

"Math and science are becoming more and more essential in careers from the factory floor to the boardroom. Whether filling 'white collar' or 'blue collar' positions, employers today want workers with 'pocket protector' skills--creative problem solvers with strong math and science backgrounds."

U.S. Secretary of Education Margaret Spellings

Why Students Need Advanced Courses and Content

Students in Career Technical Education (CTE) programs are required to take higher-level academic curriculum. For example:

- Pre-engineering students receive calculus instruction as an integral part of their Project Lead the Way engineering curriculum. Calculus is taught side-by-side with the engineering courses.
- Building Trades and Electricity students learn advanced algebra and trigonometry in order to develop skills needed in their career fields.
- Students on the FIRST (For Inspiration and Recognition of Science and Technology) robotics team advance their computer programming, machining, and design skills through building an award-winning robot.
- Pupils in the Marketing and Entrepreneurship program integrate college level research and writing skills to create business plans and build web sites for e-commerce.
- Medical Careers students are able to receive Delta College credit for the cell biology and higher-level science concepts learned in their high school career and technical education program.¹

Higher Order Math Content Contained in Courses like Algebra II, Set Higher Math Expectations, Increase Student Depth of Knowledge and Provide the Type of Math Skills Needed for College Entry and the Workplace

Research

- In a 2005 survey of almost 1,500 recent graduates, just 24 percent of graduates said they were significantly challenged during high school. 1 in 5 recent high school graduates said that "expectations were low and...it was easy to slide by."²
- Students are more likely to pass high-level courses than low-level courses. Thus, the research suggests that increasing access by all students to advanced academic course work will improve student academic achievement.³
- In a recent survey, 40 percent of high school graduates said they were not adequately prepared for employment or postsecondary education, and that if they could repeat their high school experience, they would work harder, especially in math, science and English.⁴

Increased Math Skills Can Increase College and Job Success and Reduce the Need for Remedial Math in College or Training Programs

Research

- The quality of courses completed in high school is a greater predictor of college success than test scores, class rank, or grade point average.⁵
- ACT reports that students taking Algebra I, Geometry, Algebra II and one additional higher-level course are more likely to succeed in college.⁶
- High school students who complete advanced math are 12.6 times more likely to earn a four-year degree at an in-state public institution than peers who stop at geometry.⁷
- 68 percent of students who completed Algebra II felt they were extremely or very well prepared for work.⁸
- It's also about equality -- Taking a rigorous high school curriculum that includes math, at least through Algebra II, cuts in half the gap in college completion rates between white students and African American and Latino students.⁹

Taking Algebra II and Geometry Pays Off

Research

- 84 percent of individuals who currently hold highly paid professional jobs had taken Algebra II or higher as their last high school math course.¹⁰
- Among those who hold well paid, white-collar, skilled jobs, 67 percent had taken Algebra II or a higher-level math course, and 84 percent had taken at least Geometry.¹¹

¹ Saginaw Career Complex

² Hart, Rising to the Challenge.

³ Hallinan, Maureen T. "Ability Grouping and Student Learning," Prepared for Brookings Papers on Education Policy Conference: The American High School Today, The Brookings Institution. Washington, DC, May 14-15, 2002.

⁴ 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.

⁵ Barth, P. (2003). A common core curriculum for the new century. Thinking K-16, 7(1), 3-25.

⁶ Crisis at the Core: Preparing All Students for College and Work, ACT 2004.

⁷ Perna, Laura and Titus, Mavin, "Understanding Difference in the Choice of College Attended," April 2003.

⁸ 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.

⁹ National Center for Education Statistics, Condition of Education 2004, Indicator 22, Supplemental Table 22-2.

¹⁰ Carnevale and Desrochers, Educational Testing Service, Connecting Education Standards and Employment: Course-Taking Patterns of Young Workers, American Diploma Project: Workplace Study, 2002.

¹¹ Carnevale and Desrochers, Educational Testing Service, Connecting Education Standards and Employment: Course-Taking Patterns of Young Workers, American Diploma Project: Workplace Study, 2002.

