

Do All Students Need Challenging Math in High School?

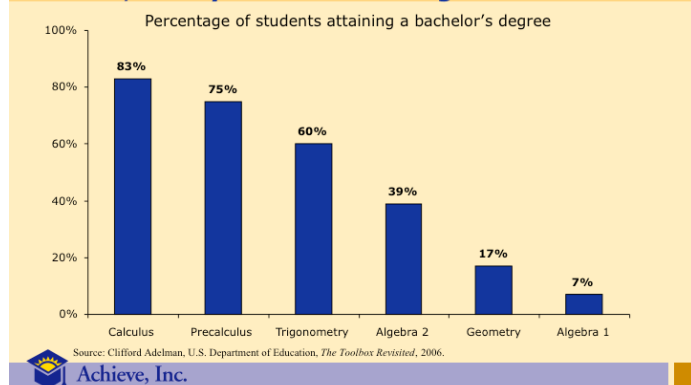
As states begin to examine their high school mathematics standards and align requirements with the demands of work and college, some concerns are emerging. How much math is really needed? What if students are not planning to go to college? Do all students really need Algebra II?

The research on this is clear, and it may come as a surprise to many adults who did not take higher-level math courses when they went to school. For most students, taking challenging mathematics in high school is the gatekeeper that either opens or shuts the doors to great opportunities.

Math Is Essential for Success in College

In a pair of landmark federal studies that followed high school students through their postsecondary years, Clifford Adelman found that the highest level of math taken in high school has the most powerful relationship to earning a bachelor's degree. This is true regardless of student ethnicity, family income or parents' education levels. Students who complete Algebra II in high school *more than double* their chances of earning a four-year college degree. Those who do not take challenging math courses are much more likely to end up in remedial courses and are more likely to drop out.

Highest level of math in high school is the strongest predictor of BA attainment, regardless of race, family income or background



Two-Year Colleges Also Require Rigorous Math

Students planning on attending community college also need strong Algebra II skills. Although most two-year colleges allow any student with a high school diploma to attend, students cannot get into "credit-bearing" courses unless they meet a certain level on a placement test in reading, writing and mathematics.

Most of these math placement tests cover geometry and advanced algebra. And most certificate and degree programs at two-year colleges require at least one credit-bearing math course — so it's hard for students to avoid math in college.

More than one-third of community college students fail placement tests and need to be remediated in math. And unfortunately, two-thirds of students who take remedial math courses will drop out without earning their degree.

Well-Paying Jobs Require Strong Math Skills, Too

It is not only the college bound who need more math. Increasingly, well-paying jobs that pay a living wage and allow for career advancement require strong mathematics, problem-solving and reasoning skills as well.

Due to advancements in technology, manufacturing companies need employees with strong math skills to operate the machinery on the factory floor. Eastman Chemical in Texas has an established company-run Operator Apprenticeship Program to train new machine operators. Apprentices are evaluated on their ability to perform tasks that require solving multiple-step math problems and presenting solutions in the appropriate unit of measure or dimension. In 2000, there were 1.6 million jobs for machine operators, paying median hourly wages from \$10.40 to \$16.07.

Those in the construction trade also need higher math skills. According to the Associated General Contractors of America, electricians, pipe fitters, sheet metal workers, draftsmen and surveyors all need algebra, geometry, trigonometry and physics to be successful on the job.

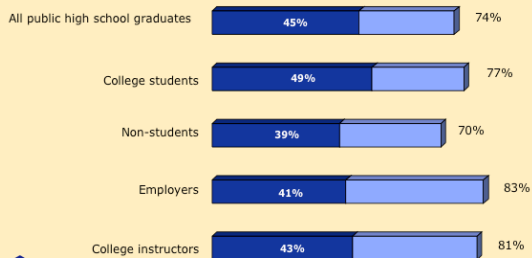
If you think this sounds a lot like the math courses students need for college, you're right. A new study by ACT looked carefully at the skills needed for success in freshmen courses in college and compared them to skills needed for training programs in occupations that offer a salary sufficient to support a family of four. ACT concluded that those jobs require a comparable level of math skills in algebra, geometry, data analysis and statistics as colleges do.

Do All Students Need Challenging Math in High School?

Support for math/science requirement

Percentage who say requiring four years of math, biology, chemistry and physics to graduate would encourage high school students to work harder/be better prepared

■ Would improve things a great deal ■ Would improve things somewhat



Students Want More Challenging Courses

In a national poll of recent high school graduates, more than two-thirds who took Algebra II in high school reported that they were well prepared for the demands they faced in college and the workplace. In contrast, of graduates who took less than Algebra II, only four out of 10 say they were well prepared. The statistics were similar whether graduates went to college or directly to the workplace.

Eighty percent of graduates said they would work harder and apply themselves more if they could go back and do high school all over again — that answer was the same for those who went straight to the workforce and for those who went on to college. More than two-thirds of graduates would like to have taken harder courses in high school knowing what they know now about the demands of the workplace and college. When it comes to math, one-third of college students and half of those who went straight to the workplace would have taken more rigorous high school courses.

Closing the Expectations Gap

In most states, students can take all of the required mathematics courses and earn a high school diploma without being prepared for success in college or the workplace. Simply put, graduation requirements have not kept pace with the changing world students will enter after high school.

The good news is that some states and communities are raising graduation requirements so that all students take a challenging math curriculum. Arkansas, Indiana, Kentucky, Michigan, Oklahoma and Texas are among the states that have put more rigorous requirements in place. Boston, Chicago, Los Angeles and San Jose also have raised requirements. In each of these states and districts, students will be expected to take three or four years of math through at least Algebra II. This should dramatically improve their preparation for the world they will enter after high school.

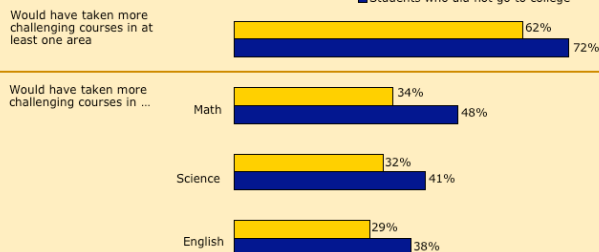
The Bottom Line:

No matter what path they choose after they finish high school, students who have taken more demanding math courses are better prepared.

Majority of graduates would have taken harder courses

Knowing what they know today about the expectations of college/work ...

■ College students ■ Students who did not go to college



Source: Peter D. Hart Research Associates/Public Opinion Strategies, *Rising to the Challenge: Are High School Graduates Prepared for College and Work* prepared for Achieve, Inc., 2005.