

**COLLEGE
READINESS**



ACT National Curriculum Survey[®] 2005–2006



ACT[®]

ACT National
Curriculum Survey®
2005–2006

ACT®

ACT is an independent, not-for-profit organization that provides assessment, research, information, and program management services in the broad areas of education and workforce development. Each year we serve millions of people in high schools, colleges, professional associations, businesses, and government agencies, nationally and internationally. Though designed to meet a wide array of needs, all ACT programs and services have one guiding purpose—helping people achieve education and workplace success.

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Overview

What Is the ACT National Curriculum Survey®?

The ACT National Curriculum Survey is a one-of-a-kind nationwide survey of educational practices and expectations conducted by ACT every three to five years. ACT surveys thousands of middle school/junior high school, secondary, and postsecondary¹ teachers in English/writing, reading (including English language arts and social studies teachers), mathematics, and science for the purpose of determining what skills and knowledge are currently being taught that are considered important for success at each grade level for college readiness.

ACT uses the survey results to guide the test development of ACT's EXPLORE® (8th and 9th grade), PLAN® (10th grade), and ACT® (11th and 12th grade) tests, which are key components of ACT's Educational Planning and Assessment System (EPAS™). ACT conducts the ACT National Curriculum Survey to ensure its curriculum-based assessments are measuring the knowledge and skills that are important for success in postsecondary education.

Because the ACT National Curriculum Survey collects a wealth of information about what middle school, secondary, and postsecondary educators believe entering college students should know and be able to do to be ready for credit-bearing college-level coursework, we are sharing the results more broadly, recognizing that these data can help educational stakeholders make more informed educational decisions about college readiness standards and alignment of those standards with assessment and curriculum.

The first section of this report provides an overview of the 2005–2006 survey and highlights key findings. This section is followed by the findings for each of four subject areas: English/writing, mathematics, reading, and science. The last section offers conclusions based on the results.

ACT conducts the only nationwide curriculum survey that empirically identifies current instructional practices and postsecondary expectations in order to develop tests that measure critical skills and knowledge.

What is “college readiness”? In this report we use the phrase to refer to approximately a 75% chance of earning a grade of C or better, or approximately a 50% chance of earning a grade of B or better, in selected courses commonly taken by first-year college students in the areas of English (English Composition), mathematics (Algebra), social sciences (History, Psychology, Sociology, Political Science, or Economics), and natural sciences (Biology).

¹ Throughout this report, the term *postsecondary instructors* refers only to instructors of credit-bearing college courses; it does not include instructors of remedial college courses. When the latter are referenced in the report, they are termed “remedial-course teachers.”

Survey Participants Included Middle School, High School, and Postsecondary Instructors; Remedial-Course Teachers; and High School Guidance Counselors

For the 2005–2006 ACT National Curriculum Survey, we sent surveys (see Table 1.1) to a nationally representative sample of middle school/junior high school, high school, and college teachers who teach courses in English/writing, reading (including English language arts and social studies), mathematics, and science (including biology, chemistry, physics, and Earth/space science) in public and private institutions across the United States. We also included a sample of high school guidance counselors and of college remedial-course teachers. The response rates by content area ranged from 16% to 30%, and the overall response rate was 19%. Appendix A provides the details of the survey respondent information.

In the fall of 2000, 28% of incoming college freshmen took a remedial course in either reading, writing, or math (NCES, 2004). Instructors of these kinds of courses were included in the 2005–2006 survey sample.

All teachers were asked to perform two primary tasks. First, teachers were asked to *rate content knowledge and skills* with respect to how important each is to student success in the content area (specifically, secondary teachers were asked to rate the importance in the class they teach; postsecondary instructors were asked to rate the importance of the content/skill as a prerequisite to success in their class). These results allow for comparison of secondary school teachers' views of the importance of course outcomes to postsecondary instructors' expectations of what is needed for success in their courses. Second, teachers were asked to *rank groups* of content and skills, known as *strands*, with respect to their relative importance for student readiness for college. In addition, all teachers (except

for postsecondary) were asked to indicate whether they teach that particular knowledge/skill in their course. Finally, teachers were asked to provide additional information specific to the courses they teach (e.g., textbooks used, calculator policies in math, course requirements in science, texts featured in English and social studies courses, impact of state standards).

High school guidance counselors were surveyed to provide information such as what kinds of courses were typically offered in their schools, general course-taking patterns of students, and at what grade level a student in their district typically took certain courses.

Grade level	Number of surveys
Middle school/junior high school	6,800
High school	
Teachers	10,800
Guidance counselors	1,200
Postsecondary	12,992
Remedial-course	3,873
Total	35,665

We also surveyed a sample of teachers who teach remedial courses at the postsecondary level in reading, writing, and math. Unfortunately, far too many high school graduates currently need to enroll in non-credit-bearing remedial courses in order to become ready for postsecondary work. According to the National Center for Educational Statistics (NCES), in the fall of 2000, 28% of all incoming freshmen were enrolled in at least one remedial course (see Figure 1.1; National Center for Education Statistics, 2004, p. 84). By collecting data identifying both the critical skills and knowledge that students were missing and the set of knowledge and skills that resulted in successful remediation in a content area, we believe the results will help to identify the broader knowledge and skills these students are not attaining in high school.

It is important to note that there are no remedial science courses that students typically take in college; thus freshman science courses were not included in the remediation part of the survey.

