

# Rigor at Risk

Reaffirming Quality  
in the High School  
Core Curriculum

## Executive Summary

Among the motivations behind the federal government's publication of *A Nation at Risk* in 1983 were the desire to see more students graduate from high school prepared for college and work and the need for more students to attend and graduate from college. *A Nation at Risk* proposed that every high school in the United States require its graduates to take a "core" curriculum: a minimum number of courses designed to provide students with a "foundation of success for the after-school years." This foundation would consist of a set of universal knowledge and skills that graduates would be able to put to good use regardless of their specific educational or work objectives.

Since then, almost every state has made significant efforts to improve its education system. Nearly a quarter-century later, in a climate in which U.S. workers are dealing with new forms of technology and facing the challenges of a global economy, it is not only reasonable but increasingly urgent to ask: Have we succeeded in fulfilling the goals of *A Nation at Risk*?

At a time when it is becoming more important for U.S. workers to compete internationally, our high school graduates are in danger of entering college or the workforce without sufficient academic preparation. While taking the right number of courses is certainly better than not, it is no longer enough to guarantee that students will graduate ready for life after high school. ACT's national college readiness indicators, the ACT College Readiness Benchmarks, show that three out of four ACT-tested 2006 high school graduates who take a core curriculum are not prepared to take credit-bearing entry-level college courses with a reasonable chance of succeeding in those courses.

ACT research also suggests that students today do not have a reasonable chance of becoming ready for college unless they take a number of additional higher-level courses beyond the minimum core, and that even students who do take these additional higher-level courses are not always likely to be ready for college either. This finding is in part a reflection on the quality and intensity—in other words, the *rigor*—of the high school curriculum. Without improving the quality and content of the core, it appears that most students need to take additional higher-level courses to learn what they should have learned from a rigorous core curriculum, with no guarantee even then that they will be prepared for college-level work.

It is neither realistic nor justifiable to expect all high school students to take more and more courses to learn what they need to learn for college. The essential agenda is to improve the quality of core courses that *really* matter in preparing students for college and work. The time has come to improve the quality of core courses so that all students have equal opportunities to become prepared for postsecondary education—whether in a two-year or four-year institution—and for work. *Rigor at Risk* examines the gap between secondary and postsecondary education in the U.S. and focuses on successful strategies for eliminating this gap so that all high school graduates learn the essential skills they need to be successful in college and work.



research  
readiness  
results

# The Core Curriculum: An Unfulfilled Promise

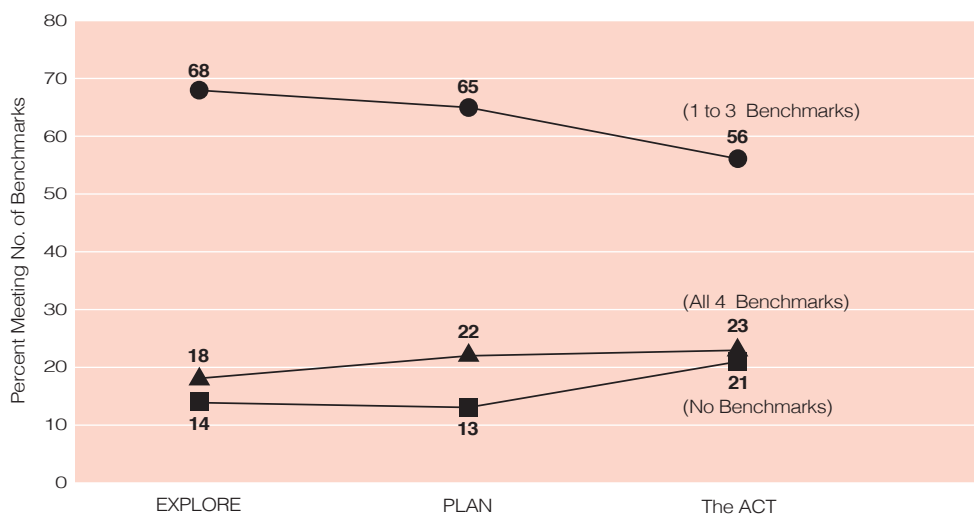
Far too many students who take a core curriculum today are unprepared for the challenges of first-year college coursework.

