thinking/reasoning)
- "The standards that relate to logic, reasoning, and critical thinking apply most for my course. Additionally, understanding the use of rhetoric and strategy are helpful for students." (problem solving/critical thinking/reasoning, and rhetoric)

Summary of Respondent Views and Comments

In general, respondents said that they thought the Common Core standards were a coherent representation of their course when it came to the ELA and literacy standards (84% of respondents to the question) and, to a lesser degree, for the mathematics standards (62% of respondents to the question). A large number of respondents (96% of respondents to the question) gave feedback that the Common Core standards are sufficient in terms of cognitive demand.

Respondents noted that there were areas in which the Common Core standards could be improved. Responding to a question about whether the Common Core standards omit key knowledge and skills, there were nearly 300 respondents who said they did. In terms of what the standard omit, answers were wide-ranging. Across all questions, when respondents mentioned a deficit of the standards, they were most likely to mention that the wording of the standards could be improved or that they should include more focus on problem solving and critical thinking. It is interesting to note that this second aspect was also mentioned as a strength. In their comments, respondents emphasized the importance of concepts that fall outside of content learning, that is, issues such as student attitude or motivation, developing a love of learning, and honing academic behaviors such as study habits; they commented that the Common Core standards do not sufficiently address these aspects. Respondents also shared a number of areas in which they feel their students enter college courses unprepared. In these comments, they implied that if students could master the Common Core standards, they would be better prepared for the challenge of post-secondary courses.

Chapter 6 | Summary and Discussion

In this chapter we review the major purposes of the study, the method chosen to obtain data necessary to answer our two research questions, and the major findings regarding applicability and importance of the Common Core standards. The chapter concludes with the recommendation to conceive of college and career readiness as more complex than the knowledge represented by the Common Core standards, and suggestions for future research.

This study addresses two research questions:

1. How applicable are the Common Core standards to college courses?
2. When they are perceived as applicable, how important are the Common Core standards to college courses?

The reason for asking these questions is that the Common Core standards sponsors explicitly intended the standards to be indicators of readiness for college and careers. According to the authors, the English language arts and literacy standards are anchored by the concept of "college and career readiness" and do not simply represent high school completion standards (Common Core State Standards Initiative, 2010c). The intent of the Common Core standards is to ensure that all students "meet college and career readiness expectations no later than the end of high school" (Common Core State Standards Initiative, 2010b, p. 4). The mathematics standards are slightly less explicit about end goals, describing the intent of standards to be to "provide clear signposts along the way to the goal of college and career readiness for all students" (Common Core State Standards Initiative, 2010b, p. 4).

Discussion of Methodology

We chose self-reports from postsecondary faculty who teach entry-level or first-in-sequence courses as our primary source of data for answering these two questions. We asked them whether each Common Core standard was applicable to their course. If the standard was applicable, we asked them to rate the standard's importance to success in the course. We also included several additional questions about their perceptions of the standards' coherence and intellectual challenge level. Finally, we requested that they submit the syllabus for the course they were using as the reference point for their responses. Although we did not use the syllabi in analyses for the current report, they are an additional potential resource for understanding the specific content and expectations students encounter in postsecondary courses and how these relate to the Common Core standards. Future plans call for analyzing syllabus content against the Common Core standards, which should help add a level of understanding and context to the findings contained in this report.

While self-reported data have limitations, EPIC has collected this type of information several times previously and has been able to cross-reference instructor responses against third-party document analysis of course syllabi.[1] In those studies, independent judgment of whether syllabi aligned with a set of standards correlated with instructor reports in the 70–90% range. This means that external reviewers independently found evidence of 70% to 90% of the standards the instructors self-reported. This is especially noteworthy given the fact that some standards do not lend themselves to being stated explicitly in a course syllabus. We take the findings from

[1]These studies include the College Board Advanced Placement® best practices course study (Conley, Aspengren, Gallagher, Stout, & Veach, 2006) and an alignment of the Texas College and Career Readiness Standards (Educational Policy Improvement Center, 2008).

Additional Syllabi Data

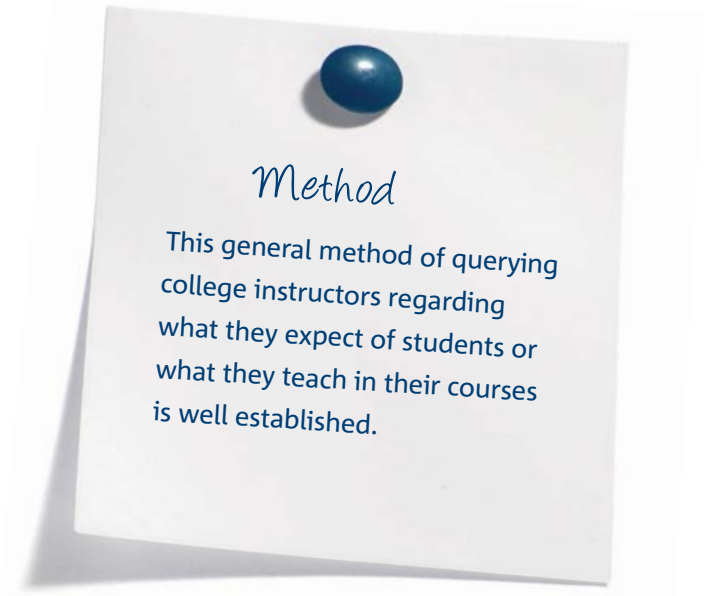
Although we did not use the syllabi in analyses for the current report, they are an additional potential resource for understanding the specific content and expectations students encounter in postsecondary courses and how these relate to the Common Core standards. Future plans call for analyzing syllabus content against the Common Core standards, which should help add a level of understanding and context to the findings contained in this report.

previous studies to indicate that instructor self-reports are sufficiently accurate and reliable to constitute the basis for an overall judgment of the applicability of the Common Core standards to their courses.

We might add parenthetically that this general method of querying college instructors regarding what they expect of students or what they teach in their courses is well established and has been employed for years by both ACT and the College Board as a primary means for ascertaining the content of the ACT and SAT assessments. For this study, we believe our initial attention to instructor selection, our relatively high yield and response rates, and the broad range of course categories we queried provide us with a respondent pool sufficient to answer the questions posed.

This study employs basic descriptive statistics to create response tallies. Such methods are not intended to answer the research questions with statistical certainty. We therefore and necessarily answer our two basic questions on the basis of an overall judgment of the quantity and consistency of the evidence that the Common Core standards consist of knowledge and skills that are applicable and important to a wide range of postsecondary courses. This approach is consistent with evidence-centered design approaches used to validate the claims made for standards or assessments (Behrens, Mislevy, DiCerbo, & Levy, 2010; Mislevy, Steinberg, & Almond, 2002; 2003).

In the preceding results chapters, we provide summative data that rolls applicability findings up to the strand level (for ELA and literacy) or the conceptual category level (for mathematics). For that view of the data, we chose to use the criterion of a minimum of one standard match within the strand or conceptual category as the indicator that the strand or category was applicable. Generally accepted alignment methodology requires that the criterion level be established a priori (Webb 1997; 2002), and this particular criterion level has been set in previous standards-to-standards alignment studies (Cook, 2005; Cook & Wilmes, 2007). The one-standard criterion eliminates the need to select an arbitrary number of standards that must match in order to call the strand or category applicable. In other words, if the criterion for achieving applicability is more than one standard per strand, it must be consistent for all strands, in the form of either a fixed number or a percent of all standards. Neither is adequate when the number of standard and sub-standard statements per strand or category varies as significantly as the Common Core standards vary (from 9 to 28 statements in ELA and literacy; from 8 to 45 statements in mathematics).



We also examined the mean and modal number of standards found to be applicable by respondents who completed ratings for a strand or category. The proportion of respondents indicating only the minimum criterion of one standard is in the low single digit percentage range for every strand in ELA and literacy and every conceptual category in mathematics. Respondents tended to rate a majority, if not all, of the standards in the strand as applicable (see Tables 5 and 30). Appendix D (ELA and literacy) and Appendix F (mathematics) provide detailed breakdowns of the number of standards that respondents selected as applicable.

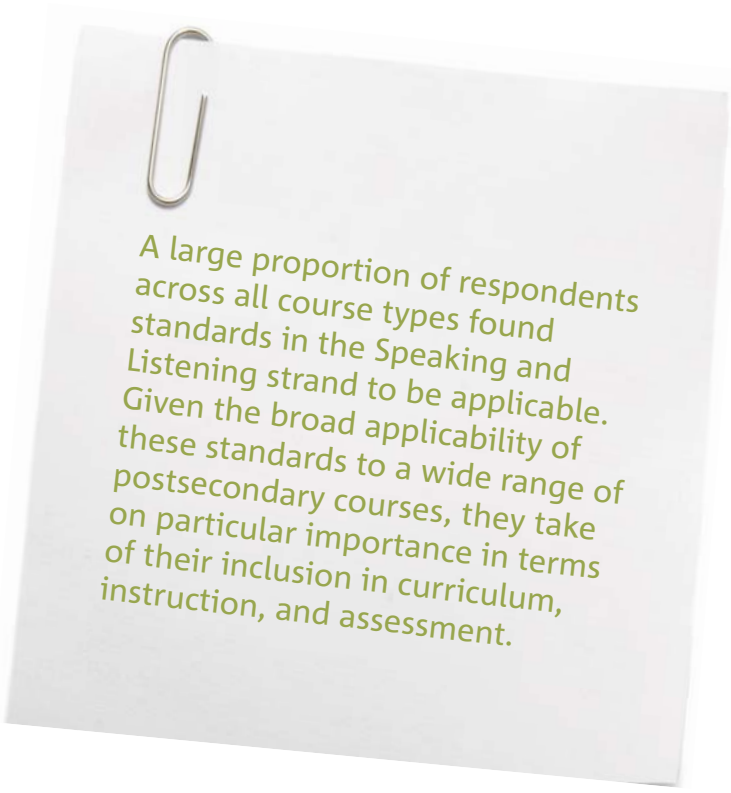
How applicable are the Common Core standards to college courses?

Answering this question is relatively straightforward because of the way we asked the question. We did not ask whether students need all of the Common Core standards to be college and career ready. Therefore, we can report the degree of applicability of each standard individually or roll up to a higher level to represent the entire set of standards for an area (ELA and literacy strand or mathematics conceptual category) or for a topic or domain within that area. We can then offer an overall judgment about the degree to which the Common Core standards are applicable to college courses in general or to particular college courses. By applicable, we mean that the content is a prerequisite for, reviewed in, or introduced in the course. In other words, knowledge of the content is necessary and useful for success in the course

Based on our analysis, not every standard is applicable to every one of the 25 course categories. This should hardly be

surprising given the wide range of courses we intentionally included in the study and the fact that we made all standards available for review by all respondents. This was done on the theory that the two sets of Common Core standards are not designed for just two single subjects. Because of the nature of their courses, however, a large proportion of respondents were likely to have found an entire set of standards to be less relevant. Generally, English teachers and those from courses with strong emphasis on language arts would not be expected to find mathematics standards applicable, and those who teach courses with a strong emphasis on quantitative knowledge and skills may not find reading and writing standards to be as applicable. This was largely true, although we did find notable exceptions to both of these statements.

What immediately stands out in the ELA and literacy standards is the large proportion of respondents across all course types who found standards in the Speaking and Listening strand to be applicable. Given the broad applicability of these standards to a wide range of postsecondary courses, they take on a particular importance in terms of their inclusion in curriculum and instruction and their assessment at the classroom level and by the two consortia developing assessments of the Common Core standards.



Applicability ratings for non-literary reading and writing standards are very high, particularly when results from the English language arts strands of Reading for Informational Texts and Writing are combined with results from the literacy, subject-specific versions of these same strands. Recall that all reading standards and all writing standards — whether in ELA or in literacy — are based on the same anchor standards. This means that the two sets of standards need to be combined when determining overall applicability of informational texts and writing. When this is done, these two areas become much more universally applicable, at a level comparable with the Speaking and Listening strand.

The notable outlier is the Reading for Literature strand, for which no comparable set of standards was developed for the subject areas, for obvious reasons. While these standards are certainly important in their own right, they were viewed as applicable by only a minimal proportion of respondents (15%, on average) in content areas outside of English language arts. Nearly all the English language arts respondents (94%), on the other hand, found the strand applicable.

Further reinforcing the conclusion that the standards were broadly applicable to entry-level courses are the results from supplemental questions that all respondents had the opportunity to answer. When asked if the standards as a whole are sufficiently challenging cognitively to prepare students for their classes, nearly 96% of respondents said they are, and at least some of those who responded “no” did so because they felt the standards are more challenging than they need to be, not insufficiently challenging. In responses to the question of whether the standards omit key knowledge and skills, nearly 84% responded no, they do not. These responses were high across all of the course categories.

Over 90% of all respondents chose to answer the question of whether the English language arts (ELA) and literacy standards are a coherent representation of the fields of knowledge necessary for success in their course. Of those who answered the question, nearly 84% indicated they are. When the same question was asked about the mathematics standards, the response rate was also 90%, with 62% of these respondents indicating that the standard are coherent. This somewhat lower number in mathematics suggests the mathematics standards, with their greater specificity and number of standards, may have sacrificed coherence somewhat for a sizeable number of postsecondary instructors. However, it is worth noting the agreement rate that they are coherent still approached two-thirds of those who answered the question.

A final open-ended question gave respondents an opportunity to offer their opinions on the Common Core standards. Of the 184 codeable comments, the largest category, just over 40%, detailed ways that students are not well prepared for college rather than issues related directly to the standards themselves. Just under 30% of comments noted deficiencies in the standards. The open-ended questions are one more place where general dissatisfaction with the applicability of the standards might have been noted but was not.

In terms of applicability, it appears the Common Core standards are applicable to a wide range of postsecondary entry-level courses, although to varying degrees. It is worth stating explicitly that this is not the same as saying that all Common Core standards are necessary for success in all of the 25 course categories. In particular, we found no evidence that somewhat varying profiles of student mastery of the Common Core standards would preclude student success in initial postsecondary courses.

What can be concluded regarding applicability based on the findings of this study is that students who are generally proficient in the Common Core standards will likely be ready for a wide range of postsecondary courses, and the more Common Core standards in which they are proficient, the wider the range of postsecondary-level classes they will be ready to undertake.

How important are the Common Core standards to success in a wide range of postsecondary courses?

Almost every standard received a mean rating that exceeds 2.5 on a 4-point scale, and most exceed 3. Therefore, interpretation of the importance ratings is relatively easy: respondents who consider a particular standard applicable also consider it to be important. Some math standards (25) fall below 2.5. The means of two English language arts (ELA) and literacy standards also are below 2.5, but the ELA and literacy standards on the whole received higher importance ratings than did the math standards, with all strands except one at or above 3 for their cumulative mean.

Instructors who taught courses in the English content area comprised the majority of respondents in all strands except Speaking and Listening, and Language. Responses in these two strands were distributed more representatively among all respondent categories, which means their importance ratings are more reflective of a wide range of courses. Social science instructors made up the large majority of respondents in the Reading Standards in History/Social Studies, while respondents in the Reading Standards in Science and Technical Subjects was more broadly distributed, with about a quarter of respondents teaching science courses. The importance ratings responses for the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects were also distributed representatively, with social science and science instructors making up just over half of the respondents.

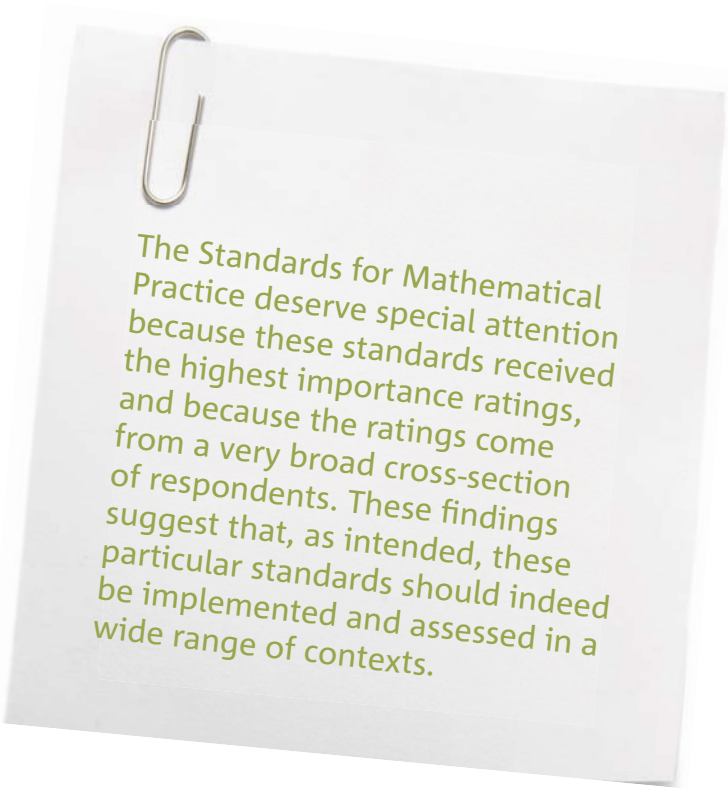
These results indicate that the responses to the questions about the importance of the ELA and literacy standards are broadly representative of the instructors who also find these standards to be applicable. This suggests that the importance ratings are reasonably good indicators of the perceptions of postsecondary instructors from a wide range of course categories and institution types.

Although it received high applicability ratings, the strand with the lowest importance ratings in ELA and literacy is the Language strand. These standards relate to use of the English language and include spelling, punctuation, and usage conventions. One possible explanation of this finding is that the Language standards are very detailed in nature and contain at least a few standard statements that are rated among the lowest of all of the ELA and literacy standards, perhaps because they are so specific. Some of these specific statements are actually sub-standards that fall under some broader concept. In

general, across strands, respondents tended to place the most importance on broad reading and writing concepts.

The mathematics standards are rated somewhat lower overall in terms of importance and also demonstrate a wider range in importance (as they also do in applicability). Only the average rating of Mathematical Practices exceeds the 3, or "more important," level on the scale. Respondents rated, on average, four conceptual categories, Number and Quantity, Algebra, Functions, and Statistics and Probability, just below "more important." Geometry is the lowest-rated category. However, it is still above 2.5, the midpoint between "more important" and "less important."

Mathematics and science instructors comprise the majority of respondents in several conceptual categories: Number and Quantity, Algebra, Functions, and Geometry, in which they make up 85% of respondents. They are less than a majority in two strands: Statistics and Probability, where science and social science respondents make up a majority, and the Mathematical Practices, for which mathematics and science instructors make up 43% of respondents and social science instructors comprise an additional 17%. The three other content areas each have more than 10% of the responses.



It is interesting to note that even math and science respondents rated the Geometry category relatively lower. This finding suggests that the Geometry category may be a candidate for further review in order to increase its applicability and importance by eliminating or consolidating some standards.

The Standards for Mathematical Practice, which authors of the Common Core standards stated are to be applied across all applicable standards, deserve special attention for two reasons; first, because these standards received the highest importance ratings and, second, because the ratings come from a very broad cross-section of respondents. These findings suggest that, as intended, these particular standards should indeed be implemented and assessed in a wide range of contexts and courses in secondary schools and in state and consortia assessments.

Do the standards prepare students for both college and career?

This study did not explicitly attempt to answer this question. However, by including a number of courses that are not typically included in general education requirements for a bachelor's degree, it is possible to gain at least a glimmer of insight into this important question. Therefore, we spend some time reporting on responses from instructors in the three content areas that are more commonly associated with a career pathway and are found with relatively higher frequency in two-year institutions. These are business management, computer technology, and health care. We do not break out importance ratings by course categories due in part to low n's in some categories. We do report the percent of respondents from each content area.

Instructors in these three areas gave the Speaking and Listening, and Language strands applicability ratings comparable to instructors in general education-related courses. Similarly, instructors in the more career-oriented course categories tended to rate the reading and writing standards at the same applicability level as instructors from most of the non-mathematics general education content areas (recalling here that these standards appear in different but comparable strands across the ELA and literacy sections). Importance ratings of the teaching and writing standards in the subject areas evidence a similar pattern, with high importance ratings and broad participation across subject areas.

In mathematics, the respondents from the more career-oriented course categories gave applicability ratings to the Standards for Mathematical Practice that are nearly as high as those given by mathematics and science instructors in general education

content areas. The Standards for Mathematical Practice were also rated as "more important" by a wide cross-section of respondents, including sizeable numbers from the career-oriented course categories.

These preliminary and very general findings suggest some important overlaps may exist between many general education courses and courses taken for a certificate or associate's degree. Much additional research is necessary in this area before any definitive conclusion is reached. For instance, we limit our exploration to just three potential career paths and do so only at the postsecondary level. Further work needs to be done to solicit ratings of the standards instructors in additional career pathway areas and in workforce training programs, and to compare the Common Core standards to analyses of job skills contained in sources such as O*NET Level 3.

Will students who do well on the common assessments be ready for college?

This study examines the Common Core standards' applicability to and importance for success in college courses. While the standards fare very well on these two criteria, this is not the same as saying students who test well on assessments of the Common Core standards will necessarily be fully ready for college or careers.