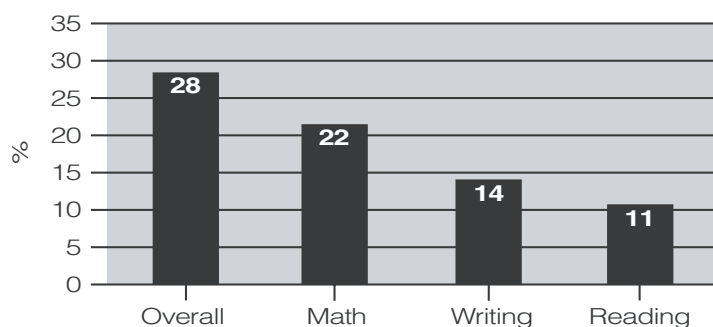


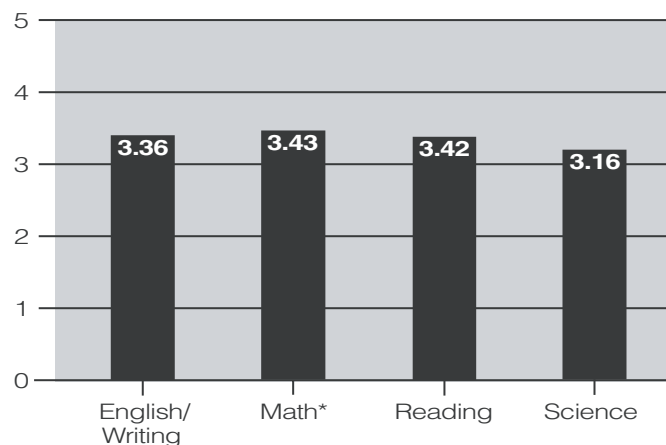
Figure 1.1: Percentage of College Freshmen Enrolled in Remedial Coursework in Fall 2000

Summary of Results

1. ACT's Educational Planning and Assessment System (EPAS) Tests Measure Content and Skills Educators Identify as Important for College Readiness

ACT conducts its National Curriculum Survey to make sure that ACT's EPAS test specifications are up to date and reflect the knowledge and skills currently needed for college readiness. The results of the ACT National Curriculum Survey affirm that the knowledge and skills currently being taught in United States classrooms that are important for readiness and success in college are being adequately represented in ACT's EXPLORE, PLAN, and ACT tests. The knowledge and skills being measured by the tests and the relative emphasis accorded to each are consistent with those rated as important and necessary by secondary and postsecondary teachers.

Figure 1.2 reports the means of postsecondary teacher importance ratings using a five-point scale (1 = Not Important, 5 = Very Important) for the groups of knowledge and skills currently measured by the EPAS tests. This table illustrates that the knowledge and skills being measured



* Because mathematics, unlike the other three content areas, contains a much larger pool of topics and skills whose importance varies depending on the courses taught by the survey respondents, we evaluated these topics and skills in the context of the courses in which they are most relevant.

Figure 1.2: Postsecondary Mean Importance Ratings of EPAS Content and Skills (1=Not Important; 5=Very Important)

are considered important by postsecondary instructors, with all four subject areas averaging above the 3.0 mark (the minimum level of importance is 2.0).

ACT uses importance rating results to guide decisions about the knowledge and skills to be measured on EPAS tests and in what proportions. When postsecondary and secondary instructors' ratings disagree, we give precedence to the postsecondary instructors' ratings to make sure our EPAS tests measure knowledge and skills critical to college readiness. If a particular skill or knowledge currently on the EPAS tests falls into the unimportant range, or if an untested skill or knowledge falls into the moderately important range or beyond, the ACT National Curriculum Survey results give us the

validity evidence to make a corresponding change in our test specifications. We also use the importance rating results to help guide us in evaluating the overall emphases the knowledge and skills receive in each test.

Appendix B gives statistical details about each knowledge and skill question asked. Appendix C provides details about EPAS test development, including EPAS test specifications. Sections 2 through 5 in this document include additional discussion about the validity evidence provided by ACT National Curriculum Survey 2005–2006 results with respect to each content area EPAS tests.

Across all subject areas, high school teachers rate more content topics and skills as “important” or “very important” than do postsecondary instructors.

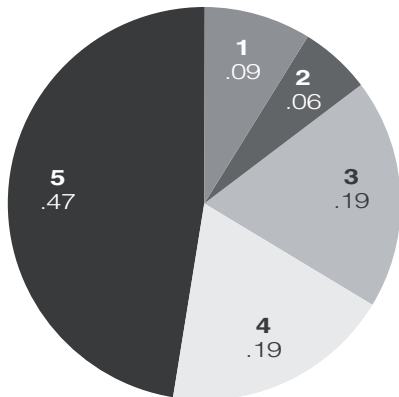


Figure 1.3: High School Teachers' Ratings (1=Not Important; 5=Very Important)

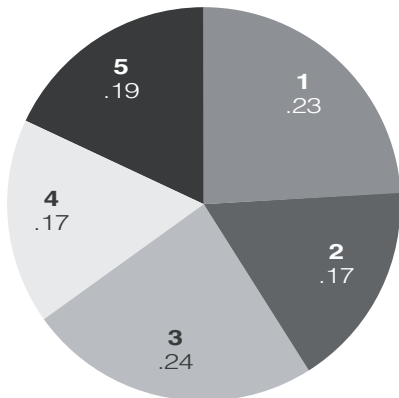


Figure 1.4: Postsecondary Instructors' Ratings (1=Not Important; 5=Very Important)

2. What Postsecondary Instructors Expect Entering College Students to Know Is Far More Targeted and Specific Than What High School Teachers View as Important

High school teachers in all content areas (English/writing, reading, mathematics, and science) tended to rate far more content and skills as “important” or “very important” than did their middle school/junior high school, postsecondary, or remedial counterparts (see Figures 1.3 and 1.4). Postsecondary instructors selected fewer topics and skills as important prerequisites for success.

This finding is consistent with recent policy statements raising concerns that some states require far too many standards to be taught and measured, rather than becoming more

selective in identifying the most important state standards for students to attain. The long lists of content topics and skills defy teachers' efforts to teach them in detail within the confines of a single school year (Thomas B. Fordham Foundation, 2006). It may be that the extensive demands of state standards are forcing high school teachers to treat all content topics as important, sacrificing depth for breadth. And since our postsecondary survey results indicate that a more rigorous treatment of fundamental content knowledge and skills needed for credit-bearing college courses would better prepare students for postsecondary school and work, this unintended consequence of state standards merits further analysis.

