math works

Math Works

Advocacy Kit

Achieve

American Diploma Project Network

Math Works

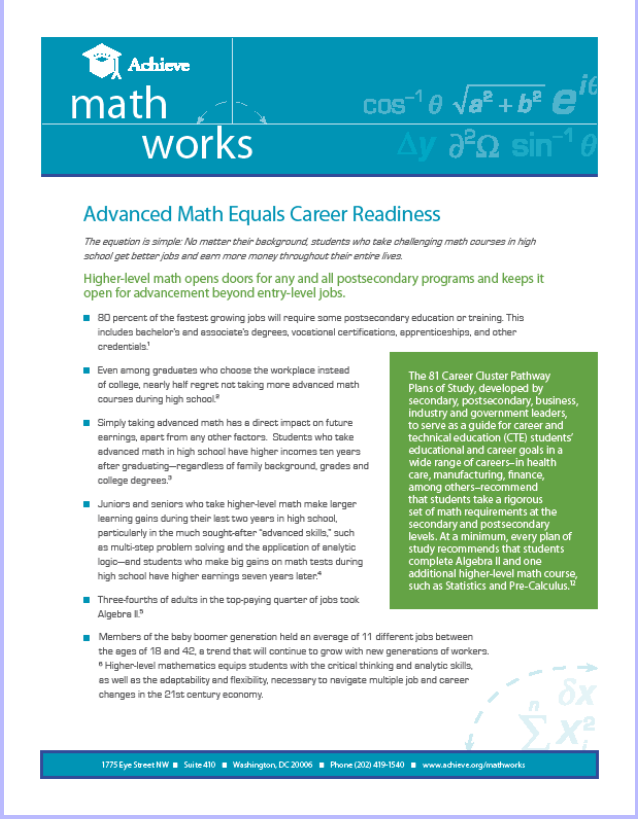
- The *Math Works* advocacy kit provides resources that make the case for why all students - regardless of their plans after graduation - should engage in rigorous math course-taking throughout their high school experiences.
- The *Math Works* materials include fact sheets, PowerPoint presentations, brochures, policy papers and others
- The concept behind *Math Works* is that individuals should pick and choose among the various resources based on their areas of interest, the audiences they will be reaching out to and the types of materials they believe will be most useful.

www.Achieve.org/MathWorks

Math Works

- Topics include:
  - *All Students Need Advanced Math*
  - *Advanced Math Equals Career Readiness*
  - *Advanced Math: Closing the Equity Gap*
  - *Americans Need Advanced Math to Stay Globally Competitive*
  - *The Value of the Fourth Year of Math (Coming)*
  - *Advanced Math and the Drop Out Rate (Coming)*

Math Works Fact Sheets



Achieve
math works

Advanced Math Equals Career Readiness

The equation is simple: No matter their background, students who take challenging math courses in high school get better jobs and earn more money throughout their entire lives.

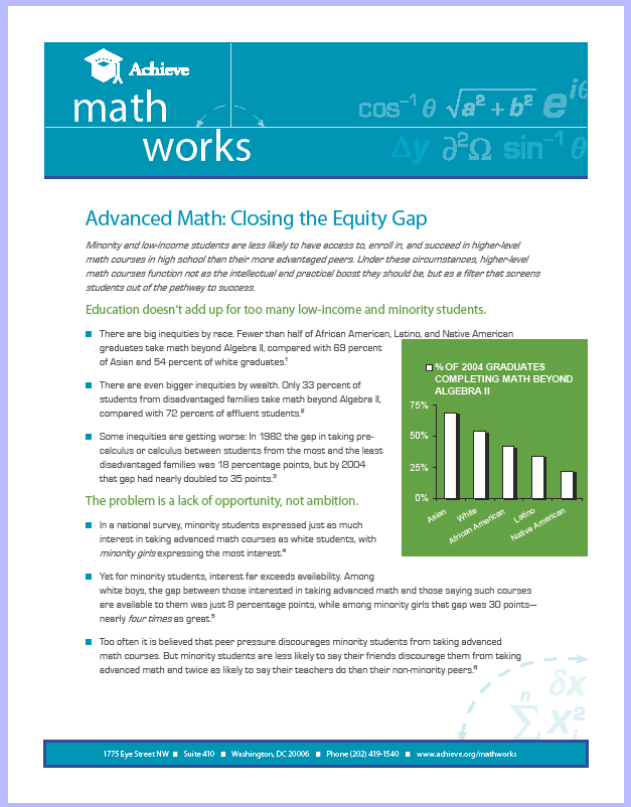
Higher-level math opens doors for any and all postsecondary programs and keeps it open for advancement beyond entry-level jobs.