As we have noted elsewhere (Conley, 2007; 2010), college and career readiness is a multidimensional construct, and content knowledge is only one of several key dimensions. The Common Core standards represent an important set of content knowledge and potentially of cognitive strategies, but caution should be exercised when describing them as a complete specification for college and career readiness. Achieving the goal of a college- and career-ready student is dependent on other factors and dimensions as well, factors that are not addressed by the Common Core standards and that, in all likelihood, will not be assessed by the common assessments currently under development by two consortia of states, the Partnership for the Assessment of Readiness for College and Careers (PARCC) and SMARTER Balanced Assessment Consortium (SBAC).

Beyond content knowledge, a second and equally important dimension is the cognitive strategies students possess when they enter college. These strategies allow them to apply content they are using in novel and nonroutine ways to solve problems and attack important questions of the discipline. In short, they require deeper learning skills (Conley, 2011). The Common Core standards were rated as sufficient in terms of cognitive challenge, which is an indicator that they have the potential to develop student thinking skills and cognitive strategies. These, however, are dependent on how the standards are taught and then subsequently assessed. Some of the comments to the open-ended questions suggest that postsecondary instructors think the Common Core standards could do more to develop thinking skills.

A third important dimension of college and career readiness are the associated learning skills and techniques students develop as they engage with challenging academic material. The Common Core standards are necessarily silent on these skills, which include time management, goal setting, persistence, study skills, collaboration, and other important behaviors associated with managing academic learning tasks successfully and independently. Here, again, the ways in which students are taught the standards will affect the degree to which they acquire and develop these necessary college- and career-readiness skills.

The final dimension in college and career knowledge consists of the specific knowledge and skills students need to make a successful transition from high school to postsecondary education. In the U.S., the transition process is complex and multi-step and includes numerous requirements, deadlines, forms, and pieces of information. The Common Core standards

do not and cannot address this dimension, but it is important to note that defining a set of standards as "college and career ready" that overlook the three dimensions beyond content knowledge will result in assuming that students who have achieved a particular score on the common assessments are fully ready for college and career studies when, in fact, they may possess only a subset of the knowledge and skills, strategies and techniques necessary to be fully ready for postsecondary success.

Future directions for subsequent research and analysis

We recommend several directions for continued analysis of and reflection on the current Common Core standards. First, from the data we have in hand from this survey, we intend to look further at subgroup findings. We have the opportunity to look more in-depth at elements such as the ratings from specific content areas or from specific types of institutions (e.g., selectivity). As previously mentioned, we intend to analyze the syllabus content of respondents from this survey against the Common Core standards, which should add a level of understanding and context to the findings contained in this report. We will also compare the results from this survey with findings from other surveys that ask postsecondary faculty about the preparation of high school students (e.g., ACT, 2009; College Board, 2005).

Whereas this study compares content of the Common Core standards with expectations for college courses, another study that EPIC conducted concurrently compares content of the Common Core standards with content of existing high school standards (see Conley, Drummond, Seburn, de Gonzalez, Stout, & Rooseboom, 2011). This additional study offers additional insight into the implementation of the Common Core, particularly how similar or different the Common Core are from current standards, and it adds to the developing body of literature in this area (Porter, McMaken, Hwang, & Yang, 2011a; 2011b; Beach, 2011; Cobb & Jackson, 2011).

We also recommend that others with interests in these areas, including state education departments and postsecondary agencies, undertake additional analyses of career pathways in relation to the Common Core standards to gain greater insight into the specific profiles of knowledge and skills that students need for each of a range of postsecondary career programs. We did not look specifically at the applicability and importance of the Common Core standards in relation to job readiness, which we define as what is necessary to enter the workforce directly from secondary school. This may be worthwhile to undertake to help confirm the degree to which postsecondary learning is necessary for all students to be prepared to enter the workforce and to identify the types of jobs that do not require mastery of the Common Core standards. Similarly, the knowledge and skill level necessary to succeed in employer and military training programs should be determined in relation to the Common Core standards. Finally, the relationship between the Common Core standards and the new version of the General Education Development (GED) certificate that is currently under design should be determined. This full set of studies is necessary to ensure that there are not "shortcuts" around the Common Core standards, particularly if a program purports to be equivalent to the standards.

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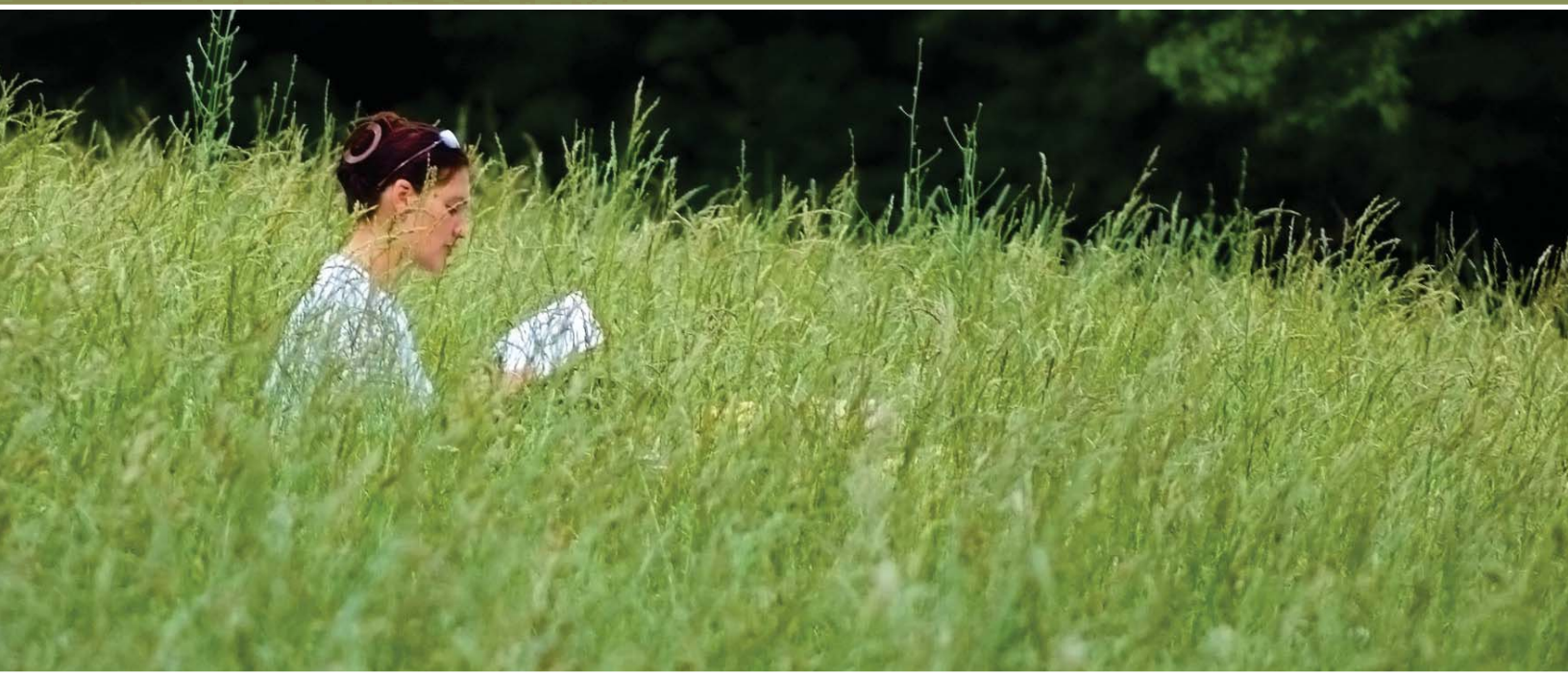
Appendices to

Reaching the Goal:
The Applicability and Importance of the Common Core State Standards to College and Career Readiness



Appendix A shows the percentage breakdowns from the Carnegie Classification of Institutions of Higher Education™ (Carnegie Foundation, 2009) that served as rough recruitment goals for the study. In order to identify college instructors to complete the survey, a list was obtained from the Carnegie website in the spring of 2009. It contained information for the 3468 institutions of higher education in the United States offering associate and undergraduate degrees at that time[1]. As we recruited, we attempted to replicate in our sample, as closely as possible, the proportions of all institutions in terms of size, whether they are private or public, and whether they are two-year or four-year institutions. Tables A1 through A4 show the percentage breakdowns that served as recruitment goals compared to the percentage breakdown of the actual study sample.

[1]We did not include institutions located in U.S. territories.

Table A1. Comparison of All U.S. Institutions of Higher Education[a] Compared to Study Respondents by Type: Public vs. Private

Institution Type	All institutions *n*	All institutions percent	Study *n*	Study percent
Private	1677	51.6	688	36.3
Public	1791	48.4	1209	63.7
Total	**3468**	**100.0**	**1897**	**100.0**

[a]The data on all institutions of higher education were calculated from information obtained from the Carnegie Foundation (2009).

Table A2. Comparison of All U.S. Institutions of Higher Education[a] Compared to Study Respondents by Type: 2-year vs. 4-year

Institution Type	All institutions *n*	All institutions percent	Study *n*	Study percent
2-year	1176	33.9	767	40.4
4-year or above	2292	66.1	1130	59.6
Total	**3468**	**100.0**	**1897**	**100.0**

[a]The data on all institutions of higher education were calculated from information obtained from the Carnegie Foundation (2009).

Table A3. Comparison of All U.S. Institutions of Higher Education[a] Compared to Study Respondents by Size and Setting Category

Size and setting	All institutions *n*	All institutions percent	Study *n*	Study percent
2-year				
Very small	233	6.7	58	3.1
Small	402	11.6	285	15.0
Medium	393	11.3	259	13.7
Large	153	4.4	129	6.8
Very large	71	2.0	48	2.5
4-year				
Very small, highly residential	159	4.6	88	4.6
Very small, primarily nonresidential	174	5.0	37	2.0

Continued on next page

Table A3. continued

Size and setting	All institutions *n*	All institutions percent	Study *n*	Study percent
Very small, primarily residential	61	1.8	33	1.7
Small four-year, highly residential	308	8.9	187	9.9
Small, primarily nonresidential	155	4.5	79	4.2
Small, primarily residential	171	4.9	137	7.2
Medium, highly residential	115	3.3	77	4.1
Medium, primarily nonresidential	148	4.3	94	5.0
Medium, primarily residential	157	4.5	112	5.9
Large, highly residential	32	0.9	7	0.4
Large, primarily nonresidential	124	3.6	113	6.0
Large, primarily residential	87	2.5	61	3.2
Other (4-year)				
Special focus institution	525	15.1	93	4.9
Total	**3468**	**100.0**	**1897**	**100.0**

[a]The data on all institutions of higher education were calculated from information obtained from the Carnegie Foundation (2009).

Table A4. Comparison of All U.S. Higher Education Institutions[a] Compared to Study Respondents by Geographic Location

Geographic Location	All institutions *n*	All institutions percent	Study *n*	Study percent
East	782	22.5	295	15.6
Midwest	894	25.8	532	28.0
South	849	24.5	524	27.6
Southwest	296	8.5	239	12.6
West	647	18.7	307	16.2
Total	**3468**	**100.0**	**1897**	**100.0**

[a]The data on all institutions of higher education were calculated from information obtained from the Carnegie Foundation (2009). The Carnegie list contained the state for all institutions. The geographic regions were derived from regions that the College Board specifies (College Board, 2009); however, we combined two College Board regions — Middle States and New England — to create the East category.

Appendix B presents information about the level of the courses represented in our sample. Specifically, Tables B1 and B2 present additional information about how many times respondents had taught their courses and whether the courses had prerequisites. The survey was intended to capture the perceptions of instructors of entry-level courses, however, there was 10% of the sample that considered their course to be upper level. This is because students do not ordinarily take some of the some of the course categories we chose until they are established in their postsecondary education. However, the courses were still first in the sequence in the subject area and, therefore, represented an acceptable measure of the applicability and importance of the Common Core standards. We did compare the means of responses from instructors whose courses were beyond the entry level with those at the entry level, and we found little notable statistical difference. We therefore included these courses in analyses in the body of the report.

Table B1 shows the level of the course. The 10% of cases that were upper level tended to be concentrated in business management and healthcare and, to a lesser degree, in computer technology and mathematics.

Table B1. Level of Course (n = 1897) Reported by Respondent

Level	English language arts		Mathematics		Science		Social science		Business management		Computer technology		Healthcare		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Entry level/ lower division	285	91.3	266	88.1	274	97.5	414	98.6	193	79.4	129	84.3	144	77.4	1705	89.9
Upper division	27	8.7	36	11.9	7	2.5	5	1.2	50	20.6	24	15.7	42	22.6	191	10.1
Total	**312**	**100.0**	**302**	**100.0**	**281**	**100.0**	**420**	**99.8**[a]	**243**	**100.0**	**153**	**100.0**	**186**	**100.0**	**1896**	**99.9**[a]

[a]Due to a system error, one person from a social science course did not answer the question.

Appendix B

Table B2 displays responses to the question about whether or not the course has prerequisites. The sample as a whole was fairly evenly split, with 55% reporting that the course did have a prerequisite. A majority of English language arts, mathematics, computer technology, and healthcare respondents reported that their courses had prerequisites. Social science respondents were much less likely to report a prerequisite. Examining the syllabi of these courses show that they were indeed generally first-in-sequence courses but some did require courses from a related content area, concurrent enrollment in a course, or a high school-level prerequisite.

Table B2. Answer to Question About Whether or Not Courses (n = 1897) Have One or More Specific Prerequisites, Reported by Respondent

Response	English language arts		Mathematics		Science		Social science		Business management		Computer technology		Healthcare		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Yes	215	68.9	261	86.4	180	64.1	57	6.4	99	40.7	83	54.2	145	78.0	1040	54.8
No	97	31.1	41	13.6	101	35.9	362	86.2	144	59.3	70	45.8	41	22.0	856	45.1
Total	**312**	**100.0**	**302**	**100.0**	**281**	**100.0**	**420**	**99.8**[a]	**243**	**100.0**	**153**	**100.0**	**186**	**100.0**	**1896**	**99.9**[a]

[a]Due to a system error, one person from a social science course did not answer the question.

Appendix C presents information about the demographics of the sample. In order to obtain context for the sample, we asked respondents several questions about their courses. The body of the report shows information about the level, size, and mode of delivery for courses, reported for the sample as a whole. Tables C1 through C3 show the information broken down by content area. Table C4 shows additional information about the modes of assessment that respondents reported using in their courses.

Table C1 displays the number of students in respondents' courses, by content area. All content areas had a majority of courses fall into the two smallest ranges of class size, between 1 and 25 or 26 and 50 students. There was a tendency for English language arts and computer technology classes to be smaller; between 64% and 73% of courses had fewer than 26 students. Science, social science, and healthcare courses tended to be larger, with more than 25% of courses enrolling more than 50 students.

Table C1. Number of Students Enrolled in Courses (n = 1897), Reported by Respondent

Number of students	English language arts		Mathematics		Science		Social science		Business Management		Computer technology		Healthcare		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
1–25	227	72.8	115	38.1	80	28.5	99	23.6	88	36.2	98	64.1	36	19.4	743	39.2
26–50	65	20.8	126	41.7	86	30.6	203	48.3	100	41.2	29	19.0	79	42.5	688	36.3
51–100	9	2.9	24	7.9	49	17.4	53	12.6	28	11.5	17	11.1	39	21.0	219	11.5
101–500	7	2.2	25	8.3	55	19.6	57	13.6	17	7.0	7	4.6	25	13.4	193	10.2
501–1000	4	1.3	8	2.6	7	2.5	7	1.7	7	2.9	0	0.0	5	2.7	38	2.0
1001+	0	0.0	4	1.3	4	1.4	1	0.2	3	1.2	2	1.3	2	1.1	16	0.8
Total	**312**	**100.0**	**302**	**100.0**	**281**	**100.0**	**420**	**100.0**	**243**	**100.0**	**153**	**100.0**	**186**	**100.0**	**1897**	**100.0**

Table C2 displays the ways in which respondents in each content area reported that they deliver instruction in their courses. Most respondents include a lecture component. Science, computer technology, and healthcare courses are likely to include laboratories. More than 50% of the English language arts courses use seminar formats. In most content areas, approximately one-third of courses use some type of online learning component. Respondents in many content areas checked "other" modes of delivery, in addition to the choices provided. In explaining these other modes, many respondents listed interactive activities, such as group work or projects, class discussions, writing workshops, or peer tutoring. Some respondents listed such activities as clinical experiences or hands-on practice.

Appendix C

Table C2. Mode of Delivery for Courses (n = 1897), Reported by Respondent

Mode	English language arts (*n* = 312)		Mathematics (*n* = 302)		Science (*n* = 281)		Social science (*n* = 420)		Business management (*n* = 243)		Computer technology (*n* = 153)		Healthcare (*n* = 186)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Seminar	162	51.9	14	4.6	12	4.3	73	17.4	27	11.1	9	5.9	13	7.0
Lecture	241	77.2	293	97.0	276	98.2	396	94.3	223	91.8	141	92.2	181	97.3
Lab	52	16.7	71	23.5	246	87.5	21	5.0	32	13.2	120	78.4	115	61.8
Online	98	31.4	95	31.5	60	21.4	134	31.9	112	46.1	52	34.0	63	33.9
Teleconference	6	1.9	7	2.3	0	0.0	10	2.4	7	2.9	2	1.3	0	0.0
Other	58	18.6	30	9.9	35	12.5	55	13.1	29	11.9	7	4.6	39	21.0
Total responses	**617**		**510**		**629**		**689**		**430**		**331**		**411**	

Note. Totals add to more than 100% because instructors could select all applicable modes.

Table C3 shows the number of times instructor in each content area had taught the course. For a relatively small percentage of courses (from 2–6% across different content areas), the instructor had only taught the course once. For a majority of courses (from 54–76% across different content areas), the instructor had taught it 10 or more times.

Table C3. Number of Times Teaching Course, Reported by Respondent

Number of times	English language arts		Mathematics		Science		Social science		Business management		Computer technology		Healthcare		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
1	8	2.6	9	3.0	7	2.5	13	3.1	14	5.8	3	2.0	5	2.7	59	3.1
2–5	45	14.4	51	16.9	53	18.9	52	12.4	36	14.8	34	22.2	48	25.8	319	16.8
6–9	33	10.6	37	12.3	43	15.3	35	8.3	25	10.3	23	15.0	33	17.7	229	12.1
10+	226	72.4	205	67.9	178	63.3	319	76.0	168	69.1	93	60.8	100	53.8	1289	67.9
Total	**312**	**100.0**	**302**	**100.0**	**281**	**100.0**	**420**	**99.8**[a]	**243**	**100.0**	**153**	**100.0**	**186**	**100.0**	**1896**	**99.9**[a]

[a]Due to a system error, one person from a social science course did not answer the question.

Appendix C

Table C4 shows the different modes of assessment that respondents reported using in their courses, by content area. Respondents could select all that were applicable. Tests and quizzes were commonly reported across all content areas in the sample. Tests and quizzes are the predominant method of assessment for mathematics courses. Science, social science, business management, and healthcare courses commonly also use short answer formats. Not surprisingly, nearly every English language arts course involves essay writing; a majority of these courses also use rubrics and peer evaluation. A majority of social science courses also use essays. Performance tasks are used for a majority of science, business management, computer technology, and healthcare courses.

Table C4. Modes of Assessment for Courses (n = 1897), Reported by Respondent

Mode	English language arts (*n* = 312)		Mathematics (*n* = 302)		Science (*n* = 281)		Social science (*n* = 419)		Business management (*n* = 243)		Computer technology (*n* = 153)		Healthcare (*n* = 186)		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Observation	151	48.4	110	36.4	127	45.2	153	36.5	99	40.7	55	35.9	103	55.4	798	42.1
Essays	309	99.0	24	7.9	74	26.3	299	71.4	101	41.6	12	7.8	66	35.5	885	46.7
Interviews	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Performance tasks	135	43.3	139	46.0	167	59.4	133	31.7	146	60.1	101	66.0	104	55.9	925	48.8
Exhibitions/ demonstrations	61	19.6	44	14.6	51	18.1	59	14.1	46	18.9	38	24.8	72	38.7	371	19.6
Portfolios	107	34.3	9	3.0	5	1.8	18	4.3	10	4.1	10	6.5	9	4.8	168	8.9
Journals	126	40.4	12	4.0	12	4.3	39	9.3	17	7.0	7	4.6	38	20.4	251	13.2
Rubrics	200	64.1	56	18.5	82	29.2	120	28.6	76	31.3	47	30.7	78	41.9	659	34.8
Self and peer evaluations	211	67.6	32	10.6	43	15.3	65	15.5	76	31.3	22	14.4	45	24.2	494	26.1
Short answers	138	44.2	146	48.3	189	67.3	255	60.9	137	56.4	51	33.3	111	59.7	1027	54.2
Tests and quizzes	199	63.8	301	99.7	279	99.3	401	95.7	233	95.9	145	94.8	182	97.8	1740	91.8
Oral presentation	166	53.2	43	14.2	82	29.2	137	32.7	108	44.4	23	15.0	72	38.7	631	33.3
Individual projects	164	52.6	107	35.4	103	36.7	182	43.4	143	58.8	127	83.0	84	45.2	910	48.0
Group projects	126	40.4	90	29.8	124	44.1	116	27.7	133	54.7	64	41.8	88	47.3	741	39.1
Total responses	**2093**		**1113**		**1338**		**1977**		**1325**		**702**		**1052**		**9600**	

Note. Totals add to more than 100% because instructors could select all applicable modes.