3. Remedial-Course Teachers' Ratings of Math and Reading Skills Tend to Align More Closely With Those of Postsecondary Instructors Than With Those of High School Teachers

When individual content and skill ratings of importance were examined, the responses given by both mathematics and reading remedial-course teachers aligned much more closely with postsecondary instructors' responses than with high school teachers' responses. This finding is consistent with the intent of remedial programs, which is to prepare students for success in postsecondary coursework. The closer alignment of remedial-course teachers' and postsecondary instructors' views of what their students need to know is important and points to a continuing gap between what high schools are teaching and what postsecondary educators expect of their entering students.

4. While Most High School Teachers Across Subject Areas Believe That Meeting Their State's Standards Prepares Students for College-Level Work, Most Postsecondary Instructors Disagree

State standards describe the knowledge and skills that each state identifies as important and necessary for students to learn. Schools, teachers, and students are being held accountable for meeting state standards by No Child Left Behind legislation (No Child Left Behind Act, 2001). Although the standards differ from state to state in content, specificity, and levels of proficiency expected, one thing they have in common is that they are the foundation for each state's curriculum and assessment efforts. Given the importance of state standards, ACT collected data on how aware postsecondary and high school teachers were of their state's standards as well as how well they thought their state's standards were preparing students for college-level work (for detailed data see Appendix D). The majority of these teachers (95% of high school teachers and 59% of postsecondary instructors) indicated that they understood their state's standards at least moderately well. Figure 1.5 summarizes how well

teachers believed their state's standards prepared students for college-level work.

High school teachers believe state standards are preparing students well for college-level work; however, 65% of postsecondary

Question: How well do you think your state's standards prepare students for college-level work in your content area?

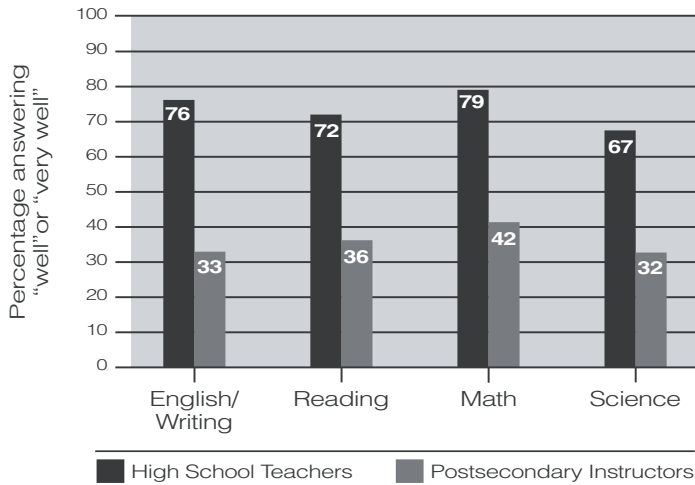


Figure 1.5: High School and Postsecondary Responses About State Standards

instructors responded that their state's standards prepared students poorly or very poorly for college-level work in their content area. This finding strongly suggests that a gap still exists between what colleges believe is important for college readiness and what state standards are requiring teachers to teach.

Repairing this gap does *not* necessarily involve adding more state standards. In fact, our survey findings (including the responses of remedial-course teachers) suggest that perhaps fewer and more-targeted state standards, focused on the essential knowledge and skills in each content area instead of many standards covering a broad array of topics and skills, might bring state standards more in line with what postsecondary instructors identify as prerequisite for postsecondary success in

school and work. Whether such an approach would be appropriate in any particular state would need to be considered as part of ongoing P–20 dialogues among the state's elementary, middle/junior high, and high school teachers, postsecondary instructors, and other stakeholders.

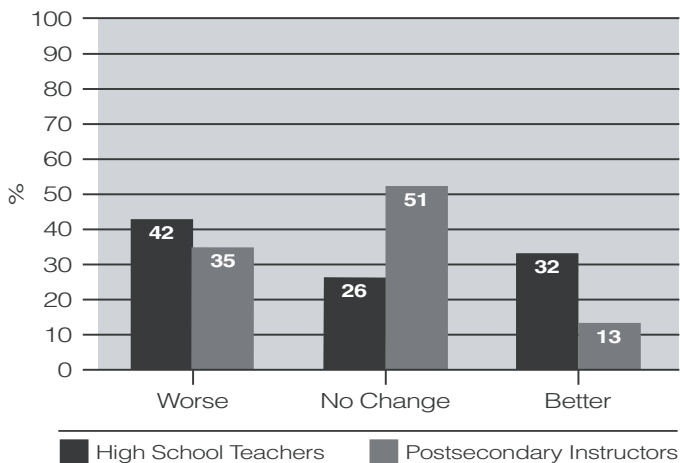


Figure 1.6: 2006 Students' College Readiness Compared With That of the Past 5–10 Years

5. High School Teachers Believe Today's High School Graduates Are Less Well Prepared for Postsecondary Education and Work Than Graduates in Previous Years, While Postsecondary Instructors Perceive No Difference

ACT asked educators their opinions as to "How prepared for college-level work are today's graduating seniors (or incoming freshmen) compared with graduating seniors (or the freshmen) in the past 5–10 years?"

As Figure 1.6 shows, a plurality of secondary instructors across disciplines (42%) believe that students are not as well prepared today for college-level work as were students in the past,

while a majority of postsecondary instructors (51%) believe that student preparation today is neither better nor worse than that of students in the past (see Appendix E for detailed response data). At the same time, 32% of high school teachers think students today are better prepared for college-level work—a percentage nearly two and a half times greater than that of postsecondary instructors who believe this.