- **High school graduates who take more than a minimum core curriculum meet the ACT College Readiness Benchmarks in greater—sometimes substantially greater—percentages than do graduates who take only the core.** ACT-tested 2006 high school graduates who took more than the recommended core (that is, graduates who took core courses plus additional higher-level courses) meet Benchmarks in percentages greater than students who take only the recommended core: 8 percent greater in Science, 10 percent greater in English and Reading, and 59 percent greater in Mathematics.
- **Even when students take substantial numbers of additional courses, no more than three-fourths of them are ready for first-year college coursework.** Despite the higher percentages of students who met the College Readiness Benchmarks and took more than the recommended core, still no more than 38 percent of these students are ready for first-year college science, no more than 60 percent are ready for first-year college social science, no more than 75 percent are ready for first-year college mathematics, and no more than 77 percent are ready for first-year college English. So, even taking additional higher-level coursework in high school does not lead to increased college readiness for many students.
- **While some students make progress toward college readiness in high school, a larger percentage of**

**students are actually failing to meet College Readiness Benchmarks, and much of this loss of momentum appears to be occurring during the last two years of high school.** We examined student progress from eighth to tenth to twelfth grade by studying students in three consecutive graduating classes who were tested using all three components of ACT’s Educational Planning and Assessment System (EPAS™): EXPLORE®, PLAN®, and the ACT® test.

The figure below shows that, while there is a slow but steady increase in the percentages of students meeting all four Benchmarks (from 18 to 23 percent), there is also a net increase in the percentages of students meeting no Benchmarks—with all of the increase occurring between tenth and twelfth grades (from 13 to 21 percent). There is also a fairly rapid decline in the percentage of students meeting one to three Benchmarks (from 68 to 56 percent). The rate of decline of the percentage of students meeting some of the Benchmarks (12 percentage points from EXPLORE to the ACT) is more rapid than the rate of increase in students who have become fully ready for college (five percentage points from EXPLORE to the ACT). And there is a seven percentage-point increase in students who are *no longer on target* to be ready for college at all.

These statistics reveal that the rate of failure is exceeding the rate of success when it comes to preparing high school students for college. And this does not account for students who have dropped out of high school along the way.



## A Rigorous Core: Aligning the Essentials

The rigor of core courses is at risk in today's high schools unless we align a number of the essentials for college readiness.