Appendix C

Appendix D presents additional information on respondents' applicability ratings in English language arts (ELA) and literacy to supplement the data presented in Chapter 3. The first set of tables show the number of standards that respondents rated as applicable in each ELA and literacy strand (Tables D1 through D8). Table D9 shows the number of standards that were rated as applicable across the four strands that cover reading (two in ELA and two in literacy) and D10 shows the standards that were rated across the three strand that cover non-literary reading (one in ELA and two in literacy). Table D11 shows the number of standards that were rated as applicable across the two strands that involve writing (one in ELA and one in literacy). Finally, Table D12 shows applicability information by content area, specifically the number of respondents in each content area who rated at least one standard in a strand as applicable. Table D13 presents the percent of responses that fall into each of the four applicable categories, by strand and for all the strands combined.

Table D1. Number of Standard Statements Rated as Applicable for Reading for Literature Strand

Number of statements (out of 9)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 535)
1	26	1.4	4.9
2	52	2.7	9.7
3	60	3.2	11.2
4	59	3.1	11.0
5	43	2.3	8.0
6	58	3.1	10.8
7	60	3.2	11.2
8	84	4.4	15.7
9	93	4.9	17.4
Total	**535**	**28.2**	**100.0**

Table D2. Number of Standard Statements Rated as Applicable for Reading for Informational Texts Strand

Number of statements (out of 10)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 488)
1	4	0.2	0.8
2	12	0.6	2.5
3	27	1.4	5.5
4	17	0.9	3.5
5	26	1.4	5.3
6	45	2.4	9.2
7	124	6.5	25.4
8	112	5.9	23.0
9	58	3.1	11.9
10	63	3.3	12.9
Total	**488**	**25.7**	**100.0**

Table D3. Number of Standard Statements Rated as Applicable for Writing Strand

Number of statements (out of 28)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 504)
1–7	9	0.5	1.8
8–14	44	2.3	8.7
15–21	141	7.4	28.0
22–28	310	16.3	61.5
Total	**504**	**26.6**	**100.0**

Table D4. Number of Standard Statements Rated as Applicable for Speaking and Listening Strand

Number of statements (out of 10)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 1507)
1	21	1.1	1.4
2	43	2.3	2.9
3	45	2.4	3.0
4	70	3.7	4.6
5	84	4.4	5.6
6	112	5.9	7.4
7	164	8.6	10.9
8	173	9.1	11.5
9	238	12.5	15.8
10	557	29.4	37.0
Total	**1507**	**79.4**	**100.0**

Table D5. Number of Standard Statements Rated as Applicable for Language Strand

Number of statements (out of 17)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 1552)
1–4	91	4.8	5.9
5–8	271	14.3	17.5
9–12	302	15.9	19.5
13–17	888	46.8	57.2
Total	**1552**	**81.8**	**100.0**

Table D6. Number of Standard Statements Rated as Applicable for Reading for Literacy in History/Social Studies Strand

Number of statements (out of 10)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 571)
1	4	0.2	0.7
2	6	0.3	1.1
3	10	0.5	1.8
4	10	0.5	1.8
5	17	0.9	3.0
6	28	1.5	4.9
7	49	2.6	8.6
8	55	2.9	9.6
9	111	5.9	19.4
10	281	14.8	49.2
Total	**571**	**30.1**	**100.0**

Table D7. Number of Standard Statements Rated as Applicable for Reading for Literacy in Science and Technical Subjects Strand

Number of statements (out of 10)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 1068)
1	5	0.3	0.5
2	15	0.8	1.4
3	23	1.2	2.2
4	40	2.1	3.7
5	41	2.2	3.8
6	74	3.9	6.9
7	76	4.0	7.1
8	122	6.4	11.4
9	167	8.8	15.6
10	505	26.6	47.3
Total	**1068**	**56.3**	**100.0**

Table D8. Number of Standard Statements Rated as Applicable for Writing for Literacy in History/Social Studies, Science, and Technical Subjects Strand

Number of statements (out of 19)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 1265)
1—5	68	3.6	5.4
6—10	172	9.1	13.6
11—15	242	12.8	19.1
16—19	783	41.3	61.9
Total	**1265**	**66.7**	**100.0**

Summary of English Language Arts and Literacy Applicability Ratings

The following tables show the standards that were rated across the Reading and Writing strands.

Table D9. Number of Standard Statements Rated as Applicable Across Four Reading Strands

Number of statements (out of 39)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in four strands (*n* = 1697)
1–10	1121	59.1	66.1
11–20	410	21.6	24.2
21–30	133	7.0	7.8
31–39	33	1.7	1.9
Total	**1697**	**89.5**	**100.0**

Table D10. Number of Standard Statements Rated as Applicable Across the Three Non-literary Reading Strands: Informational Texts, History/Social Studies, Science and Technical Subjects

Number of statements (out of 30)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in three strands (*n* = 1676)
1–8	541	28.5	32.3
9–16	930	49.0	55.5
17–24	167	8.8	10.0
25–30	38	2.0	2.3
Total	**1676**	**88.4**	**100.0**

Table D11. Number of Standard Statements Rated as Applicable Across Two Writing Strands

Number of statements (out of 47)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in two strands (*n* = 1564)
1–12	298	15.7	19.1
13–24	940	49.6	60.1
25–36	201	10.6	12.9
37–47	125	6.6	8.0
Total	**1564**	**82.4**	**100.0**

Table D12. Number of Respondents Who Rated At Least One Standard in Strand as Applicable, by Subject Area

Common Core English language arts strand	ELA (*n* = 312)		Mathematics (n = 302)		Science (n = 281)		Social science (*n* = 420)		Business management (*n* = 243)		Computer technology (*n* = 153)		Healthcare (*n* = 186)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Reading for Literature	293	93.9	27	8.9	24	8.5	72	17.1	69	28.4	20	13.1	30	16.1
Reading for Informational Texts	301	96.5	17	5.6	16	5.7	51	12.1	63	25.9	13	8.5	27	14.5
Writing	310	99.4	20	6.6	17	6.0	54	12.9	67	27.6	10	6.5	26	14.0
Speaking and Listening	265	84.9	169	56.0	230	81.9	371	88.3	204	84.0	113	73.9	155	83.3
Language	311	99.7	162	53.6	236	84.0	377	89.8	204	84.0	97	63.4	165	88.7
Reading for Literacy in History/ Social Studies	83	26.6	12	4.0	14	5.0	353	84.0	67	27.6	6	3.9	36	19.4
Reading for Literacy in Science and Technical Subjects	38	12.2	214	70.9	262	93.2	107	25.5	159	65.4	127	83.0	161	86.6
Writing for Literacy in History/ Social Studies, Science, and Technical Subjects	37	11.9	158	52.3	249	88.6	379	90.2	182	74.9	103	67.3	157	84.4

Appendix D

Table D13. Percent of Responses in Four Applicability Categories Across Each Strand

Strand (number of respondents)	Number of Ratings	Prerequisite	Reviewed	Introduced	Subsequent	Total
Reading for Literature (535)	3038	17.5	36.3	39.3	6.8	100.0
Reading for Informational Texts (488)	3493	18.6	37.4	40.1	3.9	100.0
Writing (504)	11118	20.9	38.1	35.4	5.5	100.0
Speaking and Listening (1507)	11858	27.5	34.8	32.0	5.6	100.0
Language (1552)	19425	58.2	27.0	11.8	3.1	100.0
Reading for History/Social Studies (571)	4931	26.4	37.6	31.3	4.6	100.0
Reading for Science and Technical Subjects (1068)	8974	28.1	33.8	34.1	4.0	100.0
Writing for History/Social Studies, Science, and Technical Subjects (1265)	19136	23.6	33.4	32.5	10.5	100.0
All strands (1793)	**81973**	**32.2**	**33.3**	**28.6**	**5.9**	**100.0**

Appendix D

Appendix E provides descriptive statistics for the individual ratings of every standard statement in the Common Core standards for English language arts (ELA) and literacy. Recall that, for the purposes of the study, respondents rated sub-standards and standards as though they were on the same level; therefore, the ELA and literacy standards comprised 113 ratable statements.

Reading Standards for Literature

Standard 1 (Key Ideas and Details). Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 516)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	87	4.6	16.9	Most	256	50.3	3.42	0.65
Reviewed	194	10.2	37.6	More	211	41.5		
Introduced	228	12.0	44.2	Less	41	8.1		
Subsequent	7	0.4	1.4	Least	1	0.2		
Not applicable	1381	72.8		**Total**	**509**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2 (Key Ideas and Details). Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 475)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	83	4.4	17.5	Most	182	39.3	3.28	0.66
Reviewed	183	9.6	38.5	More	230	49.7		
Introduced	197	10.4	41.5	Less	49	10.6		
Subsequent	12	0.6	2.5	Least	2	0.4		
Not applicable	1422	75.0		**Total**	**463**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 3 (Key Ideas and Details). Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 296)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	30	1.6	10.1	Most	77	28.0	3.04	0.74
Reviewed	127	6.7	42.9	More	138	50.2		
Introduced	118	6.2	39.9	Less	55	20.0		
Subsequent	21	1.1	7.1	Least	5	1.8		
Not applicable	1601	84.4		**Total**	**275**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 4 (Craft and Structure). Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 436)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	18.8	Most	150	35.3	3.18	0.72
Reviewed	195	10.3	44.7	More	203	47.8		
Introduced	148	7.8	33.9	Less	69	16.2		
Subsequent	11	0.6	2.5	Least	3	0.7		
Not applicable	1461	77.0		**Total**	**425**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Craft and Structure). Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 327)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	28	1.5	8.6	Most	72	23.6	3.02	0.68
Reviewed	131	6.9	40.1	More	170	55.7		
Introduced	146	7.7	44.6	Less	61	20.0		
Subsequent	22	1.2	6.7	Least	2	0.7		
Not applicable	1570	82.8		**Total**	**305**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Craft and Structure). Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 375)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	42	2.2	11.2	Most	86	24.4	2.97	0.74
Reviewed	130	6.9	34.7	More	178	50.4		
Introduced	181	9.5	48.3	Less	83	23.5		
Subsequent	22	1.2	5.9	Least	6	1.7		
Not applicable	1522	80.2		**Total**	**353**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

ELA and Literacy: Reading Standards for Literature

Standard 7 (Integration of Knowledge and Ideas). Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 222)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	14	0.7	6.3	Most	58	32.8	3.06	0.79
Reviewed	65	3.4	29.3	More	75	42.4		
Introduced	98	5.2	44.1	Less	41	23.2		
Subsequent	45	2.4	20.3	Least	3	1.7		
Not applicable	1675	88.3		**Total**	**177**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

For the Reading Standards for Literature, the eighth College and Career Readiness anchor standard is listed as not relevant to literature.

Standard 9 (Integration of Knowledge and Ideas). Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 159)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	12	0.6	7.5	Most	23	23.2	2.79	0.88
Reviewed	30	1.6	18.9	More	39	39.4		
Introduced	57	3.0	35.8	Less	30	30.3		
Subsequent	60	3.2	37.7	Least	7	7.1		
Not applicable	1738	91.6		**Total**	**99**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 10 (Range of Reading and Level of Text Complexity). By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 232)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	155	8.2	66.8	Most	107	47.8	3.33	0.72
Reviewed	48	2.5	20.7	More	86	38.4		
Introduced	21	1.1	9.1	Less	30	13.4		
Subsequent	8	0.4	3.4	Least	1	0.4		
Not applicable	1665	87.8		**Total**	**224**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Reading Standards for Informational Texts

Standard 1 (Key Ideas and Details). Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 464)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	87	4.6	18.8	Most	250	55.1	3.47	0.65
Reviewed	186	9.8	40.1	More	168	37.0		
Introduced	181	9.5	39.0	Less	35	7.7		
Subsequent	10	0.5	2.2	Least	1	.2		
Not applicable	1432	75.5		**Total**	**454**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2 (Key Ideas and Details). Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 434)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	69	3.6	15.9	Most	176	41.6	3.32	0.65
Reviewed	185	9.8	42.6	More	207	48.9		
Introduced	169	8.9	38.9	Less	38	9.0		
Subsequent	11	0.6	2.5	Least	2	.5		
Not applicable	1462	77.1		**Total**	**423**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3 (Key Ideas and Details). Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 426)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	57	3.0	13.4	Most	164	39.8	3.26	0.70
Reviewed	175	9.2	41.1	More	195	47.3		
Introduced	180	9.5	42.3	Less	49	11.9		
Subsequent	14	0.7	3.3	Least	4	1.0		
Not applicable	1470	77.5		**Total**	**412**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 4 (Craft and Structure). Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 452)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	86	4.5	19.0	Most	167	37.9	3.22	0.71
Reviewed	182	9.6	40.3	More	208	47.2		
Introduced	173	9.1	38.3	Less	62	14.1		
Subsequent	11	0.6	2.4	Least	4	.9		
Not applicable	1444	76.1		**Total**	**441**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Craft and Structure). Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 383)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	59	3.1	15.4	Most	156	41.7	3.27	0.71
Reviewed	141	7.4	36.8	More	163	43.6		
Introduced	174	9.2	45.4	Less	54	14.4		
Subsequent	9	0.5	2.3	Least	1	.3		
Not applicable	1513	79.8		**Total**	**374**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Craft and Structure). Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 357)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	34	1.8	9.5	Most	140	40.6	3.22	0.74
Reviewed	148	7.8	41.5	More	143	41.4		
Introduced	163	8.6	45.7	Less	61	17.7		
Subsequent	12	0.6	3.4	Least	1	.3		
Not applicable	1539	81.1		**Total**	**345**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 7 (Integration of Knowledge and Ideas). Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 432)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	54	2.8	12.5	Most	176	42.4	3.23	0.77
Reviewed	139	7.3	32.2	More	165	39.8		
Introduced	222	11.7	51.4	Less	68	16.4		
Subsequent	17	0.9	3.9	Least	6	1.4		
Not applicable	1464	77.2		**Total**	**415**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 8 (Integration of Knowledge and Ideas). Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 154)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	13	0.7	8.4	Most	36	28.3	2.95	0.82
Reviewed	44	2.3	28.6	More	52	40.9		
Introduced	70	3.7	45.5	Less	36	28.3		
Subsequent	27	1.4	17.5	Least	3	2.4		
Not applicable	1742	91.8		**Total**	**127**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9 (Integration of Knowledge and Ideas). Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (= 112)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	10	0.5	8.9	Most	29	31.9	3.01	0.81
Reviewed	38	2.0	33.9	More	35	38.5		
Introduced	43	2.3		Less	26	28.6		
Subsequent	21	1.1	18.8	Least	1	1.1		
Not applicable	1784	94.0		**Total**	**91**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

ELA and Literacy: Reading Standards for Informational Texts

Standard 10 (Range of Reading and Level of Text Complexity). By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 1Standard 2, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (= 279)**
Prerequisite	182	9.6	65.2
Reviewed	68	3.6	24.4
Introduced	25	1.3	9.0
Subsequent	4	0.2	1.4
Not applicable	1617	85.2	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	136	49.5
More	110	40.0
Less	29	10.5
Total	**275**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.39	0.67

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Writing Standards

Standard 1 (Text Types and Purposes). Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 485)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	104	5.5	21.4	Most	332	70.2	3.67	0.53
Reviewed	163	8.6	33.6	More	127	26.8		
Introduced	206	10.9	42.5	Less	14	3.0		
Subsequent	12	0.6	2.5	**Total**	**473**	**100.0**		
Not applicable	1411	74.4						
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 1a (Text Types and Purposes). Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 459)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	69	3.6	15.0	Most	225	51.4	3.42	0.65
Reviewed	159	8.4	34.6	More	175	40.0		
Introduced	210	11.1	45.8	Less	37	8.4		
Subsequent	21	1.1	4.6	Least	1	0.2		
Not applicable	1437	75.8		**Total**	**438**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 1b (Text Types and Purposes). Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 445)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	60	3.2	13.5	Most	197	47.5	3.34	0.71
Reviewed	146	7.7	32.8	More	167	40.2		
Introduced	209	11.0	47.0	Less	48	11.6		
Subsequent	30	1.6	6.7	Least	3	.7		
Not applicable	1451	76.5		**Total**	**415**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 1c (Text Types and Purposes). Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 441)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	105	5.5	23.8	Most	167	39.9	3.23	0.73
Reviewed	176	9.3	39.9	More	185	44.2		
Introduced	138	7.3	31.3	Less	63	15.0		
Subsequent	22	1.2	5.0	Least	4	1.0		
Not applicable	1455	76.7		**Total**	**419**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 1d (Text Types and Purposes). Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 470)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	93	4.9	19.8	Most	158	34.8	3.15	0.74
Reviewed	195	10.3	41.5	More	213	46.9		
Introduced	166	8.8	35.3	Less	77	17.0		
Subsequent	16	0.8	3.4	Least	6	1.3		
Not applicable	1426	75.2		**Total**	**454**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 1e (Text Types and Purposes). Provide a concluding statement or section that follows from and supports the argument presented.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 471)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	103	5.4	21.9	Most	176	38.5	3.19	0.76
Reviewed	195	10.3	41.4	More	195	42.7		
Introduced	159	8.4	33.8	Less	81	17.7		
Subsequent	14	0.7	3.0	Least	5	1.1		
Not applicable	1425	75.1		**Total**	**457**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2 (Text Types and Purposes). Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 470)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	111	5.9	23.6	Most	231	50.7	3.40	0.68
Reviewed	175	9.2	37.2	More	177	38.8		
Introduced	170	9.0	36.2	Less	47	10.3		
Subsequent	14	0.7	3.0	Least	1	.2		
Not applicable	1426	75.2		**Total**	**456**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2a (Text Types and Purposes). Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 454)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	91	4.8	20.0	Most	185	42.2	3.28	0.71
Reviewed	176	9.3	38.8	More	194	44.3		
Introduced	171	9.0	37.7	Less	55	12.6		
Subsequent	16	0.8	3.5	Least	4	.9		
Not applicable	1442	76.0		**Total**	**438**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2b (Text Types and Purposes). Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 460)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	17.8	Most	249	55.6	3.50	0.61
Reviewed	189	10.0	41.1	More	173	38.6		
Introduced	177	9.3	38.5	Less	25	5.6		
Subsequent	12	0.6	2.6	Least	1	.2		
Not applicable	1436	75.7		**Total**	**448**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2c (Text Types and Purposes). Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 451)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	115	6.1	25.5	Most	158	36.5	3.15	0.78
Reviewed	198	10.4	43.9	More	192	44.3		
Introduced	120	6.3	26.6	Less	72	16.6		
Subsequent	18	0.9	4.0	Least	11	2.5		
Not applicable	1445	76.2		**Total**	**433**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2d (Text Types and Purposes). Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 437)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	18.8	Most	114	27.8	2.99	0.79
Reviewed	178	9.4	40.7	More	188	45.9		
Introduced	150	7.9	34.3	Less	97	23.7		
Subsequent	27	1.4	6.2	Least	11	2.7		
Not applicable	1459	76.9		**Total**	**410**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2e (Text Types and Purposes). Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 467)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	17.6	Most	144	32.0	3.08	0.77
Reviewed	207	10.9	44.3	More	203	45.1		
Introduced	161	8.5	34.5	Less	96	21.3		
Subsequent	17	0.9	3.6	Least	7	1.6		
Not applicable	1429	75.3		**Total**	**450**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 2f (Text Types and Purposes). Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 472)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	101	5.3	21.4	Most	159	34.6	3.13	0.77
Reviewed	216	11.4	45.8	More	213	46.3		
Introduced	143	7.5	30.3	Less	77	16.7		
Subsequent	12	0.6	2.5	Least	11	2.4		
Not applicable	1424	75.1		**Total**	**460**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3 (Text Types and Purposes). Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 297)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	76	4.0	25.6	Most	81	28.8	2.87	0.90
Reviewed	92	4.8	31.0	More	99	35.2		
Introduced	113	6.0	38.0	Less	84	29.9		
Subsequent	16	0.8	5.4	Least	17	6.0		
Not applicable	1599	84.3		**Total**	**281**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3a (Text Types and Purposes). Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 304)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	56	3.0	18.4	Most	71	25.6	2.93	0.80
Reviewed	99	5.2	32.6	More	124	44.8		
Introduced	122	6.4	40.1	Less	74	26.7		
Subsequent	27	1.4	8.9	Least	8	2.9		
Not applicable	1592	83.9		**Total**	**277**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3b (Text Types and Purposes). Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 216)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	38	2.0	17.6	Most	29	15.8	2.54	0.89
Reviewed	67	3.5	31.0	More	63	34.2		
Introduced	79	4.2	36.6	Less	71	38.6		
Subsequent	32	1.7	14.8	Least	21	11.4		
Not applicable	1680	88.6		**Total**	**184**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3c (Text Types and Purposes). Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 256)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	46	2.4	18.0	Most	38	16.8	2.69	0.83
Reviewed	89	4.7	34.8	More	95	42.0		
Introduced	91	4.8	35.5	Less	77	34.1		
Subsequent	30	1.6	11.7	Least	16	7.1		
Not applicable	1640	86.5		**Total**	**226**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3d (Text Types and Purposes). Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 304)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	63	3.3	20.7	Most	77	27.4	2.92	0.85
Reviewed	116	6.1	38.2	More	120	42.7		
Introduced	102	5.4	33.6	Less	69	24.6		
Subsequent	23	1.2	7.6	Least	15	5.3		
Not applicable	1592	83.9		**Total**	**281**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 3e (Text Types and Purposes). Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 338)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	78	4.1	23.1	Most	92	28.9	2.96	0.85
Reviewed	127	6.7	37.6	More	137	43.1		
Introduced	113	6.0	33.4	Less	72	22.6		
Subsequent	20	1.1	5.9	Least	17	5.3		
Not applicable	1558	82.1		**Total**	**318**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 4 (Production and Distribution of Writing). Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 484)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	153	8.1	31.6	Most	327	69.1	3.66	0.55
Reviewed	206	10.9	42.6	More	131	27.7		
Introduced	114	6.0	23.6	Less	14	3.0		
Subsequent	11	0.6	2.3	Least	1	0.2		
Not applicable	1412	74.4		**Total**	**473**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Production and Distribution of Writing). Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3, up to and including grades 11–12 on page 54 [of Common Core State Standards document].)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 454)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	125	6.6	27.5	Most	281	63.9	3.56	0.64
Reviewed	196	10.3	43.2	More	126	28.6		
Introduced	119	6.3	26.2	Less	32	7.3		
Subsequent	14	0.7	3.1	Least	1	0.2		
Not applicable	1442	76.0		**Total**	**440**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Production and Distribution of Writing). Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 384)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	90	4.7	23.4	Most	129	35.5	3.09	0.81
Reviewed	132	7.0	34.4	More	145	39.9		
Introduced	141	7.4	36.7	Less	81	22.3		
Subsequent	21	1.1	5.5	Least	8	2.2		
Not applicable	1512	79.7		**Total**	**363**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 7 (Research to Build and Present Knowledge). Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 453)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	63	3.3	13.9	Most	228	55.6	3.49	0.62
Reviewed	153	8.1	33.8	More	156	38.0		
Introduced	194	10.2	42.8	Less	25	6.1		
Subsequent	43	2.3	9.5	Least	1	0.2		
Not applicable	1443	76.1		**Total**	**410**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 8 (Research to Build and Present Knowledge). Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 442)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	69	3.6	15.6	Most	248	62.8	3.55	0.63
Reviewed	145	7.6	32.8	More	117	29.6		
Introduced	181	9.5	41.0	Less	30	7.6		
Subsequent	47	2.5	10.6	**Total**	**395**	**100.0**		
Not applicable	1454	76.6						
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9 (Research to Build and Present Knowledge). Draw evidence from literary or informational texts to support analysis, reflection, and research.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 461)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	65	3.4	14.1	Most	244	56.0	3.47	0.66
Reviewed	179	9.4	38.8	More	158	36.2		
Introduced	192	10.1	41.6	Less	31	7.1		
Subsequent	25	1.3	5.4	Least	3	0.7		
Not applicable	1435	75.6		**Total**	**436**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9a (Research to Build and Present Knowledge). Apply grades 11–12 Reading standards to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth-, and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics").