Despite the apparently conflicting beliefs of high school teachers, a clear majority of both secondary (68%) and postsecondary (86%) teachers think that student preparation today for college-level work is the same or worse than student preparation 5 to 10 years ago.

These results can be interpreted in a number of ways. Because so much discussion has revolved around the current state of student readiness, educators may be more acutely aware than in the past that many graduating seniors (or incoming freshmen) are not well prepared for college. Another interpretation might be that expectations for students entering college have increased over the past 5–10 years, in which case educators are responding to a question asking about a moving target. Or, the data may reflect an increased sense that student preparation is declining. In any case, the results clearly reflect that the majority of respondents do not believe today's students are better prepared than their predecessors, despite explicit attempts toward this end.

6. Differences Between Secondary Instruction and Postsecondary Expectations

English/Writing:

Idea Development (High School) Versus Usage and Punctuation (Postsecondary)

Survey results suggest that high school and postsecondary teachers differ in the relative importance they ascribe to the basic mechanics of writing (Sentence Structure and Formation, Usage, and Punctuation) as compared to more global skills that deal with rhetoric or the development of arguments (Topic and Idea Development). Postsecondary instructors ranked mechanics more frequently among the most important groups of skills for success in an entry-level, credit-bearing postsecondary English course, while secondary teachers' rankings of these strands were generally lower. In contrast, secondary teachers ranked Topic and Idea Development (e.g., considering the appropriateness of expression in relation to purpose, audience, unity, or focus; or determining the effect of adding, revising, or deleting supporting material) higher than did postsecondary instructors.

With the advent of word processors and grammar checkers, is it really that important for students to know the basics when perhaps a machine can do it for them? The answer from many postsecondary English and writing instructors is “yes.”

Mathematics:

Advanced Content (High School) Versus Rigorous Understanding of Fundamentals (Postsecondary)

Survey results indicate wide agreement between secondary and postsecondary mathematics teachers in ranking strands of skills and processes in order of importance for success in mathematics. Then why do 22% of college freshmen take remedial math courses (NCES, 2004, p. 84)? Inadequate high school coursework may account for at least part of the remediation problem. Too few students may be taking enough high school math (up through Algebra II at a minimum). However, survey results also revealed a discontinuity between secondary preparation and postsecondary expectations. High school mathematics teachers gave more advanced topics greater importance than did their postsecondary counterparts. In contrast, postsecondary and remedial-course mathematics instructors rated a rigorous understanding of fundamental underlying mathematics skills and processes as being more important than exposure to more advanced math topics. These results suggest that high school mathematics instruction concentrating on building up fundamental understanding and rigorous application of fundamental principles will likely better prepare students for college-level math than will instruction that covers many content topics less rigorously.

Reading:

Decreased Instruction in Reading Strategies After 10th Grade (High School) Versus Reading Strategies Emphasized in Remedial Reading Courses (Postsecondary)

Postsecondary and high school teachers' responses aligned identically when the teachers were asked to rank given strands of reading skills in order of importance. However, overall achievement in reading does not show evidence of increasing throughout high school (ACT, 2006), and we know that 11% of college freshmen enrolled in a remedial reading course in Fall 2000 (National Center for Education Statistics, 2004). The survey results indicate that this may be tied to a lack of reading courses in high school and a decline in the teaching of targeted reading strategies after 9th grade. Meanwhile, remedial-course teachers rate such strategies as being of high importance and devote a high percentage of time to teaching them in order to get their students ready for entry-level college coursework. These findings suggest that more instruction in reading—including reading texts with greater complexity across the curriculum—is needed throughout the high school years.

Science:

Science Content (High School) Versus Inquiry/Process (Postsecondary)

High school science teachers consistently rated science content as more important to student success than science process/inquiry skills. These responses are in direct contrast to those of middle school/junior high school and postsecondary science teachers, who consistently rated science process skills higher in importance than science content. These results are reflected in state standards for science, which often describe detailed strategic content standards but only provide one overall group of “process standards” that often apply across courses, or sometimes across all of the high school grades. Survey results suggest that the emphasis on science content in high school science instruction does not align with postsecondary expectations for college readiness in science.

EPAS tests, as measures of college readiness, reflect postsecondary expectations of what knowledge and skills are most important for success in first-year college coursework. Postsecondary instructors' importance ratings of skills and knowledge are given precedence in ACT's evaluation of the survey results.

2

English/Writing

The English/Writing ACT National Curriculum Survey

The English/Writing ACT National Curriculum Survey was sent to 7,146 educators in English/writing, as shown in Table 2.1 (see Appendix A, Table A.2 for further details).

Table 2.1 Participants in the English/Writing ACT National Curriculum Survey		
Grade level	Courses	Surveys sent
Middle school/ junior high school	<i>English/Language Arts</i>	1,600
High school	<i>Writing/Composition</i>	2,000
Postsecondary	Entry-level courses	1,097
	<i>Composition</i>	403
	<i>Freshman English</i> <i>Survey of American Literature</i>	800
Remedial-course	<i>Developmental Writing</i>	1,246

All teachers were asked to perform two primary tasks. First, teachers were asked to rate discrete *content knowledge and skills* with respect to how important each is to student success in English/writing (specifically, secondary and remedial-course teachers were asked to rate the importance in the class they teach; postsecondary instructors were asked to rate the importance of the content/skill as a prerequisite to success in their class). These results allow for comparison of secondary school teachers' course outcomes to postsecondary instructors' expectations.

Second, teachers were asked to rank *groups* of content and skills, known as *strands*, with respect to their relative importance for student success in English and writing.