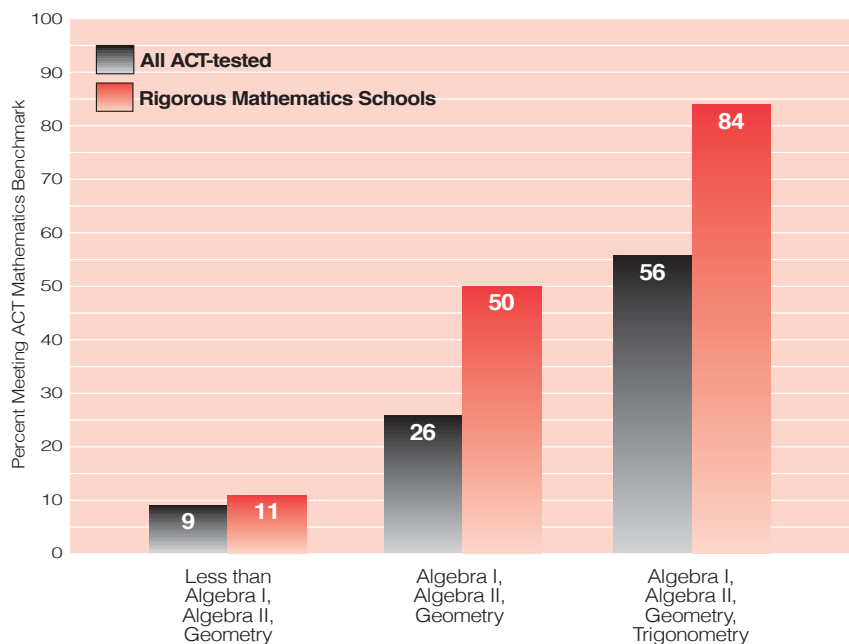
- **State Diploma Requirements: More than half the states do not require students to take specific core courses in mathematics or science in order to graduate from high school.** State diploma requirements currently in effect or scheduled to be implemented within the next two years show that just over half the 50 states require students to take any mathematics courses at all. Of these 26 states, 12 require Algebra II, and only four states require any mathematics beyond Algebra II. In science, while 30 of the 50 states require at least one course for graduation, only 17 explicitly require Biology, one explicitly requires Chemistry, and two explicitly require Physics. More than half of the states today do not specify particular core courses in either mathematics or science, even though these courses have been shown to have a dramatic impact on college readiness.
  - **State Standards: High school teachers and college faculty disagree about how well state standards are preparing their students for college.** The most recent ACT National Curriculum Survey® suggests that high school and college faculty disagree about the role that state standards are playing in preparing students for college: postsecondary educators were about half as likely as secondary educators to assert that state standards prepared students for college-level work.
  - **Secondary and Postsecondary Alignment: High school teachers and college faculty also disagree about the depth and breadth of essential state standards needed to prepare students for college.** High school teachers rate a much larger number of topics and skills as being “important” or “very important” for college success than do college instructors. This parallels the tendency of many state standards to be broad and inclusive rather than specific and selective. It may be that the extensive nature of state standards forces high school teachers to treat all topics as important, potentially sacrificing depth for breadth. In contrast, postsecondary educators indicate that a more rigorous treatment of *fundamental* content knowledge and skills would better prepare students for college and work.
  - **Course Standards: Too often, state standards do not prescribe specific essential outcomes at the course level.** Ideally, state standards should delineate what students ought to know and be able to do in their high school courses in each subject area so that students have a solid foundation on which to begin the next course.
- However, only a minority of states—21 in language arts, 19 in mathematics, and 17 in science—have course-level standards in grades 9 through 12. And even in states whose standards are considered the best in the nation—the knowledge and skills needed for college readiness are commonly absent from course-level standards.
- **High School Readiness: Many eighth graders begin high school without the knowledge and skills they need to succeed.** One reason that improving college readiness is such a challenge for high schools is because many eighth graders enter high school without having learned the skills needed to perform well in high school. In a recent ACT survey, teachers of entering high school students reported spending from about one-fifth to about one-third of their time in the classroom re-teaching skills that should have been learned prior to high school. Not surprisingly, students who are not prepared for high school are even less likely to be prepared for college by the time they graduate from high school.
  - **High School Course Grades: Students who earn good grades in their high school courses are led to believe they are ready for college; unfortunately, many are not.** Many students are receiving high grades in their high school courses, leading them to believe they are ready for college. But nearly half of ACT-tested 2005 high school graduates who earned a grade of A or B in high school Algebra II did not meet the ACT College Readiness Benchmark for Mathematics, and *more than half* of the graduates who earned a grade of A or B in high school Physics did not meet the ACT College Readiness Benchmark for Science. Whether as a result of grade inflation or a lack of challenging course content, it is clear that course grades are not accurately reflecting what is needed to meet the challenges of a college education.
  - **Teacher Quality: Teacher quality has a huge impact on high school students' readiness for college.** Students' academic momentum can be stymied if teachers are assigned to courses that they are not professionally qualified to teach or not yet experienced enough to teach well. There is evidence that these teachers are most often assigned to lower-level courses and to those students who are furthest behind and who consequently need the most help. There is also evidence that lower-level mathematics courses at schools with higher teacher quality benefit students more than do the same courses at schools with lower teacher quality. Schools need to determine whether they are assigning the right teachers to the right core courses—and to the students who need them most.