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 143)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	49	2.6	34.3	Most	35	31.3	2.98	0.85
Reviewed	41	2.2	28.7	More	44	39.3		
Introduced	22	1.2	15.4	Less	29	25.9		
Subsequent	31	1.6	21.7	Least	4	3.6		
Not applicable	1753	92.4		**Total**	**112**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9b (Research to Build and Present Knowledge). Apply grades 11–12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., The Federalist, presidential addresses]").

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 162)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	50	2.6	30.9	Most	44	31.4	3.03	0.82
Reviewed	59	3.1	36.4	More	61	43.6		
Introduced	31	1.6	19.1	Less	30	21.4		
Subsequent	22	1.2	13.6	Least	5	3.6		
Not applicable	1734	91.4		**Total**	**140**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 10 (Range of Writing). Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 438)**
Prerequisite	107	5.6	24.4
Reviewed	166	8.8	37.9
Introduced	145	7.6	33.1
Subsequent	20	1.1	4.6
Not applicable	1458	76.9	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	214	51.2
More	149	35.6
Less	52	12.4
Least	3	0.7
Total	**418**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.37	0.73

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Speaking and Listening Standards

Standard 1 (Comprehension and Collaboration). Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own ideas clearly and persuasively.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1266)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	498	26.3	39.3	Most	336	27.0	3.03	0.74
Reviewed	430	22.7	34.0	More	630	50.7		
Introduced	315	16.6	24.9	Less	252	20.3		
Subsequent	23	1.2	1.8	Least	25	2.0		
Not applicable	631	33.3		**Total**	**1243**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1a (Comprehension and Collaboration). Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1381)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	590	31.1	42.7	Most	680	50.1	3.41	0.67
Reviewed	470	24.8	34.0	More	555	40.9		
Introduced	297	15.7	21.5	Less	114	8.4		
Subsequent	24	1.3	1.7	Least	8	0.6		
Not applicable	516	27.2		**Total**	**1357**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1b (Comprehension and Collaboration). Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1082)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	313	16.5	28.9	Most	278	26.9	3.00	0.76
Reviewed	413	21.8	38.2	More	499	48.3		
Introduced	307	16.2	28.4	Less	237	22.9		
Subsequent	49	2.6	4.5	Least	19	1.8		
Not applicable	815	43.0		**Total**	**1033**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 1c (Comprehension and Collaboration). Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1279)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	306	16.1	23.9	Most	394	32.1	3.13	0.72
Reviewed	473	24.9	37.0	More	622	50.6		
Introduced	450	23.7	35.2	Less	196	15.9		
Subsequent	50	2.6	3.9	Least	17	1.4		
Not applicable	618	32.6		**Total**	**1229**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1d (Comprehension and Collaboration). Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1259)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	252	13.3	20.0	Most	404	34.0	3.15	0.73
Reviewed	458	24.1	36.4	More	570	48.0		
Introduced	478	25.2	38.0	Less	198	16.7		
Subsequent	71	3.7	5.6	Least	16	1.3		
Not applicable	638	33.6		**Total**	**1188**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2 (Comprehension and Collaboration). Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1363)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	277	14.6	20.3	Most	459	35.6	3.18	0.72
Reviewed	459	24.2	33.7	More	614	47.6		
Introduced	555	29.3	40.7	Less	205	15.9		
Subsequent	72	3.8	5.3	Least	13	1.0		
Not applicable	534	28.1		**Total**	**1291**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 3 (Comprehension and Collaboration). Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 944)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	173	9.1	18.3	Most	224	26.3	2.95	0.79
Reviewed	331	17.4	35.1	More	382	44.8		
Introduced	348	18.3	36.9	Less	226	26.5		
Subsequent	92	4.8	9.7	Least	20	2.3		
Not applicable	953	50.2		**Total**	**852**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4 (Presentation of Knowledge and Ideas). Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1259)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	261	13.8	20.7	Most	428	36.5	3.18	0.73
Reviewed	443	23.4	35.2	More	533	45.5		
Introduced	467	24.6	37.1	Less	200	17.1		
Subsequent	88	4.6	7.0	Least	10	0.9		
Not applicable	638	33.6		**Total**	**1171**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Presentation of Knowledge and Ideas). Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1081)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	212	11.2	19.6	Most	199	20.6	2.76	0.83
Reviewed	360	19.0	33.3	More	387	40.0		
Introduced	395	20.8	36.5	Less	334	34.5		
Subsequent	114	6.0	10.5	Least	47	4.9		
Not applicable	816	43.0		**Total**	**967**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Presentation of Knowledge and Ideas). Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 [of Common Core State Standards document] for specific expectations.)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 944)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	382	20.1	40.5	Most	221	25.6	2.93	0.80
Reviewed	295	15.6	31.3	More	392	45.4		
Introduced	187	9.9	19.8	Less	221	25.6		
Subsequent	80	4.2	8.5	Least	30	3.5		
Not applicable	953	50.2		**Total**	**864**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Language Standards

Standard 1 (Conventions of Standard English). Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1500)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	1093	57.6	72.9	Most	723	49.0	3.31	0.78
Reviewed	310	16.3	20.7	More	519	35.2		
Introduced	72	3.8	4.8	Less	207	14.0		
Subsequent	25	1.3	1.7	Least	26	1.8		
Not applicable	397	20.9		**Total**	**1475**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1a (Conventions of Standard English). Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1070)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	420	22.1	39.3	Most	251	24.3	2.82	0.87
Reviewed	382	20.1	35.7	More	406	39.3		
Introduced	230	12.1	21.5	Less	311	30.1		
Subsequent	38	2.0	3.6	Least	64	6.2		
Not applicable	827	43.6		**Total**	**1032**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1b (Conventions of Standard English). Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage) as needed.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 907)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	431	22.7	47.5	Most	197	22.9	2.77	0.88
Reviewed	266	14.0	29.3	More	328	38.1		
Introduced	165	8.7	18.2	Less	275	31.9		
Subsequent	45	2.4	5.0	Least	62	7.2		
Not applicable	990	52.2		**Total**	**862**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 2 (Conventions of Standard English). Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1450)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	1058	55.8	73.0	Most	614	43.0	3.16	0.87
Reviewed	298	15.7	20.6	More	482	33.8		
Introduced	72	3.8	5.0	Less	275	19.3		
Subsequent	22	1.2	1.5	Least	57	4.0		
Not applicable	447	23.6		**Total**	**1428**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2a (Conventions of Standard English). Observe hyphenation conventions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1028)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	671	35.4	65.3	Most	152	15.3	2.33	0.96
Reviewed	234	12.3	22.8	More	215	21.7		
Introduced	88	4.6	8.6	Less	431	43.4		
Subsequent	35	1.8	3.4	Least	195	19.6		
Not applicable	869	45.8		**Total**	**993**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2b (Conventions of Standard English). Spell correctly.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1489)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	1123	59.2	75.4	Most	584	39.9	3.11	0.88
Reviewed	275	14.5	18.5	More	528	36.0		
Introduced	67	3.5	4.5	Less	281	19.2		
Subsequent	24	1.3	1.6	Least	72	4.9		
Not applicable	408	21.5		**Total**	**1465**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 3 (Knowledge of Language). Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1201)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	577	30.4	48.0	Most	364	31.2	3.05	0.79
Reviewed	377	19.9	31.4	More	526	45.0		
Introduced	214	11.3	17.8	Less	246	21.1		
Subsequent	33	1.7	2.7	Least	32	2.7		
Not applicable	696	36.7		**Total**	**1168**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 3a (Knowledge of Language). Vary syntax for effect, consulting references (e.g., Tufte's Artful Sentences) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 848)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	383	20.2	45.2	Most	136	17.4	2.68	0.84
Reviewed	250	13.2	29.5	More	307	39.4		
Introduced	147	7.7	17.3	Less	286	36.7		
Subsequent	68	3.6	8.0	Least	51	6.5		
Not applicable	1049	55.3		**Total**	**780**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4 (Vocabulary Acquisition and Use). Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11-12 reading and content, choosing flexibly from a range of strategies.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1229)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	726	38.3	59.1	Most	359	30.0	3.01	0.81
Reviewed	331	17.4	26.9	More	533	44.5		
Introduced	141	7.4	11.5	Less	268	22.4		
Subsequent	31	1.6	2.5	Least	38	3.2		
Not applicable	668	35.2		**Total**	**1198**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4a (Vocabulary Acquisition and Use). Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1271)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	795	41.9	62.5	Most	359	28.8	3.00	0.80
Reviewed	340	17.9	26.8	More	562	45.1		
Introduced	110	5.8	8.7	Less	289	23.2		
Subsequent	26	1.4	2.0	Least	35	2.8		
Not applicable	626	33.0		**Total**	**1245**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4b (Vocabulary Acquisition and Use). Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1011)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	669	35.3	66.2	Most	199	20.3	2.75	0.85
Reviewed	240	12.7	23.7	More	401	40.9		
Introduced	72	3.8	7.1	Less	316	32.2		
Subsequent	30	1.6	3.0	Least	65	6.6		
Not applicable	886	46.7		**Total**	**981**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4c (Vocabulary Acquisition and Use). Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1113)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	688	36.3	61.8	Most	271	25.1	2.82	0.89
Reviewed	281	14.8	25.2	More	423	39.1		
Introduced	112	5.9	10.1	Less	306	28.3		
Subsequent	32	1.7	2.9	Least	81	7.5		
Not applicable	784	41.3		**Total**	**1081**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 4d (Vocabulary Acquisition and Use). Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1115)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	707	37.3	63.4	Most	245	22.5	2.79	0.87
Reviewed	282	14.9	25.3	More	449	41.3		
Introduced	98	5.2	8.8	Less	314	28.9		
Subsequent	28	1.5	2.5	Least	79	7.3		
Not applicable	782	41.2		**Total**	**1087**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Vocabulary Acquisition and Use). Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1014)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	514	27.1	50.7	Most	215	22.1	2.79	0.86
Reviewed	342	18.0	33.7	More	397	40.7		
Introduced	119	6.3	11.7	Less	302	31.0		
Subsequent	39	2.1	3.8	Least	61	6.3		
Not applicable	883	46.5		**Total**	**975**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5a (Vocabulary Acquisition and Use). Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 797)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	382	20.1	47.9	Most	154	20.5	2.66	0.91
Reviewed	257	13.5	32.2	More	261	34.8		
Introduced	111	5.9	13.9	Less	264	35.2		
Subsequent	47	2.5	5.9	Least	72	9.6		
Not applicable	1100	58.0		**Total**	**751**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5b (Vocabulary Acquisition and Use). Analyze nuances in the meaning of words with similar denotations.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 909)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	414	21.8	45.5	Most	155	17.9	2.33	0.87
Reviewed	329	17.3	36.2	More	352	40.6		
Introduced	124	6.5	13.6	Less	281	32.4		
Subsequent	42	2.2	4.6	Least	79	9.1		
Not applicable	988	52.1		**Total**	**867**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Vocabulary Acquisition and Use). Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1473)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	656	34.6	44.5	Most	640	44.4	3.33	0.69
Reviewed	443	23.4	30.1	More	640	44.4		
Introduced	341	18.0	23.2	Less	149	10.3		
Subsequent	33	1.7	2.2	Least	11	0.8		
Not applicable	424	22.4		**Total**	**1440**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Reading Standards in History/Social Studies

Standard 1 (Key Ideas and Details). Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 537)**
Prerequisite	120	6.3	22.3
Reviewed	222	11.7	41.3
Introduced	178	9.4	33.1
Subsequent	17	0.9	3.2
Not applicable	1359	71.6	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	272	52.3
More	200	38.5
Less	45	8.7
Least	3	0.6
Total	**520**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.43	0.67

Standard 2 (Key Ideas and Details). Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 547)**
Prerequisite	156	8.2	28.5
Reviewed	229	12.1	41.9
Introduced	150	7.9	27.4
Subsequent	12	0.6	2.2
Not applicable	1349	71.1	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	297	55.5
More	193	36.1
Less	44	8.2
Least	1	0.2
Total	**535**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.47	0.65

Standard 3 (Key Ideas and Details). Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 512)**
Prerequisite	113	6.0	22.1
Reviewed	199	10.5	38.9
Introduced	179	9.4	35.0
Subsequent	21	1.1	4.1
Not applicable	1384	73.0	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	212	43.2
More	204	41.5
Less	70	14.3
Least	5	1.0
Total	**491**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.27	0.74

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 4 (Craft and Structure). Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines faction in Federalist No. 10).

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 490)**
Prerequisite	140	7.4	28.6
Reviewed	201	10.6	41.0
Introduced	137	7.2	28.0
Subsequent	12	0.6	2.4
Not applicable	1406	74.1	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	141	29.5
More	252	52.7
Less	78	16.3
Least	7	1.5
Total	**478**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.10	0.71

Standard 5 (Craft and Structure). Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 430)**
Prerequisite	101	5.3	23.5
Reviewed	157	8.3	36.5
Introduced	140	7.4	32.6
Subsequent	32	1.7	7.4
Not applicable	1466	77.3	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	95	23.9
More	181	45.5
Less	112	28.1
Least	10	2.5
Total	**398**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.91	0.78

Standard 6 (Craft and Structure). Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 464)**
Prerequisite	84	4.4	18.1
Reviewed	179	9.4	38.6
Introduced	172	9.1	37.1
Subsequent	29	1.5	6.3
Not applicable	1432	75.5	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	174	40.0
More	195	44.8
Less	55	12.6
Least	11	2.5
Total	**435**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.22	0.76

Standard 7 (Integration of Knowledge and Ideas). Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 521)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	109	5.7	20.9	Most	193	38.8	3.21	0.74
Reviewed	197	10.4	37.8	More	222	44.7		
Introduced	191	10.1	36.7	Less	76	15.3		
Subsequent	24	1.3	4.6	Least	6	1.2		
Not applicable	1375	72.5		**Total**	**497**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 8 (Integration of Knowledge and Ideas). Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 500)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	88	4.6	17.6	Most	195	41.8	3.24	0.76
Reviewed	198	10.4	39.6	More	197	42.3		
Introduced	180	9.5	36.0	Less	66	14.2		
Subsequent	34	1.8	6.8	Least	8	1.7		
Not applicable	1396	73.6		**Total**	**466**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9 (Integration of Knowledge and Ideas). Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 515)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	94	5.0	18.3	Most	206	43.5	3.30	0.70
Reviewed	186	9.8	36.1	More	206	43.5		
Introduced	194	10.2	37.7	Less	60	12.7		
Subsequent	41	2.2	8.0	Least	2	0.4		
Not applicable	1381	72.8		**Total**	**474**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

ELA and Literacy: Reading Standards in History/Social Studies

Standard 10 (Range of Reading and Level of Text Complexity). By the end of grade 12, read and comprehend history/social studies texts in the grades 11–12 text complexity band independently and proficiently.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 415)**
Prerequisite	299	15.8	72.0
Reviewed	87	4.6	21.0
Introduced	22	1.2	5.3
Subsequent	7	0.4	1.7
Not applicable	1481	78.1	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	243	59.6
More	131	32.1
Less	29	7.1
Least	5	1.2
Total	**408**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.50	0.68

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Reading Standards in Science and Technical Subjects

Standard 1 (Key Ideas and Details). Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 849)**
Prerequisite	221	11.6	26.0
Reviewed	274	14.4	32.3
Introduced	302	15.9	35.6
Subsequent	52	2.7	6.1
Not applicable	1046	55.1	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	223	28.0
More	403	50.6
Less	148	18.6
Least	23	2.9
Total	**797**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.04	0.76

Standard 2 (Key Ideas and Details). Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 974)**
Prerequisite	325	17.1	33.4
Reviewed	342	18.0	35.1
Introduced	289	15.2	29.7
Subsequent	18	0.9	1.8
Not applicable	921	48.6	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	448	46.9
More	413	43.2
Less	86	9.0
Least	9	0.9
Total	**956**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.36	0.68

Standard 3 (Key Ideas and Details). Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 913)**
Prerequisite	177	9.3	19.4
Reviewed	329	17.3	36.0
Introduced	386	20.3	42.3
Subsequent	21	1.1	2.3
Not applicable	982	51.8	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	574	64.3
More	270	30.3
Less	45	5.0
Least	3	0.3
Total	**892**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.59	0.60

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.