- 80 percent of the fastest growing jobs will require some postsecondary education or training. This includes bachelor's and associate's degrees, vocational certifications, apprenticeships, and other credentials.[1]
- Even among graduates who choose the workplace instead of college, nearly half regret not taking more advanced math courses during high school.[2]
- Simply taking advanced math has a direct impact on future earnings, apart from any other factors. Students who take advanced math in high school have higher incomes ten years after graduating—regardless of family background, grades and college degrees.[3]
- Juniors and seniors who take higher-level math make larger learning gains during their last two years in high school, particularly in the much sought-after "advanced skills," such as multi-step problem solving and the application of analytic logic—and students who make big gains on math tests during high school have higher earnings seven years later.[4]
- Three-fourths of adults in the top-paying quarter of jobs took Algebra II.[5]
- Members of the baby boomer generation held an average of 11 different jobs between the ages of 18 and 42, a trend that will continue to grow with new generations of workers.[6] Higher-level mathematics equips students with the critical thinking and analytic skills, as well as the adaptability and flexibility, necessary to navigate multiple job and career changes in the 21st century economy.

The 81 Career Cluster Pathway Plans of Study, developed by secondary, postsecondary, business, industry and government leaders, to serve as a guide for career and technical education (CTE) students' educational and career goals in a wide range of careers–in health care, manufacturing, finance, among others–recommend that students take a rigorous set of math requirements at the secondary and postsecondary levels. At a minimum, every plan of study recommends that students complete Algebra II and one additional higher-level math course, such as Statistics and Pre-Calculus.[12]

1775 Eye Street NW ■ Suite 410 ■ Washington, DC 20006 ■ Phone (202) 419-1540 ■ www.achieve.org/mathworks

Each fact sheet is two-pages and includes citations the support data-driven case-making



Achieve
math works

Advanced Math: Closing the Equity Gap

Minority and low-income students are less likely to have access to, enroll in, and succeed in higher-level math courses in high school than their more advantaged peers. Under these circumstances, higher-level math courses function not as the intellectual and practical boost they should be, but as a filter that screens students out of the pathway to success.

Education doesn't add up for too many low-income and minority students.

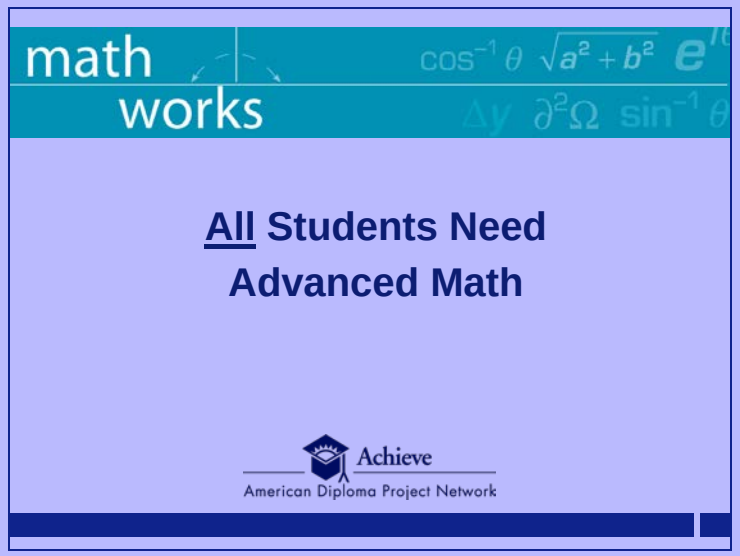
- There are big inequities by race. Fewer than half of African American, Latino, and Native American graduates take math beyond Algebra II, compared with 69 percent of Asian and 54 percent of white graduates.[1]
- There are even bigger inequities by wealth. Only 33 percent of students from disadvantaged families take math beyond Algebra II, compared with 72 percent of affluent students.[2]
- Some inequities are getting worse: In 1982 the gap in taking pre-calculus or calculus between students from the most and the least disadvantaged families was 18 percentage points, but by 2004 that gap had nearly doubled to 35 points.[3]

The problem is a lack of opportunity, not ambition.