## The Impact of Rigor: Real Evidence of Progress

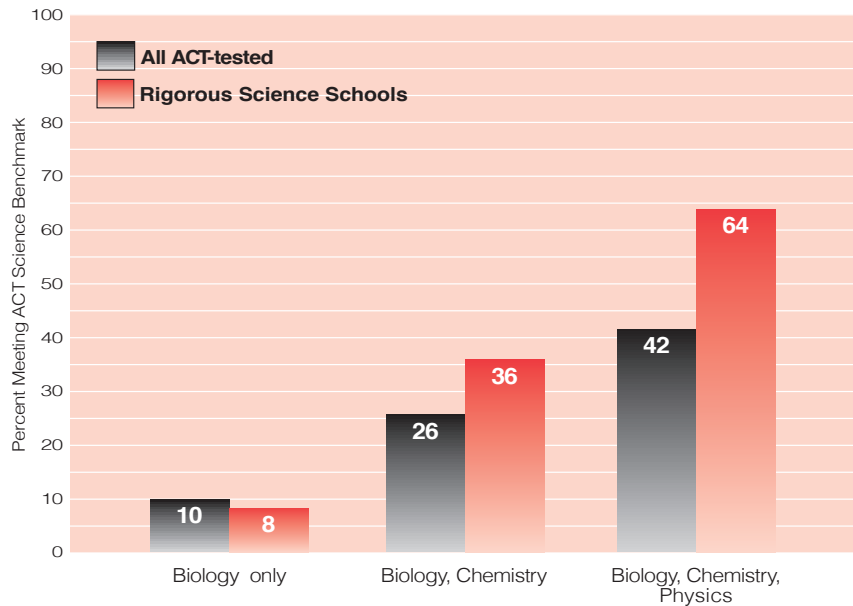
Research shows that high school courses can be made rigorous and that rigorous content can be effectively taught and learned.

ACT analyzed nearly 400 high schools across the United States that have recently shown greater-than-average increases in ACT Mathematics or Science Test scores, even though their overall performance on the ACT did not differ substantially from that of all ACT-tested high schools nationally. These increases are all associated with taking Algebra II (over and above Algebra I and Geometry) and/or Chemistry (over and above Biology). These “rigorous schools” represent a reasonable national cross-section of geographical region, family income ranges, and racial/ethnic composition, and therefore their score gains cannot be attributed solely to demographic factors.

- **For ACT-tested students in rigorous high schools, score increases associated with taking Algebra II or Chemistry were about double those for ACT-tested students in high schools nationally.** On average, students in rigorous schools improved their ACT Mathematics Test scores twice as much as did students in schools nationally (4.2 score points vs. 2.1 score points). Similarly, ACT-tested students in rigorous schools improved their ACT Science Test scores nearly twice as much as did students in schools nationally (4.0 score points vs. 2.4 score points).
- **Students who took Algebra II or Chemistry at rigorous high schools met or exceeded ACT College Readiness Benchmarks in greater percentages than ACT-tested students in high schools nationwide who took these courses.** Compared to all schools nationwide, rigorous schools nearly doubled the percentage of students who are ready for college in Mathematics when their students take Algebra II in addition to Algebra I and Geometry.



Rigorous schools also increased the percentage of students who are ready for college in Science from 8 to 36 percent when their students took Chemistry in addition to Biology, compared to a more modest increase from 10 to 26 percent in schools nationwide. Comparative gains in college readiness at rigorous schools were even greater when their students also took Trigonometry or Physics.



- **Students who took such critical courses as Algebra II or Chemistry at rigorous high schools had higher rates of college enrollment and college retention than did ACT-tested students from high schools nationwide who took Algebra II or Chemistry.** Compared to all ACT-tested students, approximately 7 to 13 percent more students at rigorous high schools enrolled in college the fall following graduation. Between 5 and 10 percent more students from rigorous high schools also returned to the same institution for their second year, compared to all ACT-tested students.
- **More students at rigorous schools are meeting all four Benchmarks than is seen among ACT-tested students from schools nationally.** The percentage of students at rigorous schools who met all four ACT College Readiness Benchmarks is about 9 percentage points higher than that of all ACT-tested students. Similarly, the percentage of students at rigorous schools who met *no* College Readiness Benchmarks is about one-third lower than that of all ACT-tested students. This is clear evidence that rigorous schools are making progress at helping the majority of their students prepare for postsecondary education.