[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 4 (Craft and Structure). Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 952)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	278	14.7	29.2	Most	514	54.5	3.48	0.63
Reviewed	337	17.8	35.4	More	371	39.3		
Introduced	328	17.3	34.5	Less	53	5.6		
Subsequent	9	0.5	0.9	Least	5	0.5		
Not applicable	943	49.7		**Total**	**943**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Craft and Structure). Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 907)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	300	15.8	33.1	Most	287	32.3	3.10	0.76
Reviewed	318	16.8	35.1	More	421	47.4		
Introduced	271	14.3	29.9	Less	164	18.4		
Subsequent	18	0.9	2.0	Least	17	1.9		
Not applicable	988	52.1		**Total**	**889**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Craft and Structure). Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 797)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	197	10.4	24.7	Most	188	25.0	2.92	0.81
Reviewed	285	15.0	35.8	More	344	45.8		
Introduced	269	14.2	33.8	Less	189	25.2		
Subsequent	46	2.4	5.8	Least	30	4.0		
Not applicable	1098	57.9		**Total**	**751**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 7 (Integration of Knowledge and Ideas). Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 943)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	193	10.2	20.5	Most	296	32.6	3.10	0.77
Reviewed	332	17.5	35.2	More	423	46.5		
Introduced	384	20.2	40.7	Less	172	18.9		
Subsequent	34	1.8	3.6	Least	18	2.0		
Not applicable	952	50.2		**Total**	**909**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 8 (Integration of Knowledge and Ideas). Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying data when possible and corroborating or challenging conclusions with other sources of information.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 859)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	127	6.7	14.8	Most	360	45.6	3.28	0.76
Reviewed	295	15.6	34.3	More	299	37.8		
Introduced	368	19.4	42.8	Less	123	15.6		
Subsequent	69	3.6	8.0	Least	8	1.0		
Not applicable	1036	54.6		**Total**	**790**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 9 (Integration of Knowledge and Ideas). Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 910)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	134	7.1	14.7	Most	362	43.1	3.28	0.74
Reviewed	324	17.1	35.6	More	366	43.6		
Introduced	381	20.1	41.9	Less	95	11.3		
Subsequent	71	3.7	7.8	Least	16	1.9		
Not applicable	985	51.9		**Total**	**839**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Standard 10 (Range of Reading and Level of Text Complexity). By the end of Grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 870)**
Prerequisite	573	30.2	65.9
Reviewed	198	10.4	22.8
Introduced	81	4.3	9.3
Subsequent	18	0.9	2.1
Not applicable	1025	54.0	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	468	54.9
More	336	39.4
Less	45	5.3
Least	3	0.4
Total	**852**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.49	0.61

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Writing Standards in History/Social Studies, Science, and Technical Subjects

Standard 1 (Text Types and Purposes). Write arguments focused on discipline-specific content.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1088)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	193	10.2	17.7	Most	413	41.2	3.24	0.73
Reviewed	350	18.5	32.2	More	427	42.6		
Introduced	459	24.2	42.2	Less	154	15.4		
Subsequent	86	4.5	7.9	Least	8	0.8		
Not applicable	809	42.6		**Total**	**1002**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1a (Text Types and Purposes). Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1049)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	159	8.4	15.2	Most	344	36.4	3.17	0.74
Reviewed	351	18.5	33.5	More	433	45.8		
Introduced	436	23.0	41.6	Less	157	16.6		
Subsequent	103	5.4	9.8	Least	12	1.3		
Not applicable	848	44.7		**Total**	**946**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1b (Text Types and Purposes). Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 998)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	140	7.4	14.0	Most	258	30.4	3.07	0.76
Reviewed	302	15.9	30.3	More	412	48.5		
Introduced	407	21.5	40.8	Less	159	18.7		
Subsequent	149	7.9	14.9	Least	20	2.4		
Not applicable	899	47.4		**Total**	**849**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 1c (Text Types and Purposes). Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 985)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	232	12.2	23.6	Most	187	21.4	2.86	0.78
Reviewed	316	16.7	32.1	More	403	46.2		
Introduced	324	17.1	32.9	Less	258	29.6		
Subsequent	113	6.0	11.5	Least	24	2.8		
Not applicable	912	48.1		**Total**	**872**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1d (Text Types and Purposes). Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1058)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	245	12.9	23.2	Most	231	24.0	2.89	0.82
Reviewed	350	18.5	33.1	More	440	45.7		
Introduced	367	19.3	34.7	Less	245	25.5		
Subsequent	96	5.1	9.1	Least	46	4.8		
Not applicable	839	44.2		**Total**	**962**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 1e (Text Types and Purposes). Provide a concluding statement or section that follows from or supports the argument presented.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1069)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	278	14.7	26.0	Most	294	29.4	3.05	0.76
Reviewed	386	20.3	36.1	More	491	49.1		
Introduced	336	17.7	31.4	Less	190	19.0		
Subsequent	69	3.6	6.5	Least	25	2.5		
Not applicable	828	43.6		**Total**	**1000**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2 (Text Types and Purposes). Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 993)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	212	11.2	21.3	Most	249	27.5	3.00	0.78
Reviewed	335	17.7	33.7	More	436	48.2		
Introduced	357	18.8	36.0	Less	190	21.0		
Subsequent	89	4.7	9.0	Least	29	3.2		
Not applicable	904	47.7		**Total**	**904**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2a (Text Types and Purposes). Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1036)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	206	10.9	19.9	Most	290	31.9	3.10	0.76
Reviewed	341	18.0	32.9	More	433	47.7		
Introduced	361	19.0	34.8	Less	168	18.5		
Subsequent	128	6.7	12.4	Least	17	1.9		
Not applicable	861	45.4		**Total**	**908**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2b (Text Types and Purposes). Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1038)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	225	11.9	21.7	Most	311	33.4	3.13	0.74
Reviewed	375	19.8	36.1	More	439	47.1		
Introduced	332	17.5	32.0	Less	172	18.5		
Subsequent	106	5.6	10.2	Least	10	1.1		
Not applicable	859	45.3		**Total**	**932**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2c (Text Types and Purposes). Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 890)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	307	16.2	34.5	Most	143	18.4	2.73	0.81
Reviewed	286	15.1	32.1	More	321	41.3		
Introduced	184	9.7	20.7	Less	275	35.4		
Subsequent	113	6.0	12.7	Least	38	4.9		
Not applicable	1007	53.1		**Total**	**777**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2d (Text Types and Purposes). Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 937)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	231	12.2	24.7	Most	194	23.4	2.86	0.84
Reviewed	303	16.0	32.3	More	369	44.5		
Introduced	295	15.6	31.5	Less	221	26.7		
Subsequent	108	5.7	11.5	Least	45	5.4		
Not applicable	960	50.6		**Total**	**829**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2e (Text Types and Purposes). Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1069)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	297	15.7	27.8	Most	285	28.8	3.01	0.79
Reviewed	385	20.3	36.0	More	454	45.9		
Introduced	308	16.2	28.8	Less	222	22.4		
Subsequent	79	4.2	7.4	Least	29	2.9		
Not applicable	828	43.6		**Total**	**990**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

For the Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects, the third College and Career Readiness anchor standard is listed as not applicable as a separate requirement.

Standard 4 (Production and Distribution of Writing). Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1142)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	449	23.7	39.3	Most	449	41.0	3.22	0.76
Reviewed	394	20.8	34.5	More	459	42.0		
Introduced	251	13.2	22.0	Less	169	15.4		
Subsequent	48	2.5	4.2	Least	17	1.6		
Not applicable	755	39.8		**Total**	**1094**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5 (Production and Distribution of Writing). Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 954)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	328	17.3	34.4	Most	271	31.8	3.05	0.80
Reviewed	346	18.2	36.3	More	373	43.7		
Introduced	179	9.4	18.8	Less	187	21.9		
Subsequent	101	5.3	10.6	Least	22	2.6		
Not applicable	943	49.7		**Total**	**853**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 6 (Production and Distribution of Writing). Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 897)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	222	11.7	24.7	Most	211	26.4	2.93	0.82
Reviewed	302	15.9	33.7	More	351	43.9		
Introduced	275	14.5	30.7	Less	206	25.8		
Subsequent	98	5.2	10.9	Least	31	3.9		
Not applicable	1000	52.7		**Total**	**799**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 7 (Research to Build and Present Knowledge). Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1020)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	147	7.7	14.4	Most	288	32.9	3.10	0.77
Reviewed	298	15.7	29.2	More	409	46.7		
Introduced	431	22.7	42.3	Less	160	18.3		
Subsequent	144	7.6	14.1	Least	19	2.2		
Not applicable	877	46.2		**Total**	**876**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 8 (Research to Build and Present Knowledge). Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 993)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	180	9.5	18.1	Most	288	34.5	3.12	0.78
Reviewed	329	17.3	33.1	More	376	45.1		
Introduced	325	17.1	32.7	Less	149	17.9		
Subsequent	159	8.4	16.0	Least	21	2.5		
Not applicable	904	47.7		**Total**	**834**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 9 (Research to Build and Present Knowledge). Draw evidence from informational texts to support analysis, reflection, and research.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1086)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	242	12.8	22.3	Most	352	36.3	3.16	0.76
Reviewed	382	20.1	35.2	More	441	45.5		
Introduced	345	18.2	31.8	Less	159	16.4		
Subsequent	117	6.2	10.8	Least	17	1.8		
Not applicable	811	42.8		**Total**	**969**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 10 (Range of Writing). Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 834)**
Prerequisite	224	11.8	26.9
Reviewed	255	13.4	30.6
Introduced	244	12.9	29.3
Subsequent	111	5.9	13.3
Not applicable	1063	56.0	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	205	28.4
More	319	44.1
Less	181	25.0
Least	18	2.5
Total	**723**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.98	0.80

[a] Respondents completed an importance rating if they indicated the content of the standard was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b] The valid percent indicates percent of respondents of those who indicated the standard was applicable.
[c] The mean importance rating is calculated by assigning the following values to the ordinal scale: least=1; less=2; more=3; most=4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Appendix F presents additional information on respondents' applicability ratings in mathematics to supplement the data presented in Chapter 4. The first set of tables show the number of standards that respondents rated as applicable in each mathematics conceptual category and for the Mathematical Practices (Tables F1 through F6). Table F7 shows applicability information by content area, specifically the number of respondents in each content area who rated at least one standard in a conceptual category as applicable. Table F8 presents the percent of responses that fall into each of the four applicable categories, by category and for all the categories and the Mathematical Practices combined.

Table F1. Number of Standard Statements Rated as Applicable for Number and Quantity Conceptual Category

Number of statements (out of 32)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 797)
1–8	380	20.0	47.7
9–16	149	7.9	18.7
17–24	83	4.4	10.4
25–32	185	9.8	23.2
Total	**797**	**42.0**	**100.0**

Table F2. Number of Standard Statements Rated as Applicable for Algebra Conceptual Category

Number of statements (out of 34)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 793)
1–8	154	8.1	19.4
9–16	195	10.3	24.6
17–24	136	7.2	17.2
25–34	308	16.2	38.8
Total	**793**	**41.8**	**100.0**

Table F3. Number of Standard Statements Rated as Applicable for Functions Conceptual Category

Number of statements (out of 45)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 606)
1–11	119	6.3	19.6
12–22	141	7.4	23.3
23–33	97	5.1	16.0
34–45	249	13.1	41.1
Total	**606**	**31.9**	**100.0**

Table F4. Number of Standard Statements Rated as Applicable for Geometry Conceptual Category

Number of statements (out of 45)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 335)
1–11	139	7.3	41.5
12–22	85	4.5	25.4
23–33	36	1.9	10.7
34–45	75	4.0	22.4
Total	**335**	**17.7**	**100.0**

Table F5. Number of Standard Statements Rated as Applicable for Statistics and Probability Conceptual Category

Number of statements (out of 36)	Number of respondents	Percent of all respondents (*n* = 1897)	Percent of respondents who rated any standard in strand (*n* = 751)
1–9	208	11.0	27.7
10–18	198	10.4	26.4
19–27	97	5.1	12.9
28–36	248	13.1	33.0
Total	**751**	**39.6**	**100.0**

Table F6. Number of Standard Statements Rated as Applicable for Standards for Mathematical Practice

Number of statements (out of 8)	Number of respondents	Percent of all respondents (n = 1897)	Percent of respondents who rated any standard in strand (n = 1380)
1	68	3.6	4.9
2	67	3.5	4.9
3	71	3.7	5.1
4	63	3.3	4.6
5	82	4.3	5.9
6	107	5.6	7.8
7	144	7.6	10.4
8	778	41.0	56.4
Total	**1380**	**72.7**	**100.0**

Table F7. Number of Respondents Who Rated At Least One Standard in Conceptual Category as Applicable, by Subject Area

Common Core mathematics conceptual category	ELA (*n* = 312)		Mathematics (*n* = 302)		Science (*n* = 281)		Social science (*n* = 420)		Business management (*n* = 243)		Computer technology (*n* = 153)		Healthcare (*n* = 186)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Number and Quantity	1	0.3	280	92.7	237	84.3	60	14.3	76	31.3	75	49.0	68	36.6
Algebra	0	0.0	285	94.4	215	76.5	59	14.0	83	34.2	86	56.2	65	34.9
Functions	0	0.0	269	89.1	158	56.2	52	12.4	27	11.1	81	52.9	19	10.2
Geometry	0	0.0	152	50.3	129	45.9	14	3.3	9	3.7	25	16.3	6	3.2
Statistics and Probability	8	2.6	148	49.0	212	75.4	185	44.0	84	34.6	48	31.4	66	35.5
Mathematical Practices	68	21.8	302	100.0	274	97.5	247	58.8	188	77.4	146	95.4	155	83.3

Appendix F

Tables F8. Percent of Responses in Four Applicability Categories Across Each Conceptual Category

Conceptual category (number of respondents)	Number of Ratings	Percent				
		Prerequisite	Reviewed	Introduced	Subsequent	Total
Number and Quantity (797)	10781	26.8	24.0	23.8	25.4	100.0
Algebra (793)	15618	41.9	31.9	17.3	8.9	100.0
Functions (606)	16285	29.0	30.4	27.4	13.2	100.0
Geometry (335)	6498	53.1	21.0	12.6	13.3	100.0
Statistics and Probability (751)	14670	13.4	16.5	40.6	29.5	100.0
Mathematical Practices (1380)	8951	29.1	37.9	26.4	6.6	100.0
All categories (1418)	**72803**	**30.5**	**27.0**	**25.9**	**16.6**	**100.0**

Appendix F

Appendix G provides descriptive statistics for the individual ratings of every standard statement in the Common Core standards for mathematics. Recall that, for the purposes of the study, respondents rated sub-standards and standards as though they were on the same level; therefore, the mathematics standards comprised 200 ratable statements.

Mathematical Practices

Standard 1. Make sense of problems

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1166)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	387	20.4	33.2	Most	672	59.9	3.49	0.71
Reviewed	460	24.2	39.5	More	338	30.2		
Introduced	274	14.4	23.5	Less	94	8.4		
Subsequent	45	2.4	3.9	Least	17	1.5		
Not applicable	731	38.5		**Total**	**1121**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 2. Reason abstractly and quantitatively

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1205)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	336	17.7	27.9	Most	581	50.8	3.36	0.75
Reviewed	457	24.1	37.9	More	408	35.7		
Introduced	351	18.5	29.1	Less	138	12.1		
Subsequent	61	3.2	5.1	Least	17	1.5		
Not applicable	692	36.5		**Total**	**1144**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 3. Construct and critique arguments

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1183)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	269	14.2	22.7	Most	330	31.0	3.07	0.77
Reviewed	414	21.8	35.0	More	502	47.2		
Introduced	381	20.1	32.2	Less	210	19.7		
Subsequent	119	6.3	10.1	Least	22	2.1		
Not applicable	714	37.6		**Total**	**1064**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Standard 4. Model

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1132)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	280	14.8	24.7	Most	459	44.1	3.25	0.78
Reviewed	418	22.0	36.9	More	409	39.3		
Introduced	342	18.0	30.2	Less	150	14.4		
Subsequent	92	4.8	8.1	Least	22	2.1		
Not applicable	765	40.3		**Total**	**1040**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 5. Use appropriate tools

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1129)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	322	17.0	28.5	Most	412	39.3	3.17	0.80
Reviewed	403	21.2	35.7	More	434	41.4		
Introduced	324	17.1	28.7	Less	173	16.5		
Subsequent	80	4.2	7.1	Least	30	2.9		
Not applicable	768	40.5		**Total**	**1049**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 6. Attend to precision

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1185)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	355	18.7	30.0	Most	499	44.3	3.28	0.74
Reviewed	482	25.4	40.7	More	450	40.0		
Introduced	289	15.2	24.4	Less	167	14.8		
Subsequent	59	3.1	5.0	Least	10	0.9		
Not applicable	712	37.5		**Total**	**1126**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 7. Look for and use structure

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 1005)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	367	19.3	36.5	Most	365	38.7	3.14	0.82
Reviewed	378	19.9	37.6	More	371	39.3		
Introduced	198	10.4	19.7	Less	182	19.3		
Subsequent	62	3.3	6.2	Least	25	2.7		
Not applicable	892	47.0		**Total**	**943**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Standard 8. Look for and express regularity in repeated reasoning

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 946)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	290	15.3	30.7	Most	268	30.8	3.02	0.81
Reviewed	376	19.8	39.7	More	383	44.0		
Introduced	205	10.8	21.7	Less	193	22.2		
Subsequent	75	4.0	7.9	Least	27	3.1		
Not applicable	951	50.1		**Total**	**871**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice.
Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.
[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.
[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.
[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Number and Quantity

The Real Number System: Standard 1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)^3}$ to hold, so $(5^{1/3})^3$ must equal 5.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 494)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	270	14.2	54.7	Most	155	33.0	3.00	0.86
Reviewed	141	7.4	28.5	More	182	38.8		
Introduced	58	3.1	11.7	Less	111	23.7		
Subsequent	25	1.3	5.1	Least	21	4.5		
Not applicable	1403	74.0		**Total**	**469**	**100.0**		
Total	1897	100.0	100.0					

The Real Number System: Standard 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 512)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	263	13.9	51.4	Most	173	35.5	3.00	0.92
Reviewed	161	8.5	31.4	More	173	35.5		
Introduced	64	3.4	12.5	Less	111	22.7		
Subsequent	24	1.3	4.7	Least	31	6.4		
Not applicable	1385	73.0		**Total**	**488**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Real Number System: Standard 3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 383)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	207	10.9	54.0	Most	67	19.3	2.61	0.89
Reviewed	97	5.1	25.3	More	108	31.1		
Introduced	43	2.3	11.2	Less	143	41.2		
Subsequent	36	1.9	9.4	Least	29	8.4		
Not applicable	1514	79.8		**Total**	**347**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Mathematics: Number and Quantity

Quantities: Standard 1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 777)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	256	13.5	32.9	Most	341	44.5	3.25	0.77
Reviewed	344	18.1	44.3	More	284	37.1		
Introduced	166	8.8	21.4	Less	133	17.4		
Subsequent	11	0.6	1.4	Least	8	1.0		
Not applicable	1120	59.0		**Total**	**766**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Quantities: Standard 2. Define appropriate quantities for the purpose of descriptive modeling.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 724)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	193	10.2	26.7	Most	232	33.1	3.07	0.79
Reviewed	317	16.7	43.8	More	300	42.9		
Introduced	190	10.0	26.2	Less	153	21.9		
Subsequent	24	1.3	3.3	Least	15	2.1		
Not applicable	1173	61.8		**Total**	**700**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Quantities: Standard 3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 713)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	184	9.7	25.8	Most	204	29.9	2.97	0.85
Reviewed	303	16.0	42.5	More	286	41.9		
Introduced	196	10.3	27.5	Less	161	23.6		
Subsequent	30	1.6	4.2	Least	32	4.7		
Not applicable	1184	62.4		**Total**	**683**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b being real.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 301)**
Prerequisite	110	5.8	36.5
Reviewed	75	4.0	24.9
Introduced	66	3.5	21.9
Subsequent	50	2.6	16.6
Not applicable	1596	84.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	58	23.1
More	80	31.9
Less	90	35.9
Least	23	9.2
Total	**251**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.69	0.93

The Complex Number System: Standard 2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 294)**
Prerequisite	111	5.9	37.8
Reviewed	66	3.5	22.4
Introduced	65	3.4	22.1
Subsequent	52	2.7	17.7
Not applicable	1603	84.5	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	55	22.7
More	84	34.7
Less	80	33.1
Least	23	9.5
Total	**242**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.71	0.92

The Complex Number System: Standard 3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 274)**
Prerequisite	90	4.7	32.8
Reviewed	61	3.2	22.3
Introduced	65	3.4	23.7
Subsequent	58	3.1	21.2
Not applicable	1623	85.6	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	45	20.7
More	68	31.3
Less	81	37.3
Least	23	10.6
Total	**217**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.62	0.93

The Complex Number System: Standard 4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 225)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	65	3.4	28.9	Most	22	17.1	2.48	0.94
Reviewed	26	1.4	11.6	More	37	28.7		
Introduced	38	2.0	16.9	Less	51	39.5		
Subsequent	96	5.1	42.7	Least	19	14.7		
Not applicable	1672	88.1		**Total**	**129**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(1 - \sqrt{3}i)^3 = 8$ because $(1 - \sqrt{3}i)$ has modulus 2 and argument 120°.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 218)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	64	3.4	29.4	Most	21	16.8	2.50	0.91
Reviewed	25	1.3	11.5	More	36	28.8		
Introduced	36	1.9	16.5	Less	53	42.4		
Subsequent	93	4.9	42.7	Least	15	12.0		
Not applicable	1679	88.5		**Total**	**125**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 241)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	66	3.5	27.4	Most	22	14.5	2.60	0.83
Reviewed	44	2.3	18.3	More	59	38.8		
Introduced	42	2.2	17.4	Less	59	38.8		
Subsequent	89	4.7	36.9	Least	12	7.9		
Not applicable	1656	87.3		**Total**	**152**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 7. Solve quadratic equations with real coefficients that have complex solutions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 348)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	131	6.9	37.6	Most	89	29.0	2.91	0.89
Reviewed	102	5.4	29.3	More	121	39.4		
Introduced	73	3.8	21.0	Less	78	25.4		
Subsequent	42	2.2	12.1	Least	19	6.2		
Not applicable	1549	81.7		**Total**	**307**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 8. (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x – 2i)$.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 275)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	86	4.5	31.3	Most	46	21.5	2.66	0.91
Reviewed	57	3.0	20.7	More	69	32.2		
Introduced	71	3.7	25.8	Less	80	37.4		
Subsequent	61	3.2	22.2	Least	19	8.9		
Not applicable	1622	85.5		**Total**	**214**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