Table 2.2 Median Ratings of Individual Skills by English/Writing Strand on a Five-Point Scale (1 = Not Important; 5 = Very Important)			
Skills	MS	HS	PS
The 14 skills that make up Topic and Idea Development	4.05	4.12	3.34
The 8 skills that make up Organization, Unity, and Coherence	4.74	4.64	3.96
The 8 skills that make up Word Choice in Terms of Style, Tone, Clarity, and Economy	4.17	4.27	3.57
The 7 skills that make up Sentence Structure and Formation	4.00	4.31	3.80
The 7 skills that make up Conventions of Usage	4.21	4.07	4.16
The 11 skills that make up Conventions of Punctuation	3.98	4.17	3.81

In addition, all teachers except for postsecondary instructors were asked to indicate whether or not the skill/content is taught in their course. If not taught, the teacher was asked to indicate the reason (because the skill is taught in a prior course, or for any other reason). Further information about what knowledge and skills are being taught in middle school/junior high school and high school can be found in Appendix F. Teachers were also asked to provide information about what texts are featured in their English and writing courses and about their perceptions of their state's standards in English and writing.

Results of Importance Ratings

Table 2.2 shows the results of cumulative importance ratings of the individual content and skills that make up each strand. Each knowledge and skill item was rated using a five-point scale where 1= not important and 5 = very important (mean rating results are given in Appendix B, Table B.1). The medians were calculated from all of the individual content and skill ratings within each strand. These median importance ratings are reported in Table 2.2 by middle school/junior high school (MS), high school (HS), and postsecondary (PS) instructors' cumulative rating results.

These results indicate that teachers at every grade level consider the knowledge and skills covered on the EPAS English and ACT Writing Tests to be important.

Results of Rank-Ordering Strands

In order to determine relative importance, participants in the English/writing version of the ACT National Curriculum Survey were asked to rank order six strands from most important (1st) through least important (6th). (For a detailed list of rankings, see Appendix G.) Results of averaged rankings are provided in Table 2.3 by middle school/junior high school (MS), high school (HS), and postsecondary (PS) responses.

Although the relative ranking results, in summary, indicate some agreement between postsecondary and high school English and writing instructors, additional analyses reveal interesting differences. Strands that deal with basic mechanics of writing (Sentence Structure and Formation, Conventions of Usage, and Conventions of Punctuation) were ranked as the most important (1) of the six strands by 35% of postsecondary instructors, whereas only 10% of high school teachers gave these strands the top mark (see Figure 2.1). This analysis reveals that knowledge and skills related to mechanics tend to be more highly valued by college instructors than by high school teachers.

Strand	MS	HS	PS
Topic and Idea Development	2	1	3
Organization, Unity, and Coherence	1	2	1
Word Choice in Terms of Style, Tone, Clarity, and Economy	4	4	6
Sentence Structure and Formation	3	3	2
Conventions of Usage	5	5	4
Conventions of Punctuation	6	6	5

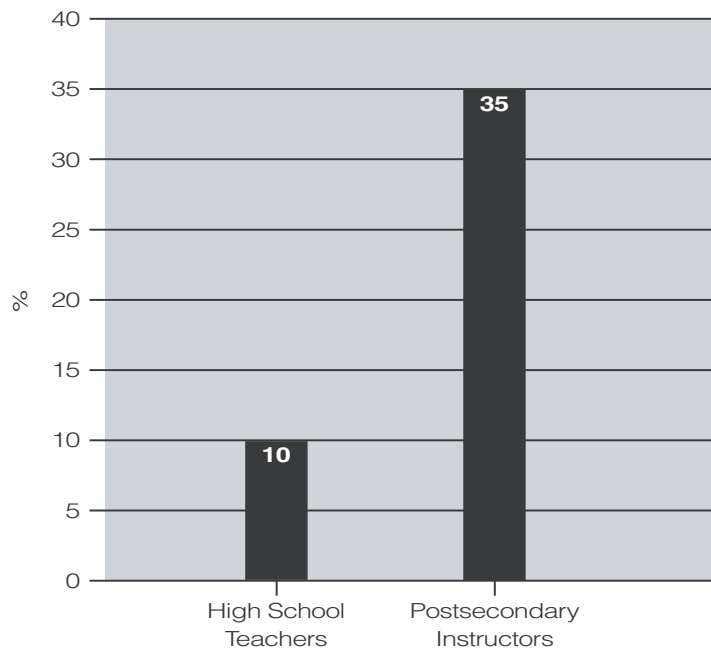


Figure 2.1: Percentage of Postsecondary Instructors Versus High School Teachers Who Rank a Mechanics Strand as the Most Important Strand (1)

Disagreement Between High School Teachers and Postsecondary Instructors

Postsecondary instructors rank the basic mechanics of writing higher than do high school teachers.

Survey results reveal differences between the secondary and postsecondary judgments of what is most important for success in English and writing. Postsecondary responses clustered around Sentence Structure and Formation and Conventions of Usage as “1” ratings in a way that high school teachers’ responses did not. This suggests that many postsecondary instructors are more concerned with the fundamental elements of writing than are high school teachers. Further examination of individual survey questions supports this inference. Of the top ten highest-rated writing characteristics in the ACT National Curriculum Survey, postsecondary instructors had six related to grammar and usage, while high school teachers had none. Of the top 30 postsecondary writing characteristics, almost half (12) were ranked a minimum of 20 spots lower in importance in the high school data. Every one of the characteristics with this great a difference was related to language usage and mechanics. High school teachers ranked as “1” the student ability to write an effective introduction and conclusion to a piece of writing; postsecondary instructors ranked this characteristic 30th. Postsecondary instructors ranked as “2” the student ability to punctuate the end of a sentence correctly; high school teachers ranked this characteristic 31st. (Postsecondary instructors ranked student ability to write unified and coherent text as “1,” which was similar to high school teachers’ ranking it “2.”)