CAREER PATHWAY INFORMATION

CAREER PATHWAY: Architecture and Engineering

Grade 9

English 9
World History
Math (Algebra/Geometry)
World Language
Intro. To Physical Science
Physical Education
Electives
Technical Drawing I
Wood Techniques I

Grade 10

English 10
Early American History
Math (Geometry/Algebra II)
World Language
Biology
Physical Education
Writing Requirement
Electives
Technical Drawing II

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II/Advanced Math)
Chemistry
Electives
Residential Architecture
Interior Design
Electronics
SAT Prep

Grade 12

English 12
World Language
Physical Education
Math (Advanced Math or Calculus)
Physics
Art (for Architecture)
Electives
Descriptive Graphics
Singles Living
Advanced Construction
Economics

CAREER PATHWAY: Business and Finance

Grade 9

English 9
World History
Math (Algebra/Geometry)
World Language
Intro. To Physical Science
Physical Education

Grade 10

English 10
Early American History
Math (Geometry/Algebra II)
World Language
Biology
Writing Requirement
Physical Education
Electives
Accounting I

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II/Advanced Math)
Chemistry
Electives
SAT Prep
Youth and Law
Accounting II

Grade 12

English 12
World Language
Physical Education
Advanced
Math/Calculus/Statistics
Science
Electives
Global Studies
Economics
Singles Living
Introduction to Business & Finance

CAREER PATHWAY: Health and BioSciences

Grade 9

English 9
World History
Math (Algebra/Geometry)
World Language
Intro. To Physical Science**
Physical Education
Electives
Foods and Nutrition I

Grade 10

English 10
Early American History
Math (Geometry/Algebra II)
World Language
Biology**
Writing Requirement
Physical Education
Electives
Foods and Nutrition II

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II/Advanced Math)
Chemistry**
Electives
Teen Realities
Psychology

Grade 12

English 12
World Language
Physical Education
Math (Adv. Math/Calculus/Statistics)
Science (Physiology/Physics)**
Electives
Sociology
Understanding the Elderly

CAREER PATHWAY INFORMATION

CAREER PATHWAY: Human Services

Grade 9

English 9
World History
Math (Algebra/Geometry)
World Language
Intro. To Physical Science
Physical Education

Grade 10

English 10
Early American History
Math (Geometry/Algebra II)
World Language
Biology
Writing Requirement
Physical Education
Electives
Psychology

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II/Advanced Math)
Chemistry
Electives
Sociology
Youth and Law

Grade 12

English 12
World Language
Physical Education
Math (Adv. Math/Calculus/Statistics)
Science
Electives
Understanding the Elderly
Journalism & Public Speaking

CAREER PATHWAY: Telecommunications & Information Technology

Grade 9

English 9
World History
Math (Algebra)
World Language
Intro. To Physical Science
Physical Education
Electives
Computerized Keyboarding

Grade 10

English 10
Early American History
Math (Geometry)
World Language
Biology
Writing Requirement
Physical Education
Electives
Computer Applications

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II)
Chemistry
Electives
Word/Excel
SAT Prep

Grade 12

English 12
World Language
Physical Education
Math
Science
Electives
Internet/Web Page Development
Journalism & Public Speaking
Economics
Global Studies

CAREER PATHWAY: Visual and Performing Arts

Grade 9

English 9
World History
Math (Algebra/Geometry)
World Language
Intro. To Physical Science
Physical Education
Electives
Art Elective (Visual Arts)
Acting I (Drama)
Chorus or Band (Music)
Voice Class (Music)

English 10

Early American History
Math (Geometry/Algebra II)
World Language
Biology
Writing Requirement
Physical Education
Electives
Acting II (Drama)
Chorus or Band (Music)
Art Elective (Visual Arts)
Piano Keyboard (Music)

Grade 11

English 11
World Language
Modern American History
Physical Education
Math (Algebra II)
Chemistry
Electives
Art Elective (Visual Arts)
Advanced Acting (Drama)
Band or Chorus (Music)
Music Theory I (Music)
Music History (Music)
Musical Theater I (Drama I)

Grade 12

English 12
World Language
Physical Education
Math (Advanced Math or Elective)
Science
Electives
Art Elective (Visual Arts)