The Complex Number System: Standard 9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 328)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	132	7.0	40.2	Most	72	25.6	2.79	0.91
Reviewed	64	3.4	19.5	More	100	35.6		
Introduced	85	4.5	25.9	Less	88	31.3		
Subsequent	47	2.5	14.3	Least	21	7.5		
Not applicable	1569	82.7		**Total**	**281**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, **|v|**, **||v||**, *v*).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 326)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	48	2.5	14.7	Most	82	38.3	3.02	0.92
Reviewed	61	3.2	18.7	More	66	30.8		
Introduced	105	5.5	32.2	Less	55	25.7		
Subsequent	112	5.9	34.4	Least	11	5.1		
Not applicable	1571	82.8		**Total**	**214**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 306)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	44	2.3	14.4	Most	74	38.9	3.01	0.95
Reviewed	59	3.1	19.3	More	56	29.5		
Introduced	87	4.6	28.4	Less	48	25.3		
Subsequent	116	6.1	37.9	Least	12	6.3		
Not applicable	1591	83.9		**Total**	**190**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 315)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	41	2.2	13.0	Most	86	41.7	3.09	0.94
Reviewed	64	3.4	20.3	More	67	32.5		
Introduced	101	5.3	32.1	Less	39	18.9		
Subsequent	109	5.7	34.6	Least	14	6.8		
Not applicable	1582	83.4		**Total**	**206**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 4. (+) Add and subtract vectors.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 324)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	52	2.7	16.0	Most	87	42.6	3.02	1.00
Reviewed	60	3.2	18.5	More	53	26.0		
Introduced	92	4.8	28.4	Less	46	22.5		
Subsequent	120	6.3	37.0	Least	18	8.8		
Not applicable	1573	82.9		**Total**	**204**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 4a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 300)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	43	2.3	14.3	Most	72	40.7	2.99	1.01
Reviewed	57	3.0	19.0	More	49	27.7		
Introduced	77	4.1	25.7	Less	39	22.0		
Subsequent	123	6.5	41.0	Least	17	9.6		
Not applicable	1597	84.2		**Total**	**177**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 4b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 303)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	39	2.1	12.9	Most	77	42.3	3.05	0.98
Reviewed	57	3.0	18.8	More	51	28.0		
Introduced	86	4.5	28.4	Less	40	22.0		
Subsequent	121	6.4	39.9	Least	14	7.7		
Not applicable	1594	84.0		**Total**	**182**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 4c. Understand vector subtraction **v – w** as **v + (–w)**, where **–w** is the additive inverse of **w**, with the same magnitude as **w** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 290)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	41	2.2	14.1	Most	64	37.9	2.96	1.00
Reviewed	48	2.5	16.6	More	52	30.8		
Introduced	80	4.2	27.6	Less	36	21.3		
Subsequent	121	6.4	41.7	Least	17	10.1		
Not applicable	1607	84.7		**Total**	**169**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 5. (+) Multiply a vector by a scalar.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 291)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	43	2.3	14.8	Most	68	39.5	2.99	1.00
Reviewed	48	2.5	16.5	More	50	29.1		
Introduced	81	4.3	27.8	Less	38	22.1		
Subsequent	119	6.3	40.9	Least	16	9.3		
Not applicable	1606	84.7		**Total**	**172**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 5a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 266)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	39	2.1	14.7	Most	54	37.0	2.93	0.98
Reviewed	37	2.0	13.9	More	39	26.7		
Introduced	70	3.7	26.3	Less	42	28.8		
Subsequent	120	6.3	45.1	Least	11	7.5		
Not applicable	1631	86.0		**Total**	**146**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 5b. Compute the magnitude of a scalar multiple c**v** using ||c**v**|| = |c|v. Compute the direction of cv knowing that when |c|v ≠ 0, the direction of c**v** is either along **v** (for c > 0) or against **v** (for c < 0).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 258)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	35	1.8	13.6	Most	56	40.6	2.99	1.01
Reviewed	34	1.8	13.2	More	38	27.5		
Introduced	69	3.6	26.7	Less	31	22.5		
Subsequent	120	6.3	46.5	Least	13	9.4		
Not applicable	1639	86.4		**Total**	**138**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 285)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	41	2.2	14.4	Most	30	18.3	2.67	0.87
Reviewed	32	1.7	11.2	More	64	39.0		
Introduced	91	4.8	31.9	Less	56	34.1		
Subsequent	121	6.4	42.5	Least	14	8.5		
Not applicable	1612	85.0		**Total**	**164**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 248)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	34	1.8	13.7	Most	21	15.6	2.67	0.81
Reviewed	32	1.7	12.9	More	56	41.5		
Introduced	69	3.6	27.8	Less	50	37.0		
Subsequent	113	6.0	45.6	Least	8	5.9		
Not applicable	1649	86.9		**Total**	**135**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 8. (+) Add, subtract, and multiply matrices of appropriate dimensions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 261)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	39	2.1	14.9	Most	29	19.7	2.76	0.83
Reviewed	33	1.7	12.6	More	62	42.2		
Introduced	75	4.0	28.7	Less	48	32.7		
Subsequent	114	6.0	43.7	Least	8	5.4		
Not applicable	1636	86.2		**Total**	**147**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 235)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	32	1.7	13.6	Most	25	20.7	2.69	0.90
Reviewed	23	1.2	9.8	More	45	37.2		
Introduced	66	3.5	28.1	Less	40	33.1		
Subsequent	114	6.0	48.5	Least	11	9.1		
Not applicable	1662	87.6		**Total**	**121**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 233)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	33	1.7	14.2	Most	20	16.5	2.65	0.87
Reviewed	22	1.2	9.4	More	51	42.1		
Introduced	66	3.5	28.3	Less	38	31.4		
Subsequent	112	5.9	48.1	Least	12	9.9		
Not applicable	1664	87.7		**Total**	**121**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 215)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	27	1.4	12.6	Most	20	22.0	2.71	0.92
Reviewed	18	0.9	8.4	More	34	37.4		
Introduced	46	2.4	21.4	Less	28	30.8		
Subsequent	124	6.5	57.7	Least	9	9.9		
Not applicable	1682	88.7		**Total**	**91**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Vector and Matrix Quantities: Standard 12. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 218)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	29	1.5	13.3	Most	19	20.4	2.61	0.97
Reviewed	16	0.8	7.3	More	32	34.4		
Introduced	48	2.5	22.0	Less	29	31.2		
Subsequent	125	6.6	57.3	Least	13	14.0		
Not applicable	1679	88.5		**Total**	**93**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Algebra

Seeing Structure in Expressions: Standard 1. Interpret expressions that represent a quantity in terms of its context.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 749)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	371	19.6	49.5	Most	292	39.4	3.21	0.75
Reviewed	271	14.3	36.2	More	325	43.9		
Introduced	99	5.2	13.2	Less	114	15.4		
Subsequent	8	0.4	1.1	Least	10	1.3		
Not applicable	1148	60.5		**Total**	**741**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Seeing Structure in Expressions: Standard 1a. Interpret parts of an expression, such as terms, factors, and coefficients.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 717)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	397	20.9	55.4	Most	271	38.5	3.14	0.82
Reviewed	228	12.0	31.8	More	284	40.3		
Introduced	78	4.1	10.9	Less	125	17.8		
Subsequent	14	0.7	2.0	Least	24	3.4		
Not applicable	1180	62.2		**Total**	**704**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Seeing Structure in Expressions: Standard 1b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 571)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	271	14.3	47.5	Most	162	29.8	2.94	0.87
Reviewed	182	9.6	31.9	More	218	40.1		
Introduced	91	4.8	15.9	Less	136	25.0		
Subsequent	27	1.4	4.7	Least	28	5.1		
Not applicable	1326	69.9		**Total**	**544**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Seeing Structure in Expressions: Standard 2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 520)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	246	13.0	47.3	Most	140	28.2	2.88	0.90
Reviewed	182	9.6	35.0	More	195	39.3		
Introduced	68	3.6	13.1	Less	124	25.0		
Subsequent	24	1.3	4.6	Least	37	7.5		
Not applicable	1377	72.6		**Total**	**496**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Seeing Structure in Expressions: Standard 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 632)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	247	13.0	39.1	Most	192	31.4	3.01	0.84
Reviewed	255	13.4	40.3	More	259	42.3		
Introduced	110	5.8	17.4	Less	134	21.9		
Subsequent	20	1.1	3.2	Least	27	4.4		
Not applicable	1265	66.7		**Total**	**612**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Seeing Structure in Expressions: Standard 3a. Factor a quadratic expression to reveal the zeros of the function it defines.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 434)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	206	10.9	47.5	Most	169	41.8	3.12	0.90
Reviewed	151	8.0	34.8	More	136	33.7		
Introduced	47	2.5	10.8	Less	78	19.3		
Subsequent	30	1.6	6.9	Least	21	5.2		
Not applicable	1463	77.1		**Total**	**404**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Seeing Structure in Expressions: Standard 3b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 375)**
Prerequisite	152	8.0	40.5
Reviewed	120	6.3	32.0
Introduced	71	3.7	18.9
Subsequent	32	1.7	8.5
Not applicable	1522	80.2	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	86	25.1
More	110	32.1
Less	109	31.8
Least	38	11.1
Total	**343**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.71	0.96

Seeing Structure in Expressions: Standard 3c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 394)**
Prerequisite	146	7.7	37.1
Reviewed	128	6.7	32.5
Introduced	78	4.1	19.8
Subsequent	42	2.2	10.7
Not applicable	1503	79.2	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	89	25.3
More	136	38.6
Less	99	28.1
Least	28	8.0
Total	**352**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.81	0.91

Seeing Structure in Expressions: Standard 4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 310)**
Prerequisite	69	3.6	22.3
Reviewed	76	4.0	24.5
Introduced	77	4.1	24.8
Subsequent	88	4.6	28.4
Not applicable	1587	83.7	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	43	19.4
More	91	41.0
Less	72	32.4
Least	16	7.2
Total	**222**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.73	0.86

Arithmetic with Polynomials and Rational Expressions: Standard 1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 428)**
Prerequisite	229	12.1	53.5
Reviewed	101	5.3	23.6
Introduced	53	2.8	12.4
Subsequent	45	2.4	10.5
Not applicable	1469	77.4	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	104	27.2
More	141	36.8
Less	101	26.4
Least	37	9.7
Total	**383**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.81	0.94

Arithmetic with Polynomials and Rational Expressions: Standard 2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 321)**
Prerequisite	121	6.4	37.7
Reviewed	71	3.7	22.1
Introduced	91	4.8	28.3
Subsequent	38	2.0	11.8
Not applicable	1576	83.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	71	25.1
More	87	30.7
Less	89	31.4
Least	36	12.7
Total	**283**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.68	0.99

Arithmetic with Polynomials and Rational Expressions: Standard 3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 349)**
Prerequisite	135	7.1	38.7
Reviewed	84	4.4	24.1
Introduced	99	5.2	28.4
Subsequent	31	1.6	8.9
Not applicable	1548	81.6	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	100	31.4
More	117	36.8
Less	77	24.2
Least	24	7.5
Total	**318**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.92	0.92

Arithmetic with Polynomials and Rational Expressions: Standard 4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 230)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	87	4.6	37.8	Most	22	12.8	2.42	0.88
Reviewed	50	2.6	21.7	More	51	29.7		
Introduced	35	1.8	15.2	Less	76	44.2		
Subsequent	58	3.1	25.2	Least	23	13.4		
Not applicable	1667	87.9		**Total**	**172**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Arithmetic with Polynomials and Rational Expressions: Standard 5. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 308)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	86	4.5	27.9	Most	34	14.3	2.52	0.88
Reviewed	83	4.4	26.9	More	84	35.3		
Introduced	69	3.6	22.4	Less	92	38.7		
Subsequent	70	3.7	22.7	Least	28	11.8		
Not applicable	1589	83.8		**Total**	**238**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Arithmetic with Polynomials and Rational Expressions: Standard 6. Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 378)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	132	7.0	34.9	Most	68	20.0	2.69	0.87
Reviewed	131	6.9	34.7	More	122	35.9		
Introduced	77	4.1	20.4	Less	127	37.4		
Subsequent	38	2.0	10.1	Least	23	6.8		
Not applicable	1519	80.1		**Total**	**340**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Arithmetic with Polynomials and Rational Expressions: Standard 7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 348)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	144	7.6	41.4	Most	64	20.8	2.68	0.92
Reviewed	108	5.7	31.0	More	114	37.1		
Introduced	55	2.9	15.8	Less	97	31.6		
Subsequent	41	2.2	11.8	Least	32	10.4		
Not applicable	1549	81.7		**Total**	**307**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Creating Equations: Standard 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 684)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	268	14.1	39.2	Most	257	38.5	3.14	0.81
Reviewed	264	13.9	38.6	More	266	39.8		
Introduced	135	7.1	19.7	Less	127	19.0		
Subsequent	17	0.9	2.5	Least	18	2.7		
Not applicable	1213	63.9		Total	668	100.0		
Total	**1897**	**100.0**	**100.0**					

Creating Equations: Standard 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 636)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	222	11.7	34.9	Most	244	40.1	3.15	0.82
Reviewed	246	13.0	38.7	More	229	37.6		
Introduced	141	7.4	22.2	Less	122	20.0		
Subsequent	27	1.4	4.2	Least	14	2.3		
Not applicable	1261	66.5		**Total**	**609**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Creating Equations: Standard 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 493)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	143	7.5	29.0	Most	104	24.1	2.85	0.84
Reviewed	164	8.6	33.3	More	182	42.1		
Introduced	125	6.6	25.4	Less	125	28.9		
Subsequent	61	3.2	12.4	Least	21	4.9		
Not applicable	1404	74.0		**Total**	**432**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Creating Equations: Standard 4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V =IR to highlight resistance R.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 619)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	271	14.3	43.8	Most	254	42.7	3.18	0.83
Reviewed	232	12.2	37.5	More	211	35.5		
Introduced	92	4.8	14.9	Less	115	19.3		
Subsequent	24	1.3	3.9	Least	15	2.5		
Not applicable	1278	67.4		**Total**	**595**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 632)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	297	15.7	47.0	Most	226	36.7	3.08	0.85
Reviewed	223	11.8	35.3	More	240	39.0		
Introduced	95	5.0	15.0	Less	124	20.2		
Subsequent	17	0.9	2.7	Least	25	4.1		
Not applicable	1265	66.7		**Total**	**615**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 517)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	227	12.0	43.9	Most	164	33.6	3.01	0.88
Reviewed	178	9.4	34.4	More	193	39.5		
Introduced	83	4.4	16.1	Less	103	21.1		
Subsequent	29	1.5	5.6	Least	28	5.7		
Not applicable	1380	72.7		**Total**	**488**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 675)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	356	18.8	52.7	Most	283	43.5	3.20	0.83
Reviewed	219	11.5	32.4	More	238	36.6		
Introduced	75	4.0	11.1	Less	107	16.5		
Subsequent	25	1.3	3.7	Least	22	3.4		
Not applicable	1222	64.4		**Total**	**650**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 4. Solve quadratic equations in one variable.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 508)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	252	13.3	49.6	Most	205	42.8	3.18	0.86
Reviewed	178	9.4	35.0	More	173	36.1		
Introduced	49	2.6	9.6	Less	81	16.9		
Subsequent	29	1.5	5.7	Least	20	4.2		
Not applicable	1389	73.2		**Total**	**479**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 4a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 340)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	142	7.5	41.8	Most	63	20.5	2.64	0.94
Reviewed	105	5.5	30.9	More	107	34.9		
Introduced	60	3.2	17.6	Less	99	32.2		
Subsequent	33	1.7	9.7	Least	38	12.4		
Not applicable	1557	82.1		**Total**	**307**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 4b. Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 438)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	217	11.4	49.5	Most	130	32.3	3.00	0.88
Reviewed	130	6.9	29.7	More	166	41.2		
Introduced	56	3.0	12.8	Less	82	20.3		
Subsequent	35	1.8	8.0	Least	25	6.2		
Not applicable	1459	76.9		**Total**	**403**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 395)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	168	8.9	42.5	Most	83	23.8	2.77	0.90
Reviewed	117	6.2	29.6	More	130	37.2		
Introduced	64	3.4	16.2	Less	110	31.5		
Subsequent	46	2.4	11.6	Least	26	7.4		
Not applicable	1502	79.2		**Total**	**349**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 451)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	191	10.1	42.4	Most	116	28.5	2.89	0.88
Reviewed	142	7.5	31.5	More	154	37.8		
Introduced	74	3.9	16.4	Less	114	28.0		
Subsequent	44	2.3	9.8	Least	23	5.7		
Not applicable	1446	76.2		**Total**	**407**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 363)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	126	6.6	34.7	Most	62	20.7	2.68	0.91
Reviewed	98	5.2	27.0	More	108	36.1		
Introduced	75	4.0	20.7	Less	101	33.8		
Subsequent	64	3.4	17.6	Least	28	9.4		
Not applicable	1534	80.9		**Total**	**299**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 243)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	53	2.8	21.8	Most	24	17.3	2.55	0.90
Reviewed	26	1.4	10.7	More	43	30.9		
Introduced	60	3.2	24.7	Less	57	41.0		
Subsequent	104	5.5	42.8	Least	15	10.8		
Not applicable	1654	87.2		**Total**	**139**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 224)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	41	2.2	18.3	Most	27	22.3	2.65	0.95
Reviewed	24	1.3	10.7	More	38	31.4		
Introduced	56	3.0	25.0	Less	43	35.5		
Subsequent	103	5.4	46.0	Least	13	10.7		
Not applicable	1673	88.2		**Total**	**121**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 565)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	244	12.9	43.2	Most	201	37.6	3.06	0.88
Reviewed	195	10.3	34.5	More	192	35.9		
Introduced	96	5.1	17.0	Less	117	21.9		
Subsequent	30	1.6	5.3	Least	25	4.7		
Not applicable	1332	70.2		**Total**	**535**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Reasoning with Equations and Inequalities: Standard 11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 468)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	183	9.6	39.1	Most	131	30.8	2.96	0.87
Reviewed	140	7.4	29.9	More	172	40.5		
Introduced	102	5.4	21.8	Less	98	23.1		
Subsequent	43	2.3	9.2	Least	24	5.6		
Not applicable	1429	75.3		**Total**	**425**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Mathematics: Algebra

Reasoning with Equations and Inequalities: Standard 12. Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 303)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	109	5.7	36.0	Most	52	21.1	2.73	0.86
Reviewed	78	4.1	25.7	More	90	36.6		
Introduced	59	3.1	19.5	Less	90	36.6		
Subsequent	57	3.0	18.8	Least	14	5.7		
Not applicable	1594	84.0		**Total**	**246**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Functions

Interpreting Functions: Standard 1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 530)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	249	13.1	47.0	Most	224	43.9	3.15	0.90
Reviewed	173	9.1	32.6	More	162	31.8		
Introduced	88	4.6	16.6	Less	98	19.2		
Subsequent	20	1.1	3.8	Least	26	5.1		
Not applicable	1366	72.0		**Total**	**510**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 514)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	233	12.3	45.3	Most	227	45.9	3.21	0.87
Reviewed	166	8.8	32.3	More	166	33.5		
Introduced	96	5.1	18.7	Less	81	16.4		
Subsequent	19	1.0	3.7	Least	21	4.2		
Not applicable	1382	72.9		**Total**	**495**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Interpreting Functions: Standard 3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 311)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	71	3.7	22.8	Most	48	21.2	2.75	0.88
Reviewed	68	3.6	21.9	More	93	41.2		
Introduced	87	4.6	28.0	Less	66	29.2		
Subsequent	85	4.5	27.3	Least	19	8.4		
Not applicable	1585	83.6		**Total**	**226**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 533)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	160	8.4	30.0	Most	228	43.9	3.24	0.81
Reviewed	186	9.8	34.9	More	202	38.9		
Introduced	173	9.1	32.5	Less	72	13.9		
Subsequent	14	0.7	2.6	Least	17	3.3		
Not applicable	1363	71.9		**Total**	**519**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 485)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	172	9.1	35.5	Most	144	30.6	2.93	0.92
Reviewed	177	9.3	36.5	More	186	39.5		
Introduced	122	6.4	25.2	Less	104	22.1		
Subsequent	14	0.7	2.9	Least	37	7.9		
Not applicable	1411	74.4		**Total**	**471**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 482)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	106	5.6	22.0	Most	159	35.3	3.07	0.83
Reviewed	182	9.6	37.8	More	180	39.9		
Introduced	163	8.6	33.8	Less	97	21.5		
Subsequent	31	1.6	6.4	Least	15	3.3		
Not applicable	1414	74.5		**Total**	**451**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 516)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	157	8.3	30.4	Most	206	41.4	3.21	0.79
Reviewed	194	10.2	37.6	More	202	40.6		
Introduced	146	7.7	28.3	Less	76	15.3		
Subsequent	19	1.0	3.7	Least	13	2.6		
Not applicable	1380	72.7		**Total**	**497**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 7a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 487)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	169	8.9	34.7	Most	184	39.8	3.15	0.84
Reviewed	184	9.7	37.8	More	178	38.5		
Introduced	109	5.7	22.4	Less	84	18.2		
Subsequent	25	1.3	5.1	Least	16	3.5		
Not applicable	1409	74.3		**Total**	**462**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 7b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 352)**
Prerequisite	114	6.0	32.4
Reviewed	103	5.4	29.3
Introduced	96	5.1	27.3
Subsequent	39	2.1	11.1
Not applicable	1544	81.4	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	99	31.6
More	116	37.1
Less	82	26.2
Least	16	5.1
Total	**313**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.95	0.88