Much of the commentary provided by postsecondary instructors in the comments section of the ACT National Curriculum Survey focused on the importance of mechanics at the postsecondary level. Many postsecondary instructors expressed frustration at having students enter their classes who could not write a complete sentence or could not understand discussion about basic elements of writing. Many postsecondary instructors reported having to reteach these basic elements before they could move on to the critical thinking/reading components required for their courses. Postsecondary instructors repeatedly indicated that their job was to teach students how to weigh and develop arguments but that students’ grammatical insufficiencies interfered with their work, although to a slightly lesser extent. Interestingly, high school teachers said the same things about the students in their classes. They expressed frustration at the inability of many students to write complete sentences or to recognize correct subject-verb agreement. Middle school/junior high school teachers voiced similar concerns. Some expressed a desire to see more grammar taught in grades 5 and 6. Middle school/junior high school teachers reported that they

received students two to three years behind in their grammar skills (and reading skills) and were unable to catch them up in just one year.

Short Shrift for Some English/Writing Skills

High school response data indicate that teachers are not teaching certain skills. For example, nearly 50% of high school teachers at each grade level do not teach the skill “writing to tell a story through fiction or nonfiction.” Almost 66% of high school teachers at each grade level do not teach “writing to describe a process or how to do something.” While these responses do not necessarily mean that half or two-thirds of students are not being taught these skills at all (since they may well be taught them in prior or later grades), there is a real possibility that these skills are not being taught in some schools or that they are not being reinforced enough to be mastered. Indeed, some correlation between teachers not teaching skills and students not mastering skills is suggested by the data in the Conventions of Usage and Conventions of Punctuation sections in the survey. Every skill but one (“Ensuring grammatical agreement”) identified in those sections is noted by 26%–69% of non-postsecondary instructors as not being taught in their grade; and postsecondary instructors noted that entering students are not proficient in conventions of language usage and punctuation.

While it appears that there may be some uncertainty about understanding the sequence for teaching some writing skills within high school and between middle school/junior high school, high school, and postsecondary, with other skills there does seem to be strong articulation. A skill such as “writing to tell a story through fiction or nonfiction,” for example, is indicated by a few middle school/junior high school teachers (7%) as Not Important, by somewhat more high school teachers (21%) as Not Important, and by even more postsecondary instructors (30%) as Not Important. “Writing to express one’s feelings” shows similar movement, perhaps being useful as a means to assist developing writers (in middle school/junior high school) and perhaps being dismissed as Not Important by postsecondary instructors who expect more critical writing. Importance ratings seem to indicate that the following elements of writing are more important to high school teachers than to either middle school/junior high school teachers or postsecondary instructors: “collaborating with peers on reviews of drafts,” “developing one’s own voice as a writer,” “writing to analyze literature or media,” “citing sources accurately,” and “gathering and synthesizing resources.” These elements appear to be most appropriately taught at the high school level in students’ development as writers.

Remedial-Course Writing Teachers' Importance Ratings Agree With High School Teachers' Ratings

A sample of teachers who teach remedial courses at the postsecondary level in writing participated in this year's ACT English/Writing National Curriculum Survey. We thought these teachers could best identify the critical skills and knowledge that students are typically missing and the set of knowledge and skills that, when emphasized, result in student readiness for success in postsecondary writing.

Analysis of the data reveals that remedial-course writing teachers' responses more closely resemble high school teachers' results than postsecondary instructors' results (see Table H.1 in Appendix H for detailed results of remedial-course teachers' responses). Because the purpose of remedial courses is to prepare students for postsecondary coursework, a close alignment with postsecondary instructors' expectations is anticipated. However, in the case of preparing students to be successful in postsecondary writing, remedial-course writing teachers seem to be fostering the same kind of environment when teaching writing as do high school teachers.

Discussion of Survey Results and EPAS English Tests

ACT National Curriculum Survey results support ACT's EPAS English Tests and ACT Writing Test as assessments of content and skills that teachers of English and writing say are important.

The EPAS English Tests measure student achievement and readiness in punctuation, grammar and usage, sentence structure, writing strategy, organization, and style (for EPAS English Test specifications, see Appendix C). Questions are distributed fairly evenly across all of these six areas of English. Both aggregate importance results (as seen in Table 2.2) and importance ratings for

specific content and skills (see Table B.1 in Appendix B for a complete listing of English/writing content and skills and their ratings) provide empirical evidence that the knowledge and skills that EPAS English Tests measure are considered important for postsecondary success. Similarly, content and skills rated by the majority of instructors as not important are not present on EPAS English Tests or the ACT Writing Test.

Examination of the EPAS English Test specifications reveals a fairly even distribution of questions among the six English content areas, with a few more items devoted to sentence structure. This relatively equal distribution is strongly supported by empirical curriculum survey evidence, especially the evidence from postsecondary responses. The median ratings support that all of these areas are important for postsecondary success in English. Although postsecondary instructors are not in complete agreement with respect to the

relative importance of topic and idea development, they do consistently rate organization, and sentence structure, as well as usage and grammar, as particularly important for college readiness. ACT staff will continue to use these survey results as we continue to develop and refine our EPAS English Tests.

Because the ACT Writing Test is optional, it should be noted that the ACT English Test measures the knowledge and skills that postsecondary instructors identified as important for postsecondary success in writing. In all the EPAS English Tests, students must make writing decisions and must make sound judgments about development and organization, as well as correct decisions about usage, grammar, and sentence structure.

Discussion of Survey Results and the ACT Writing Test Specifications

Because postsecondary institutions have varying needs with respect to considering incoming students' writing samples for admissions or placement decisions, ACT offers the ACT Writing Test as an option. With this policy, postsecondary institutions are able to make their own decisions about whether to require, recommend, or not ask for the results from the ACT Writing Test for admissions and/or course placement purposes. Also, this policy allows students to decide whether to take the ACT Writing Test based on the requirements of the institutions they are considering (which ensures that students are not required to pay for and take a test that they do not need).