## Action Steps

The rigor of core courses in our nation's high schools can be improved.

**1. Specify the number and kinds of courses that students need to take to graduate from high school ready for college and work.** In the absence of rigorous high school graduation requirements, too many students are not taking either the right number or the right kind of courses they need in order to be ready for college and work. Graduation requirements must be aligned with college and work readiness expectations:

- four years of English;
- at least three years of mathematics, including rigorous courses in Algebra I, Geometry, and Algebra II;
- three years of science, including rigorous courses in Biology, Chemistry, and Physics; and
- three years of social studies.

In keeping with recent ACT research, we recommend incorporating reading expectations across the curriculum into state standards so that they specify the inclusion, by grade level, of increasingly complex reading materials in English, mathematics, science, and social studies.

**2. Align high school course outcomes with state standards that are driven by the requirements of postsecondary education and work.** Just as it is essential for state standards to be aligned with postsecondary and work expectations, it is equally important for high school course outcomes to be aligned with state standards. A rigorous high school core curriculum must teach students the essential knowledge and skills they will need to be successful in postsecondary education and work. State standards must also delineate what students ought to know and be able to do in their high school courses in each subject area so that students have a solid foundation on which to begin the next course in the sequence. But we cannot forget that many eighth graders enter high school without having learned the skills needed to perform well in high school. Not only must the high school curriculum be aligned with the requirements of postsecondary education, but the junior high school curriculum must reflect what is needed to be successful in high school.

**3. Provide teacher support. Effective teacher education and preparation are crucial to student success in the high school classroom.** Hire qualified teachers, and provide training or professional development support to current teachers to help them improve the quality of the courses they teach. Assign all teachers on the basis of their qualification to teach in their assigned subject area, and ensure that inexperienced teachers are not disproportionately assigned to teach those students who need the best teachers.

**4. Expand access to high-quality, vertically aligned core courses.** It is important not only that all courses with the same name reach a common standard of quality, but also that courses within a discipline are vertically aligned with each other such that the outcomes of one course serve as the prerequisites for the next course in the sequence.

Improving the rigor of high school core courses benefits not just those students who are traditionally considered bound for college, but the majority of high school students who typically have not benefited from advanced coursework or other similar efforts to increase college readiness. Before offering more students the opportunity to take college-level courses in high school, our data suggest that we must offer more rigorous, high-quality *high school*-level courses to all students to prepare them for college-level work.

**5. Measure results at the course level.** Student progress at gaining the knowledge and skills necessary for postsecondary success must be continually monitored at the course level in high school. More frequent monitoring is important so that students can learn what they need to learn, that interventions can be made to improve their progress as required, and that the courses themselves can be evaluated and strengthened to ensure that students are being taught essential content with the appropriate degree of rigor.

## Conclusion

Students who are not ready for college are less likely to enroll in college, more likely to need remedial coursework during their first year of college, less likely to succeed in their college courses, and less likely to earn a college degree. If we do not raise the rigor of core courses, U.S. students are in danger of entering the workforce unprepared for the challenges of competing in a technology-based global economy. If we are unable to maintain and increase U.S. economic competitiveness throughout the world, then not just the graduates themselves but the nation at large will suffer.

There is no question that improved college readiness leads to greater success in college. It is crucial that we strengthen the high school core curriculum to improve the college readiness

of all students. If we do not, the substantial proportion of students who up to now have not been given the education they deserve may never receive the boost they need to become ready for success after graduation. Let's fulfill the original intent of *A Nation at Risk* and offer every student a rigorous core curriculum that will prepare them for college and work by the time they graduate from high school.

Visit [www.act.org/research/policymakers/reports/rigor.html](http://www.act.org/research/policymakers/reports/rigor.html) to read the full *Rigor at Risk* policy report.



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