Interpreting Functions: Standard 7c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 346)**
Prerequisite	97	5.1	28.0
Reviewed	103	5.4	29.8
Introduced	102	5.4	29.5
Subsequent	44	2.3	12.7
Not applicable	1550	81.7	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	112	37.1
More	112	37.1
Less	69	22.8
Least	9	3.0
Total	**302**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.08	0.85

Interpreting Functions: Standard 7d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 325)**
Prerequisite	84	4.4	25.8
Reviewed	91	4.8	28.0
Introduced	107	5.6	32.9
Subsequent	43	2.3	13.2
Not applicable	1571	82.8	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	100	35.5
More	96	34.0
Less	70	24.8
Least	16	5.7
Total	**282**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.99	0.91

Interpreting Functions: Standard 7e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 388)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	93	4.9	24.0	Most	114	34.2	3.04	0.85
Reviewed	126	6.6	32.5	More	129	38.7		
Introduced	114	6.0	29.4	Less	78	23.4		
Subsequent	55	2.9	14.2	Least	12	3.6		
Not applicable	1508	79.5		**Total**	**333**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 357)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	89	4.7	24.9	Most	64	20.2	2.77	0.85
Reviewed	128	6.7	35.9	More	137	43.2		
Introduced	100	5.3	28.0	Less	95	30.0		
Subsequent	40	2.1	11.2	Least	21	6.6		
Not applicable	1539	81.1		**Total**	**317**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 8a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 307)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	97	5.1	31.6	Most	73	27.1	2.90	0.85
Reviewed	87	4.6	28.3	More	107	39.8		
Introduced	85	4.5	27.7	Less	77	28.6		
Subsequent	38	2.0	12.4	Least	12	4.5		
Not applicable	1589	83.8		**Total**	**269**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 8b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 341)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	86	4.5	25.2	Most	61	21.0	2.80	0.82
Reviewed	100	5.3	29.3	More	124	42.6		
Introduced	105	5.5	30.8	Less	93	32.0		
Subsequent	50	2.6	14.7	Least	13	4.5		
Not applicable	1555	82.0		**Total**	**291**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Interpreting Functions: Standard 9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 323)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	86	4.5	26.6	Most	52	17.9	2.66	0.87
Reviewed	113	6.0	35.0	More	111	38.3		
Introduced	91	4.8	28.2	Less	103	35.5		
Subsequent	33	1.7	10.2	Least	24	8.3		
Not applicable	1573	82.9		**Total**	**290**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 1. Write a function that describes a relationship between two quantities.*

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 534)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	172	9.1	32.2	Most	208	40.3	3.20	0.79
Reviewed	189	10.0	35.4	More	216	41.9		
Introduced	155	8.2	29.0	Less	78	15.1		
Subsequent	18	0.9	3.4	Least	14	2.7		
Not applicable	1362	71.8		**Total**	**516**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 1a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 435)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	109	5.7	25.1	Most	114	28.8	3.04	0.75
Reviewed	147	7.7	33.8	More	188	47.5		
Introduced	140	7.4	32.2	Less	89	22.5		
Subsequent	39	2.1	9.0	Least	5	1.3		
Not applicable	1461	77.0		**Total**	**396**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 1b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 389)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	81	4.3	20.8	Most	84	25.1	2.92	0.80
Reviewed	126	6.6	32.4	More	150	44.9		
Introduced	127	6.7	32.6	Less	90	26.9		
Subsequent	55	2.9	14.1	Least	10	3.0		
Not applicable	1507	79.4		**Total**	**334**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 1c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 403)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	88	4.6	21.8	Most	106	30.2	2.98	0.83
Reviewed	127	6.7	31.5	More	145	41.3		
Introduced	136	7.2	33.7	Less	88	25.1		
Subsequent	52	2.7	12.9	Least	12	3.4		
Not applicable	1493	78.7		**Total**	**351**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 283)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	46	2.4	16.3	Most	30	17.0	2.69	0.83
Reviewed	55	2.9	19.4	More	73	41.5		
Introduced	75	4.0	26.5	Less	62	35.2		
Subsequent	107	5.6	37.8	Least	11	6.3		
Not applicable	1613	85.0		**Total**	**176**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 336)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	89	4.7	26.5	Most	88	29.7	2.92	0.89
Reviewed	105	5.5	31.3	More	112	37.8		
Introduced	102	5.4	30.4	Less	79	26.7		
Subsequent	40	2.1	11.9	Least	17	5.7		
Not applicable	1560	82.2		**Total**	**296**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 4. Find inverse functions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 355)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	98	5.2	27.6	Most	79	25.1	2.82	0.91
Reviewed	102	5.4	28.7	More	128	40.6		
Introduced	115	6.1	32.4	Less	80	25.4		
Subsequent	40	2.1	11.3	Least	28	8.9		
Not applicable	1541	81.2		**Total**	**315**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 4a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ for $x > 0$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 316)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	103	5.4	32.6	Most	65	23.3	2.86	0.84
Reviewed	84	4.4	26.6	More	126	45.2		
Introduced	92	4.8	29.1	Less	71	25.4		
Subsequent	37	2.0	11.7	Least	17	6.1		
Not applicable	1580	83.3		**Total**	**279**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 4b. (+) Verify by composition that one function is the inverse of another.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 288)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	78	4.1	27.1	Most	47	18.9	2.65	0.89
Reviewed	76	4.0	26.4	More	90	36.1		
Introduced	95	5.0	33.0	Less	89	35.7		
Subsequent	39	2.1	13.5	Least	23	9.2		
Not applicable	1608	84.8		**Total**	**249**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 4c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 296)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	71	3.7	24.0	Most	52	20.3	2.64	0.90
Reviewed	89	4.7	30.1	More	82	32.0		
Introduced	96	5.1	32.4	Less	101	39.5		
Subsequent	40	2.1	13.5	Least	21	8.2		
Not applicable	1600	84.3		**Total**	**256**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 4d. (+) Produce an invertible function from a non-invertible function by restricting the domain.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 241)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	59	3.1	24.5	Most	35	18.0	2.51	0.95
Reviewed	55	2.9	22.8	More	56	28.9		
Introduced	80	4.2	33.2	Less	75	38.7		
Subsequent	47	2.5	19.5	Least	28	14.4		
Not applicable	1655	87.2		**Total**	**194**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Building Functions: Standard 5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 356)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	97	5.1	27.2	Most	107	34.3	3.04	0.86
Reviewed	103	5.4	28.9	More	124	39.7		
Introduced	112	5.9	31.5	Less	67	21.5		
Subsequent	44	2.3	12.4	Least	14	4.5		
Not applicable	1540	81.2		**Total**	**312**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 444)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	105	5.5	23.6	Most	85	22.1	2.76	0.89
Reviewed	109	5.7	24.5	More	154	40.1		
Introduced	170	9.0	38.3	Less	113	29.4		
Subsequent	60	3.2	13.5	Least	32	8.3		
Not applicable	1452	76.5		**Total**	**384**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 1a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 366)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	96	5.1	26.2	Most	58	19.5	2.70	0.88
Reviewed	101	5.3	27.6	More	118	39.7		
Introduced	100	5.3	27.3	Less	95	32.0		
Subsequent	69	3.6	18.9	Least	26	8.8		
Not applicable	1530	80.7		**Total**	**297**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 478)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	111	5.9	23.2	Most	84	19.0	2.74	0.84
Reviewed	179	9.4	37.4	More	189	42.8		
Introduced	152	8.0	31.8	Less	141	31.9		
Subsequent	36	1.9	7.5	Least	28	6.3		
Not applicable	1418	74.7		**Total**	**442**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 412)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	85	4.5	20.6	Most	64	17.7	2.70	0.84
Reviewed	136	7.2	33.0	More	153	42.3		
Introduced	141	7.4	34.2	Less	119	32.9		
Subsequent	50	2.6	12.1	Least	26	7.2		
Not applicable	1484	78.2		**Total**	**362**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 389)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	21.1	Most	58	18.1	2.72	0.84
Reviewed	105	5.5	27.0	More	136	42.5		
Introduced	133	7.0	34.2	Less	104	32.5		
Subsequent	69	3.6	17.7	Least	22	6.9		
Not applicable	1507	79.4		**Total**	**320**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 373)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	85	4.5	22.8	Most	46	14.7	2.61	0.85
Reviewed	102	5.4	27.3	More	129	41.2		
Introduced	126	6.6	33.8	Less	109	34.8		
Subsequent	60	3.2	16.1	Least	29	9.3		
Not applicable	1523	80.3		**Total**	**313**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 345)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	74	3.9	21.4	Most	67	23.3	2.82	0.85
Reviewed	103	5.4	29.9	More	116	40.3		
Introduced	111	5.9	32.2	Less	90	31.3		
Subsequent	57	3.0	16.5	Least	15	5.2		
Not applicable	1551	81.8		**Total**	**288**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Linear, Quadratic, and Exponential Models: Standard 5. Interpret the parameters in a linear or exponential function in terms of a context.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 448)**
Prerequisite	105	5.5	23.4
Reviewed	158	8.3	35.3
Introduced	146	7.7	32.6
Subsequent	39	2.1	8.7
Not applicable	1448	76.3	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	79	19.3
More	197	48.2
Less	112	27.4
Least	21	5.1
Total	**409**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.82	0.80

Trigonometric Functions: Standard 1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 278)**
Prerequisite	109	5.7	39.2
Reviewed	76	4.0	27.3
Introduced	31	1.6	11.2
Subsequent	62	3.3	22.3
Not applicable	1618	85.3	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	86	39.8
More	77	35.6
Less	40	18.5
Least	13	6.0
Total	**216**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.09	0.91

Trigonometric Functions: Standard 2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 260)**
Prerequisite	107	5.6	41.2
Reviewed	65	3.4	25.0
Introduced	27	1.4	10.4
Subsequent	61	3.2	23.5
Not applicable	1636	86.2	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	72	36.2
More	69	34.7
Less	48	24.1
Least	10	5.0
Total	**199**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.02	0.90

Trigonometric Functions: Standard 3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for x, π+x, and 2π–x in terms of their values for x, where x is any real number.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 262)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	107	5.6	40.8	Most	79	39.5	3.08	0.90
Reviewed	73	3.8	27.9	More	67	33.5		
Introduced	20	1.1	7.6	Less	44	22.0		
Subsequent	62	3.3	23.7	Least	10	5.0		
Not applicable	1634	86.1		**Total**	**200**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percentb (n = 242)**	**Category**	**Number**	**Percent**	**Meanc**	**Standard deviation**
Prerequisite	101	5.3	41.7	Most	44	24.3	2.72	0.93
Reviewed	53	2.8	21.9	More	58	32.0		
Introduced	27	1.4	11.2	Less	64	35.4		
Subsequent	61	3.2	25.2	Least	15	8.3		
Not applicable	1654	87.2		**Total**	**181**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 266)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	80	4.2	30.1	Most	60	30.3	2.86	0.94
Reviewed	63	3.3	23.7	More	65	32.8		
Introduced	55	2.9	20.7	Less	58	29.3		
Subsequent	68	3.6	25.6	Least	15	7.6		
Not applicable	1630	85.9		**Total**	**198**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 219)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	66	3.5	30.1	Most	34	22.8	2.81	0.88
Reviewed	50	2.6	22.8	More	63	42.3		
Introduced	33	1.7	15.1	Less	41	27.5		
Subsequent	70	3.7	32.0	Least	11	7.4		
Not applicable	1677	88.4		**Total**	**149**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 222)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	66	3.5	29.7	Most	44	28.8	2.92	0.88
Reviewed	51	2.7	23.0	More	61	39.9		
Introduced	36	1.9	16.2	Less	39	25.5		
Subsequent	69	3.6	31.1	Least	9	5.9		
Not applicable	1674	88.2		**Total**	**153**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 229)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	103	5.4	45.0	Most	54	31.2	2.80	1.00
Reviewed	48	2.5	21.0	More	50	28.9		
Introduced	22	1.2	9.6	Less	50	28.9		
Subsequent	56	3.0	24.5	Least	19	11.0		
Not applicable	1667	87.9		**Total**	**173**	**100.0**		
Missing	1	0.1						
Total	**1897**	**100.0**	**100.0**					

Trigonometric Functions: Standard 9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 223)**
Prerequisite	87	4.6	39.0
Reviewed	46	2.4	20.6
Introduced	23	1.2	10.3
Subsequent	67	3.5	30.0
Not applicable	1673	88.2	
Missing	1	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	26	16.7
More	49	31.4
Less	68	43.6
Least	13	8.3
Total	**156**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.56	0.87

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Geometry

Congruence: Standard 1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 263)**
Prerequisite	199	10.5	75.7
Reviewed	46	2.4	17.5
Introduced	11	0.6	4.2
Subsequent	7	0.4	2.7
Not applicable	1632	86.0	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	81	31.6
More	84	32.8
Less	71	27.7
Least	20	7.8
Total	**256**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.88	0.95

Congruence: Standard 2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 157)**
Prerequisite	75	4.0	47.8
Reviewed	29	1.5	18.5
Introduced	26	1.4	16.6
Subsequent	27	1.4	17.2
Not applicable	1738	91.6	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	28	21.5
More	44	33.8
Less	44	33.8
Least	14	10.8
Total	**130**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.66	0.94

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Congruence: Standard 3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 125)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	66	3.5	52.8	Most	14	14.7	2.35	0.99
Reviewed	18	0.9	14.4	More	26	27.4		
Introduced	11	0.6	8.8	Less	34	35.8		
Subsequent	30	1.6	24.0	Least	21	22.1		
Not applicable	1770	93.3		**Total**	**95**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 147)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	76	4.0	51.7	Most	20	17.4	2.50	0.96
Reviewed	22	1.2	15.0	More	35	30.4		
Introduced	17	0.9	11.6	Less	42	36.5		
Subsequent	32	1.7	21.8	Least	18	15.7		
Not applicable	1748	92.1		**Total**	**115**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 140)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	68	3.6	48.6	Most	17	15.9	2.46	0.96
Reviewed	21	1.1	15.0	More	34	31.8		
Introduced	18	0.9	12.9	Less	37	34.6		
Subsequent	33	1.7	23.6	Least	19	17.8		
Not applicable	1755	92.5		**Total**	**107**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 117)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	71	3.7	60.7	Most	15	15.5	2.44	0.92
Reviewed	15	0.8	12.8	More	27	27.8		
Introduced	11	0.6	9.4	Less	41	42.3		
Subsequent	20	1.1	17.1	Least	14	14.4		
Not applicable	1778	93.7		**Total**	**97**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 121)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	80	4.2	66.1	Most	18	17.3	2.49	0.96
Reviewed	13	0.7	10.7	More	31	29.8		
Introduced	11	0.6	9.1	Less	39	37.5		
Subsequent	17	0.9	14.0	Least	16	15.4		
Not applicable	1774	93.5		**Total**	**104**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 108)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	72	3.8	66.7	Most	14	15.4	2.40	0.99
Reviewed	11	0.6	10.2	More	27	29.7		
Introduced	8	0.4	7.4	Less	31	34.1		
Subsequent	17	0.9	15.7	Least	19	20.9		
Not applicable	1787	94.2		**Total**	**91**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; and points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 115)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	71.3	Most	20	20.2	2.49	1.02
Reviewed	10	0.5	8.7	More	28	28.3		
Introduced	7	0.4	6.1	Less	32	32.3		
Subsequent	16	0.8	13.9	Least	19	19.2		
Not applicable	1780	93.8		**Total**	**99**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; and the medians of a triangle meet at a point.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 122)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	84	4.4	68.9	Most	24	22.4	2.50	1.04
Reviewed	14	0.7	11.5	More	25	23.4		
Introduced	9	0.5	7.4	Less	38	35.5		
Subsequent	15	0.8	12.3	Least	20	18.7		
Not applicable	1773	93.5		**Total**	**107**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Congruence: Standard 11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 105)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	76	4.0	72.4	Most	17	18.7	2.32	1.03
Reviewed	8	0.4	7.6	More	16	17.6		
Introduced	7	0.4	6.7	Less	37	40.7		
Subsequent	14	0.7	13.3	Least	21	23.1		
Not applicable	1790	94.4		**Total**	**91**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Mathematics: Geometry

Congruence: Standard 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Examples include: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 112)**
Prerequisite	74	3.9	66.1
Reviewed	13	0.7	11.6
Introduced	11	0.6	9.8
Subsequent	14	0.7	12.5
Not applicable	1783	94.0	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	22	22.4
More	20	20.4
Less	35	35.7
Least	21	21.4
Total	**98**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.44	1.07

Congruence: Standard 13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 95)**
Prerequisite	65	3.4	68.4
Reviewed	11	0.6	11.6
Introduced	6	0.3	6.3
Subsequent	13	0.7	13.7
Not applicable	1800	94.9	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	12	14.6
More	16	19.5
Less	30	36.6
Least	24	29.3
Total	**82**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.20	1.02

Similarity, Right Triangles, and Trigonometry: Standard 1. Verify experimentally the properties of dilations given by a center and a scale factor.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 82)**
Prerequisite	54	2.8	65.9
Reviewed	7	0.4	8.5
Introduced	7	0.4	8.5
Subsequent	14	0.7	17.1
Not applicable	1813	95.6	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	12	17.6
More	15	22.1
Less	23	33.8
Least	18	26.5
Total	**68**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.31	1.05

Similarity, Right Triangles, and Trigonometry: Standard 1a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 71)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	46	2.4	64.8	Most	9	15.3	2.29	1.02
Reviewed	6	0.3	8.5	More	14	23.7		
Introduced	7	0.4	9.9	Less	21	35.6		
Subsequent	12	0.6	16.9	Least	15	25.4		
Not applicable	1824	96.2		**Total**	**59**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Similarity, Right Triangles, and Trigonometry: Standard 1b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 73)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	47	2.5	64.4	Most	11	18.0	2.34	1.05
Reviewed	8	0.4	11.0	More	14	23.0		
Introduced	6	0.3	8.2	Less	21	34.4		
Subsequent	12	0.6	16.4	Least	15	24.6		
Not applicable	1822	96.0		**Total**	**61**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Similarity, Right Triangles, and Trigonometry: Standard 2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 131)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	83	4.4	63.4	Most	19	16.2	2.50	0.95
Reviewed	23	1.2	17.6	More	39	33.3		
Introduced	11	0.6	8.4	Less	40	34.2		
Subsequent	14	0.7	10.7	Least	19	16.2		
Not applicable	1764	93.0		**Total**	**117**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Similarity, Right Triangles, and Trigonometry: Standard 3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 100)**
Prerequisite	66	3.5	66.0
Reviewed	14	0.7	14.0
Introduced	7	0.4	7.0
Subsequent	13	0.7	13.0
Not applicable	1795	94.6	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	11	12.6
More	24	27.6
Less	34	39.1
Least	18	20.7
Total	**87**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.32	0.95

Similarity, Right Triangles, and Trigonometry: Standard 4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 104)**
Prerequisite	75	4.0	72.1
Reviewed	13	0.7	12.5
Introduced	5	0.3	4.8
Subsequent	11	0.6	10.6
Not applicable	1791	94.4	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	18	19.4
More	23	24.7
Less	35	37.6
Least	17	18.3
Total	**93**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.45	1.01

Similarity, Right Triangles, and Trigonometry: Standard 5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 152)**
Prerequisite	99	5.2	65.1
Reviewed	29	1.5	19.1
Introduced	13	0.7	8.6
Subsequent	11	0.6	7.2
Not applicable	1743	91.9	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	26	18.4
More	52	36.9
Less	45	31.9
Least	18	12.8
Total	**141**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.61	0.93

Similarity, Right Triangles, and Trigonometry: Standard 6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 194)**
Prerequisite	114	6.0	58.8
Reviewed	36	1.9	18.6
Introduced	20	1.1	10.3
Subsequent	24	1.3	12.4
Not applicable	1701	89.7	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	53	31.2
More	65	38.2
Less	40	23.5
Least	12	7.1
Total	**170**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.94	0.91

Similarity, Right Triangles, and Trigonometry: Standard 7. Explain and use the relationship between the sine and cosine of complementary angles.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 197)**
Prerequisite	101	5.3	51.3
Reviewed	47	2.5	23.9
Introduced	22	1.2	11.2
Subsequent	27	1.4	13.7
Not applicable	1698	89.5	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	44	25.9
More	77	45.3
Less	32	18.8
Least	17	10.0
Total	**170**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.87	0.91

Similarity, Right Triangles, and Trigonometry: Standard 8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 222)**
Prerequisite	118	6.2	53.2
Reviewed	66	3.5	29.7
Introduced	19	1.0	8.6
Subsequent	19	1.0	8.6
Not applicable	1673	88.2	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	97	47.8
More	59	29.1
Less	40	19.7
Least	7	3.4
Total	**203**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
3.21	0.88

Similarity, Right Triangles, and Trigonometry: Standard 9. (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 128)**
Prerequisite	69	3.6	53.9
Reviewed	21	1.1	16.4
Introduced	12	0.6	9.4
Subsequent	26	1.4	20.3
Not applicable	1767	93.1	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	11	10.8
More	27	26.5
Less	48	47.1
Least	16	15.7
Total	**102**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.32	0.87