The ACT Writing Test is a 30-minute essay test. Students are given one writing prompt that defines an issue and describes two points of view on that issue. The student produces a direct writing sample that responds to the question about the student's position on the issue. The ACT Writing Test measures a student's ability to express judgments, maintain a focus, develop a position on a topic, organize ideas in a logical way, and use language clearly and effectively according to the rules of standard written English (for the scoring rubric, see Appendix I). These criteria are all highly endorsed by postsecondary instructors as important skills and knowledge that students need for postsecondary success in writing (see Table B.1 in Appendix B for a complete listing of English/writing content and skills and their ratings).

The survey results also provide additional validity evidence for the persuasive writing that students must compose for the ACT Writing Test. Writing to convey information, express ideas, and express an opinion or take a position on an issue received the highest mean importance ratings from postsecondary instructors (see Table B.1 in Appendix B). These ratings align very well with the kind of writing measured by the ACT Writing Test.

3

Mathematics

The Mathematics ACT National Curriculum Survey

The Mathematics ACT National Curriculum Survey was sent to 6,879 mathematics educators, as shown in Table 3.1 (see Appendix A, Table A.4 for further details).

All teachers were asked to perform two primary tasks. First, teachers were asked to rate discrete *content knowledge and skills* with respect to how important each is to student success in mathematics (specifically, secondary and remedial-course teachers were asked to rate

the importance in the class they teach; postsecondary instructors were asked to rate the importance of the content/skill as a prerequisite to success in their class). These results allow for comparison of secondary school teachers' course outcomes to postsecondary instructors' expectations.

Second, teachers were asked to rank *groups* of content and skills, known as *strands*, with respect to their relative importance for student success in mathematics.

In addition, all teachers except for postsecondary instructors were asked to indicate in which mathematics course the knowledge or skill is taught. If not taught, the respondent was not to fill in any ratings about that particular knowledge or skill item. Further information about what

knowledge and skills are being taught in middle school/junior high school and high school can be found in Appendix F. Teachers were also asked to provide information about what textbooks are used in their mathematics courses, about calculator policies, and about their perceptions of their state's standards in mathematics.

Table 3.1 Participants in the Mathematics ACT National Curriculum Survey		
Grade level	Courses	Surveys sent
Middle school/ junior high school	<i>Mathematics, Pre-Algebra, Algebra, Geometry</i>	1,800
High school	<i>Mathematics, Algebra, Geometry, Trigonometry, Precalculus, Calculus, Probability and/or Statistics</i>	2,000
Postsecondary	<i>College/Finite/Discrete Math</i>	350
	<i>Probability/Statistics</i>	350
	<i>Algebra</i>	350
	<i>Geometry/Precalculus</i>	350
	<i>Calculus</i>	350
Remedial- course	<i>Developmental Math/ Remedial Math</i>	1,329

Results of Importance Ratings

Table 3.2 shows the results of cumulative importance ratings of the individual content and skills that make up each strand. Each knowledge and skill item was rated using a five-point scale where 1 = not important and 5 = very important (mean rating results are given in Appendix B, Table B.2). The medians were calculated from all of the individual content and skill ratings within each strand. These median importance ratings are reported in Table 3.2 by middle school/junior high school (MS), high school (HS), and postsecondary (PS) instructors' cumulative rating results.

These results indicate that teachers consider the knowledge and skills covered on the EPAS Mathematics Tests to be important. The Functions strand contains content and skills that primarily are present on the ACT, so the low importance rating from middle school/junior high school teachers is reflected in those skills not being tested at all on EXPLORE and only minimally on PLAN. Similarly, postsecondary instructors rate the Probability strand items low in importance; the ACT Mathematics Test reflects these results in that this strand is covered, but not to the extent of the other strands.

Results of Rank-Ordering Strands

In order to determine relative importance, participants in the Mathematics ACT National Curriculum Survey were asked to rank order eight strands from most important (1st) through least important (8th). (For a detailed list of rankings, see Appendix G.) Results of averaged rankings are provided in Table 3.3 by middle school/junior high school (MS), high school (HS), and postsecondary (PS) responses.

Skills	MS	HS	PS
The 4 skills that make up Basic Operations and Applications	4.53	4.03	4.15
The 12 skills that make up Probability, Statistics, and Data Analysis	3.22	2.95	1.76
The 13 skills that make up Numbers: Concepts and Properties	2.44	3.06	2.20
The 23 skills that make up Expressions, Equations, and Inequalities	2.80	3.70	2.95
The 16 skills that make up Graphical Representations	2.86	3.79	2.71
The 10 skills that make up Properties of Plane Figures	3.78	3.91	2.61
The 7 skills that make up Measurement	3.98	3.69	2.48
The 10 skills that make up Functions	1.84	3.51	2.33

Strand	MS	HS	PS
Basic Operations and Applications	1	1	1
Probability, Statistics, and Data Analysis	2	8	8
Numbers: Concepts and Properties	4	4	3
Expressions, Equations, and Inequalities	3	2	2
Graphical Representations	6	3	4
Properties of Plane Figures	7	6	6
Measurement	5	(tie) 6	7
Functions	8	(tie) 5	5

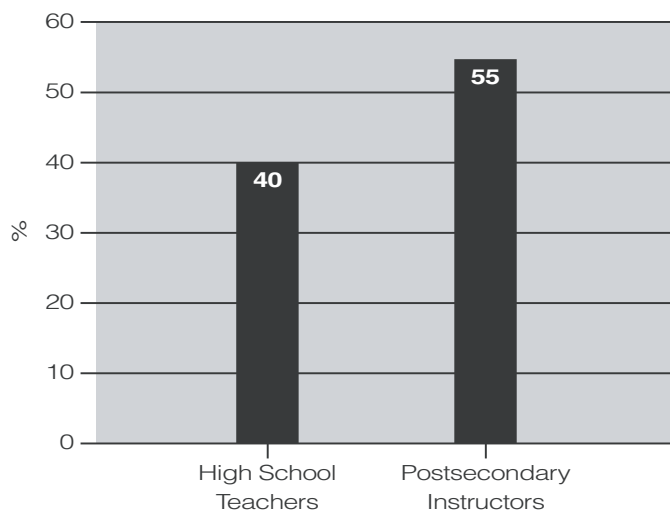


Figure 3.1: Percent of Postsecondary Instructors Versus High School Teachers Who Rank Basic Operations and Applications as the Most Important Strand (1)

The relative ranking data, in summary, reveal agreement between postsecondary and high school mathematics instructors, Figure 3.1, however, illustrates that though they each chose Basic Operations and Applications as their top-rated mathematics strand, far more postsecondary instructors made it their top choice. High school teachers spread their top ranking over more options.

Disagreement Between High School and Postsecondary Instructors About What Is Most Important in Mathematics

Despite much agreement between high school and postsecondary mathematics instructors' results, we observed areas of disagreement. Most notably, high school and postsecondary instructors tend to disagree when it comes to

the importance of more advanced content topics. High school mathematics teachers gave more advanced mathematics topics greater importance than did their postsecondary counterparts. Postsecondary instructors responded that they consider rigorous understanding of fundamental mathematics more important than exposure to more esoteric mathematics content topics for success in their courses. Postsecondary math instructors indicated in written comments on the survey instrument that the student ability they want above all else is the ability to do fundamental mathematics. These instructors feel that if their incoming students have a solid basic math background, they can teach them college content.

The largest difference between the importance ratings that high school and postsecondary instructors assigned a given knowledge and skill item was for "understanding new material by reading a textbook." This skill's mean ranked 31st on the list of postsecondary responses and only 78th on that of high school teachers' responses, a difference of 47 places. Further evidence showing the difference in perception in this skill's importance is in the "taught/not taught" data. "Understanding new material by reading a textbook" was reported as Not Taught in 20% of high school math courses. Given the greater importance assigned by postsecondary instructors, high school mathematics teachers may want to reconsider how much time they spend teaching students how to be successful consumers of textbook information.

What Coursework Is Needed for Success in Postsecondary Mathematics?

The highest-rated math content and skills that postsecondary Algebra teachers report as prerequisites for success in their courses were, in order: performing addition, subtraction, multiplication, and division on signed rational numbers; simplifying algebraic expressions; graphing on a number line; and solving linear equations and inequalities in one variable (for the complete list, see Table B.2 in Appendix B). There were 11 different skills that averaged a 4.00 rating or higher on a five-point scale, and all but one of these skills were reported by high school teachers as being taught at a 98% or greater rate than were instruction in arithmetic, or in Algebra I, or in Algebra II. The one that was not was “recalling basic facts, definitions, formulas, and algebraic procedures as needed to solve a problem,” taught at a 93% rate. The content that both postsecondary instructors rated the highest and that was being covered the least in instruction in arithmetic or in Algebra I courses was: solving quadratic equations and factoring (80%), working with rational exponents (41%), and using the quadratic formula (68%). These are all topics typically covered in Algebra II. These results suggest that high school mathematics students who take mathematics coursework through Algebra II are being taught material they need to achieve readiness for introductory math at the college level (for a detailed list of what different math courses teach, see Appendix J).

Remedial-Course Math Teachers’ Responses Agree With Postsecondary Instructors’: Fundamentals Are More Important Than Advanced Math Content Topics

A sample of teachers who teach remedial courses at the postsecondary level in mathematics participated in this year’s ACT Mathematics National Curriculum Survey. We thought these teachers could best identify the critical skills and knowledge that students are typically missing and the set of knowledge and skills that, when emphasized, result in student readiness for success in postsecondary mathematics.

Results reveal that postsecondary mathematics remedial-course teachers’ ratings were closer to postsecondary mathematics entry-level-course instructors’ ratings than to high school mathematics teachers’ ratings (see Appendix H, Table H.2 for detailed results of remedial-course teachers’ responses). Specifically, both groups of postsecondary respondents consistently rated understanding of fundamental mathematics as more important than exposure to more esoteric mathematics content topics for success in their courses. In contrast, high school mathematics teachers rated many more content

topics with greater importance. These results indicate that postsecondary mathematics teachers of entry-level and remedial courses agree in favoring “depth” and rigorous understanding of fundamental skills, whereas high school mathematics instructors more highly value “breadth.” Interestingly, state standards tend to mirror high school teachers’ responses by including long lists of mathematics content topics. Postsecondary remedial-course teachers are not required to abide by state standards, and therefore are not required to maintain the same broad focus and can concentrate more specifically on the skills required for college success.

Discussion of Survey Results and EPAS Mathematics Test Specifications

The EPAS Mathematics Tests measure student achievement and readiness in Basic Operations and Applications; Probability, Statistics and Data Analysis; Numbers: Concepts and Properties; Expressions,

Equations, and Inequalities; Graphical Representations; Properties of Plane Figures; Measurement; and (for the ACT only) Functions. (For EPAS Mathematics Test specifications, see Appendix C.)

ACT National Curriculum Survey results support ACT’s Mathematics Tests as assessments of content and skills that mathematics instructors indicate are important.

ACT National Curriculum Survey results provide solid validity evidence that EPAS Mathematics

Tests measure important skills and knowledge at the appropriate levels that are necessary for success. Both aggregate importance results (as seen in Table 3.2) and importance ratings for specific knowledge and skills (see Table B.2 in Appendix B for a complete listing of mathematics knowledge and skills and their ratings) provide empirical evidence that the knowledge and skills that EPAS Mathematics Tests measure are considered important for postsecondary success. Similarly, knowledge and skills rated by the majority of instructors as not important are not included on EPAS Mathematics Tests.

The Probability and Statistics strand received the lowest importance ratings from high school and postsecondary instructors. ACT will continue to cover Probability and Statistics on EPAS Mathematics exams because results affirm that postsecondary instructors consider this group of knowledge and skills to be important for success in postsecondary mathematics. However, the majority of the EPAS Mathematics Tests is devoted to measuring other mathematical knowledge and skills.