Similarity, Right Triangles, and Trigonometry: Standard 10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 156)**
Prerequisite	74	3.9	47.4
Reviewed	38	2.0	24.4
Introduced	15	0.8	9.6
Subsequent	29	1.5	18.6
Not applicable	1739	91.7	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	21	16.5
More	40	31.5
Less	49	38.6
Least	17	13.4
Total	**127**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.51	0.92

Similarity, Right Triangles, and Trigonometry: Standard 11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 178)**
Prerequisite	81	4.3	45.5
Reviewed	47	2.5	26.4
Introduced	19	1.0	10.7
Subsequent	31	1.6	17.4
Not applicable	1717	90.5	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	32	21.8
More	52	35.4
Less	44	29.9
Least	19	12.9
Total	**147**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.66	0.96

Circles: Standard 1. Prove that all circles are similar.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 86)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	65	3.4	75.6	Most	14	18.2	2.21	1.04
Reviewed	7	0.4	8.1	More	9	11.7		
Introduced	5	0.3	5.8	Less	33	42.9		
Subsequent	9	0.5	10.5	Least	21	27.3		
Not applicable	1809	95.4		**Total**	**77**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Circles: Standard 2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; and the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 128)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	84	4.4	65.6	Most	17	15.0	2.40	0.96
Reviewed	20	1.1	15.6	More	32	28.3		
Introduced	9	0.5	7.0	Less	43	38.1		
Subsequent	15	0.8	11.7	Least	21	18.6		
Not applicable	1767	93.1		**Total**	**113**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Circles: Standard 3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 81)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	54	2.8	66.7	Most	10	14.5	2.29	0.96
Reviewed	10	0.5	12.3	More	14	20.3		
Introduced	5	0.3	6.2	Less	31	44.9		
Subsequent	12	0.6	14.8	Least	14	20.3		
Not applicable	1814	95.6		**Total**	**69**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Circles: Standard 4. (+) Construct a tangent line from a point outside a given circle to the circle.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 110)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	63	3.3	57.3	Most	16	17.2	2.51	0.95
Reviewed	20	1.1	18.2	More	29	31.2		
Introduced	10	0.5	9.1	Less	34	36.6		
Subsequent	17	0.9	15.5	Least	14	15.1		
Not applicable	1785	94.1		**Total**	**93**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Circles: Standard 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 153)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	77	4.1	50.3	Most	26	20.0	2.58	0.96
Reviewed	32	1.7	20.9	More	41	31.5		
Introduced	21	1.1	13.7	Less	45	34.6		
Subsequent	23	1.2	15.0	Least	18	13.8		
Not applicable	1742	91.8		**Total**	**130**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 181)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	85	4.5	47.0	Most	28	16.7	2.55	0.91
Reviewed	47	2.5	26.0	More	57	33.9		
Introduced	36	1.9	19.9	Less	63	37.5		
Subsequent	13	0.7	7.2	Least	20	11.9		
Not applicable	1714	90.4		**Total**	**168**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 2. Derive the equation of a parabola given a focus and directrix.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 148)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	58	3.1	39.2	Most	13	11.1	2.32	0.93
Reviewed	32	1.7	21.6	More	36	30.8		
Introduced	27	1.4	18.2	Less	44	37.6		
Subsequent	31	1.6	20.9	Least	24	20.5		
Not applicable	1747	92.1		**Total**	**117**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 3. (+) Derive the equations of ellipses and hyperbolas given foci and directrices.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 137)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	51	2.7	37.2	Most	13	12.6	2.26	0.96
Reviewed	29	1.5	21.2	More	25	24.3		
Introduced	23	1.2	16.8	Less	41	39.8		
Subsequent	34	1.8	24.8	Least	24	23.3		
Not applicable	1758	92.7		**Total**	**103**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 129)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	65	3.4	50.4	Most	11	9.8	2.26	0.89
Reviewed	25	1.3	19.4	More	29	25.9		
Introduced	22	1.2	17.1	Less	50	44.6		
Subsequent	17	0.9	13.2	Least	22	19.6		
Not applicable	1766	93.1		**Total**	**112**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 182)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	85	4.5	46.7	Most	43	25.1	2.82	0.88
Reviewed	57	3.0	31.3	More	66	38.6		
Introduced	29	1.5	15.9	Less	51	29.8		
Subsequent	11	0.6	6.0	Least	11	6.4		
Not applicable	1713	90.3		**Total**	**171**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 135)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	73	3.8	54.1	Most	16	13.6	2.32	0.97
Reviewed	27	1.4	20.0	More	32	27.1		
Introduced	18	0.9	13.3	Less	44	37.3		
Subsequent	17	0.9	12.6	Least	26	22.0		
Not applicable	1760	92.8		**Total**	**118**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Expressing Geometric Properties with Equations: Standard 7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 151)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	79	4.2	52.3	Most	20	14.6	2.47	0.88
Reviewed	34	1.8	22.5	More	41	29.9		
Introduced	24	1.3	15.9	Less	60	43.8		
Subsequent	14	0.7	9.3	Least	16	11.7		
Not applicable	1744	91.9		**Total**	**137**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Geometric Measurement and Dimension: Standard 1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 140)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	67	3.5	47.9	Most	23	18.4	2.60	0.92
Reviewed	41	2.2	29.3	More	43	34.4		
Introduced	16	0.8	11.4	Less	45	36.0		
Subsequent	16	0.8	11.4	Least	14	11.2		
Not applicable	1755	92.5		**Total**	**125**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Geometric Measurement and Dimension: Standard 2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 93)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	39	2.1	41.9	Most	12	15.6	2.58	0.89
Reviewed	21	1.1	22.6	More	30	39.0		
Introduced	17	0.9	18.3	Less	26	33.8		
Subsequent	16	0.8	17.2	Least	9	11.7		
Not applicable	1802	95.0		**Total**	**77**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Geometric Measurement and Dimension: Standard 3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 258)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	125	6.6	48.4	Most	74	30.1	2.90	0.93
Reviewed	95	5.0	36.8	More	93	37.8		
Introduced	26	1.4	10.1	Less	59	24.0		
Subsequent	12	0.6	4.7	Least	20	8.1		
Not applicable	1637	86.3		**Total**	**246**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Geometric Measurement and Dimension: Standard 4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 198)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	61	3.2	30.8	Most	37	23.9	2.79	0.90
Reviewed	43	2.3	21.7	More	61	39.4		
Introduced	51	2.7	25.8	Less	44	28.4		
Subsequent	43	2.3	21.7	Least	13	8.4		
Not applicable	1697	89.5		**Total**	**155**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Modeling with Geometry: Standard 1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 243)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	33.7	Most	44	19.6	2.66	0.91
Reviewed	90	4.7	37.0	More	83	37.1		
Introduced	52	2.7	21.4	Less	73	32.6		
Subsequent	19	1.0	7.8	Least	24	10.7		
Not applicable	1652	87.1		**Total**	**224**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Modeling with Geometry: Standard 2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 255)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	73	3.8	28.6	Most	54	23.6	2.80	0.88
Reviewed	101	5.3	39.6	More	92	40.2		
Introduced	55	2.9	21.6	Less	67	29.3		
Subsequent	26	1.4	10.2	Least	16	7.0		
Not applicable	1640	86.5		**Total**	**229**	**100.0**		
Missing	2	0.1						
Total	**1897**	**100.0**	**100.0**					

Mathematics: Geometry

Modeling with Geometry: Standard 3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ⋆

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 175)**
Prerequisite	48	2.5	27.4
Reviewed	47	2.5	26.9
Introduced	57	3.0	32.6
Subsequent	23	1.2	13.1
Not applicable	1720	90.7	
Missing	2	0.1	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	30	19.7
More	64	42.1
Less	49	32.2
Least	9	5.9
Total	**152**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.76	0.84

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Statistics and Probability★

Interpreting Categorical and Quantitative Data: Standard 1. Represent data with plots on the real number line (dot plots, histograms, and box plots).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 632)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	185	9.8	29.3	Most	175	30.4	2.98	0.86
Reviewed	180	9.5	28.5	More	239	41.6		
Introduced	210	11.1	33.2	Less	133	23.1		
Subsequent	57	3.0	9.0	Least	28	4.9		
Not applicable	1265	66.7		**Total**	**575**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 614)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	129	6.8	21.0	Most	148	28.5	2.88	0.90
Reviewed	157	8.3	25.6	More	198	38.1		
Introduced	234	12.3	38.1	Less	139	26.7		
Subsequent	94	5.0	15.3	Least	35	6.7		
Not applicable	1283	67.6		**Total**	**520**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 529)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	87	4.6	16.4	Most	115	27.4	2.81	0.92
Reviewed	110	5.8	20.8	More	141	33.6		
Introduced	223	11.8	42.2	Less	133	31.7		
Subsequent	109	5.7	20.6	Least	31	7.4		
Not applicable	1368	72.1		**Total**	**420**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.

Interpreting Categorical and Quantitative Data: Standard 4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 523)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	78	4.1	14.9	Most	137	35.5	2.97	0.94
Reviewed	96	5.1	18.4	More	126	32.6		
Introduced	212	11.2	40.5	Less	97	25.1		
Subsequent	137	7.2	26.2	Least	26	6.7		
Not applicable	1374	72.4		**Total**	**386**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 444)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	63	3.3	14.2	Most	78	25.0	2.82	0.89
Reviewed	66	3.5	14.9	More	121	38.8		
Introduced	183	9.6	41.2	Less	91	29.2		
Subsequent	132	7.0	29.7	Least	22	7.1		
Not applicable	1453	76.6		**Total**	**312**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 560)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	81	4.3	14.5	Most	146	32.5	2.94	0.92
Reviewed	126	6.6	22.5	More	162	36.1		
Introduced	242	12.8	43.2	Less	109	24.3		
Subsequent	111	5.9	19.8	Least	32	7.1		
Not applicable	1337	70.5		**Total**	**449**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 6a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 443)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	56	3.0	12.6	Most	96	30.0	2.92	0.89
Reviewed	87	4.6	19.6	More	123	38.4		
Introduced	177	9.3	40.0	Less	81	25.3		
Subsequent	123	6.5	27.8	Least	20	6.3		
Not applicable	1454	76.6		**Total**	**320**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 6b. Informally assess the fit of a function by plotting and analyzing residuals.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 358)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	47	2.5	13.1	Most	53	23.6	2.75	0.92
Reviewed	46	2.4	12.8	More	82	36.4		
Introduced	132	7.0	36.9	Less	70	31.1		
Subsequent	133	7.0	37.2	Least	20	8.9		
Not applicable	1539	81.1		**Total**	**225**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 6c. Fit a linear function for a scatter plot that suggests a linear association.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 470)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	55	2.9	11.7	Most	115	32.9	3.02	0.86
Reviewed	95	5.0	20.2	More	144	41.1		
Introduced	200	10.5	42.6	Less	73	20.9		
Subsequent	120	6.3	25.5	Least	18	5.1		
Not applicable	1427	75.2		**Total**	**350**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 529)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	99	5.2	18.7	Most	155	35.7	3.03	0.90
Reviewed	143	7.5	27.0	More	164	37.8		
Introduced	192	10.1	36.3	Less	88	20.3		
Subsequent	95	5.0	18.0	Least	27	6.2		
Not applicable	1368	72.1		**Total**	**434**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 8. Compute (using technology) and interpret the correlation coefficient of a linear fit.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 465)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	46	2.4	9.9	Most	92	30.5	2.91	0.92
Reviewed	79	4.2	17.0	More	113	37.4		
Introduced	177	9.3	38.1	Less	75	24.8		
Subsequent	163	8.6	35.1	Least	22	7.3		
Not applicable	1432	75.5		**Total**	**302**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Interpreting Categorical and Quantitative Data: Standard 9. Distinguish between correlation and causation.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 548)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	64	3.4	11.7	Most	181	39.0	3.07	0.91
Reviewed	126	6.6	23.0	More	159	34.3		
Introduced	274	14.4	50.0	Less	98	21.1		
Subsequent	84	4.4	15.3	Least	26	5.6		
Not applicable	1349	71.1		**Total**	**464**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 588)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	95	5.0	16.2	Most	169	33.9	2.98	0.90
Reviewed	101	5.3	17.2	More	179	35.9		
Introduced	302	15.9	51.4	Less	122	24.4		
Subsequent	90	4.7	15.3	Least	29	5.8		
Not applicable	1309	69.0		**Total**	**499**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 460)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	63	3.3	13.7	Most	78	23.9	2.74	0.92
Reviewed	72	3.8	15.7	More	114	35.0		
Introduced	191	10.1	41.5	Less	106	32.5		
Subsequent	134	7.1	29.1	Least	28	8.6		
Not applicable	1437	75.8		**Total**	**326**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 527)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	60	3.2	11.4	Most	119	27.4	2.91	0.86
Reviewed	84	4.4	15.9	More	185	42.5		
Introduced	291	15.3	55.2	Less	105	24.1		
Subsequent	92	4.8	17.5	Least	26	6.0		
Not applicable	1370	72.2		**Total**	**435**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 450)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	47	2.5	10.4	Most	87	29.8	2.93	0.88
Reviewed	55	2.9	12.2	More	116	39.7		
Introduced	190	10.0	42.2	Less	72	24.7		
Subsequent	158	8.3	35.1	Least	17	5.8		
Not applicable	1447	76.3		**Total**	**292**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 454)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	43	2.3	9.5	Most	76	26.9	2.88	0.88
Reviewed	54	2.8	11.9	More	116	41.0		
Introduced	186	9.8	41.0	Less	73	25.8		
Subsequent	171	9.0	37.7	Least	18	6.4		
Not applicable	1443	76.1		**Total**	**283**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Making Inferences and Justifying Conclusions: Standard 6. Evaluate reports based on data.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 616)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	82	4.3	13.3	Most	160	30.6	2.98	0.86
Reviewed	132	7.0	21.4	More	223	42.6		
Introduced	309	16.3	50.2	Less	111	21.2		
Subsequent	93	4.9	15.1	Least	29	5.5		
Not applicable	1281	67.5		**Total**	**523**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 334)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	44	2.3	13.2	Most	55	25.7	2.84	0.87
Reviewed	44	2.3	13.2	More	81	37.9		
Introduced	126	6.6	37.7	Less	67	31.3		
Subsequent	120	6.3	35.9	Least	11	5.1		
Not applicable	1563	82.4		**Total**	**214**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 350)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	38	2.0	10.9	Most	61	27.7	2.86	0.89
Reviewed	53	2.8	15.1	More	80	36.4		
Introduced	129	6.8	36.9	Less	66	30.0		
Subsequent	130	6.9	37.1	Least	13	5.9		
Not applicable	1547	81.5		**Total**	**220**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 3. Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 303)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	28	1.5	9.2	Most	56	32.2	2.93	0.91
Reviewed	39	2.1	12.9	More	58	33.3		
Introduced	107	5.6	35.3	Less	51	29.3		
Subsequent	129	6.8	42.6	Least	9	5.2		
Not applicable	1594	84.0		**Total**	**174**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 313)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	36	1.9	11.5	Most	42	24.4	2.78	0.91
Reviewed	27	1.4	8.6	More	65	37.8		
Introduced	109	5.7	34.8	Less	51	29.7		
Subsequent	141	7.4	45.0	Least	14	8.1		
Not applicable	1584	83.5		**Total**	**172**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 377)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	49	2.6	13.0	Most	61	24.3	2.78	0.92
Reviewed	52	2.7	13.8	More	97	38.6		
Introduced	150	7.9	39.8	Less	69	27.5		
Subsequent	126	6.6	33.4	Least	24	9.6		
Not applicable	1520	80.1		**Total**	**251**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 6. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 270)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	27	1.4	10.0	Most	45	30.0	2.88	0.93
Reviewed	25	1.3	9.3	More	53	35.3		
Introduced	98	5.2	36.3	Less	41	27.3		
Subsequent	120	6.3	44.4	Least	11	7.3		
Not applicable	1627	85.8		**Total**	**150**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 273)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	25	1.3	9.2	Most	51	32.5	2.94	0.91
Reviewed	27	1.4	9.9	More	54	34.4		
Introduced	105	5.5	38.5	Less	43	27.4		
Subsequent	116	6.1	42.5	Least	9	5.7		
Not applicable	1624	85.6		**Total**	**157**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 267)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	25	1.3	9.4	Most	46	30.3	2.92	0.90
Reviewed	29	1.5	10.9	More	58	38.2		
Introduced	98	5.2	36.7	Less	38	25.0		
Subsequent	115	6.1	43.1	Least	10	6.6		
Not applicable	1630	85.9		**Total**	**152**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Conditional Probability and the Rules of Probability: Standard 9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 261)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	28	1.5	10.7	Most	38	26.4	2.80	0.92
Reviewed	25	1.3	9.6	More	50	34.7		
Introduced	91	4.8	34.9	Less	45	31.3		
Subsequent	117	6.2	44.8	Least	11	7.6		
Not applicable	1636	86.2		**Total**	**144**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.*

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 298)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	28	1.5	9.4	Most	44	25.1	2.86	0.84
Reviewed	28	1.5	9.4	More	70	40.0		
Introduced	119	6.3	39.9	Less	54	30.9		
Subsequent	123	6.5	41.3	Least	7	4.0		
Not applicable	1599	84.3		**Total**	**175**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.*

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 306)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	30	1.6	9.8	Most	48	27.3	2.90	0.86
Reviewed	33	1.7	10.8	More	70	39.8		
Introduced	113	6.0	36.9	Less	50	28.4		
Subsequent	130	6.9	42.5	Least	8	4.5		
Not applicable	1591	83.9		**Total**	**176**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.*

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 275)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	29	1.5	10.5	Most	41	26.3	2.84	0.90
Reviewed	23	1.2	8.4	More	60	38.5		
Introduced	104	5.5	37.8	Less	44	28.2		
Subsequent	119	6.3	43.3	Least	11	7.1		
Not applicable	1622	85.5		**Total**	**156**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?⋆

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percentb (n = 286)**
Prerequisite	32	1.7	11.2
Reviewed	25	1.3	8.7
Introduced	101	5.3	35.3
Subsequent	128	6.7	44.8
Not applicable	1611	84.9	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	36	22.8
More	59	37.3
Less	52	32.9
Least	11	7.0
Total	**158**	**100.0**

Importance Mean	
Meanc	**Standard deviation**
2.76	0.88

Using Probability to Make Decisions: Standard 5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.⋆

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 313)**
Prerequisite	35	1.8	11.2
Reviewed	40	2.1	12.8
Introduced	113	6.0	36.1
Subsequent	125	6.6	39.9
Not applicable	1584	83.5	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	30	16.0
More	72	38.3
Less	63	33.5
Least	23	12.2
Total	**188**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.58	0.90

Using Probability to Make Decisions: Standard 5a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.

Applicability Ratings			
Category	**Number**	**Percent**	**Valid percent[b] (n = 289)**
Prerequisite	31	1.6	10.7
Reviewed	30	1.6	10.4
Introduced	116	6.1	40.1
Subsequent	112	5.9	38.8
Not applicable	1608	84.8	
Total	**1897**	**100.0**	**100.0**

Importance Ratings[a]		
Category	**Number**	**Percent**
Most	25	14.1
More	74	41.8
Less	62	35.0
Least	16	9.0
Total	**177**	**100.0**

Importance Mean	
Mean[c]	**Standard deviation**
2.61	0.84

Using Probability to Make Decisions: Standard 5b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 290)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	32	1.7	11.0	Most	23	13.6	2.60	0.81
Reviewed	37	2.0	12.8	More	68	40.2		
Introduced	100	5.3	34.5	Less	66	39.1		
Subsequent	121	6.4	41.7	Least	12	7.1		
Not applicable	1607	84.7		**Total**	**169**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 319)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	37	2.0	11.6	Most	31	16.0	2.62	0.87
Reviewed	34	1.8	10.7	More	79	40.7		
Introduced	123	6.5	38.6	Less	64	33.0		
Subsequent	125	6.6	39.2	Least	20	10.3		
Not applicable	1578	83.2		**Total**	**194**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Using Probability to Make Decisions: Standard 7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).★

Applicability Ratings				Importance Ratings[a]			Importance Mean	
Category	**Number**	**Percent**	**Valid percent[b] (n = 336)**	**Category**	**Number**	**Percent**	**Mean[c]**	**Standard deviation**
Prerequisite	37	2.0	11.0	Most	41	19.7	2.71	0.91
Reviewed	38	2.0	11.3	More	90	43.3		
Introduced	133	7.0	39.6	Less	53	25.5		
Subsequent	128	6.7	38.1	Least	24	11.5		
Not applicable	1561	82.3		**Total**	**208**	**100.0**		
Total	**1897**	**100.0**	**100.0**					

Notes. Where (★) is shown, it is an indication in the Common Core mathematics standards document to indicate a modeling mathematics practice. Where (+) is shown, it is an indication from the Common Core Mathematics standards document that some mathematics standards represent advanced content and are intended to prepare students for advanced courses.

[a]Respondents completed an importance rating if they indicated that the content of the standards was either (a) prerequisite to, (b) reviewed in, or (c) introduced during their course. The mode rating is shaded.

[b]Valid percent values indicate percentages of respondents who indicated the standard was applicable to their course.

[c]The mean importance rating is calculated by assigning the following values to the ordinal scale ratings: least = 1, less = 2, more = 3, most = 4. Caution should be exercised when interpreting the precise value of any mean in relation to the categorical system underlying it.