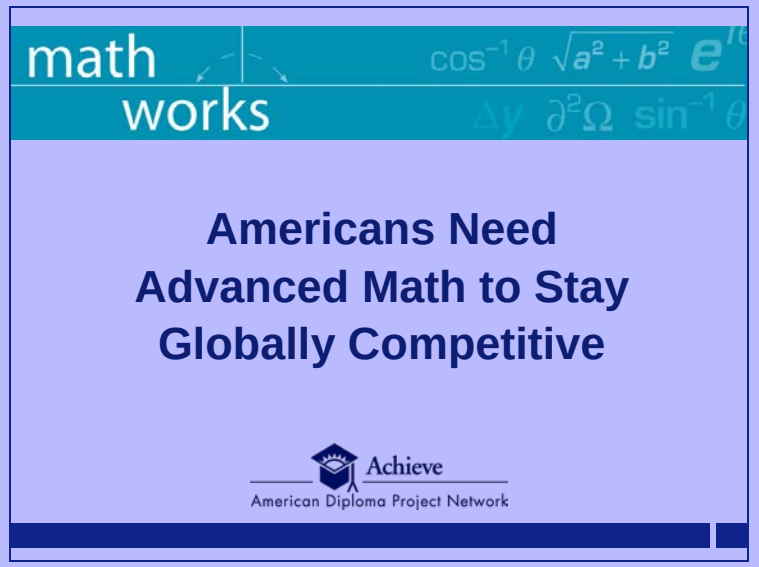
- In a national survey, minority students expressed just as much interest in taking advanced math courses as white students, with *minority girls* expressing the most interest.[4]
- Yet for minority students, interest far exceeds availability. Among white boys, the gap between those interested in taking advanced math and those saying such courses are available to them was just 8 percentage points, while among minority girls that gap was 30 points—nearly *four times* as great.[5]
- Too often it is believed that peer pressure discourages minority students from taking advanced math courses. But minority students are less likely to say their friends discourage them from taking advanced math and twice as likely to say their teachers do than their non-minority peers.[6]

1775 Eye Street NW ■ Suite 410 ■ Washington, DC 20006 ■ Phone (202) 419-1540 ■ www.achieve.org/mathworks

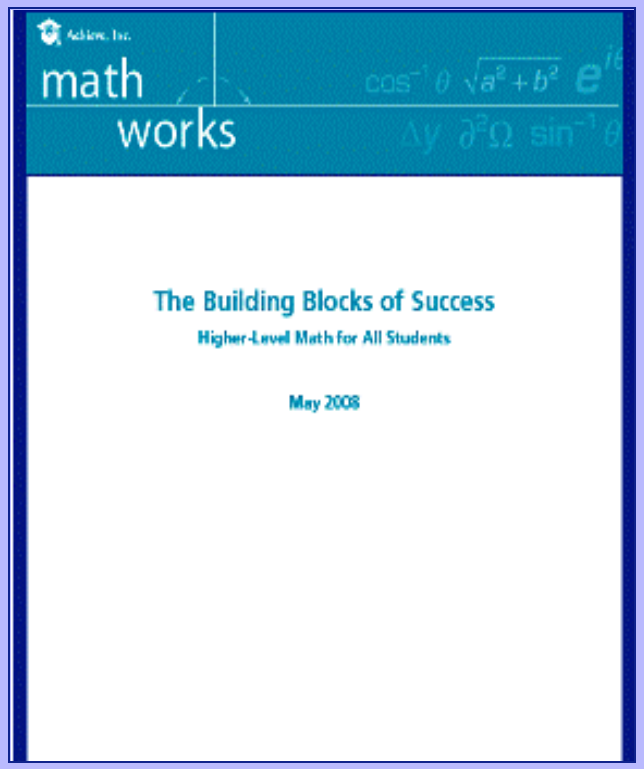
Math Works PowerPoint Presentations

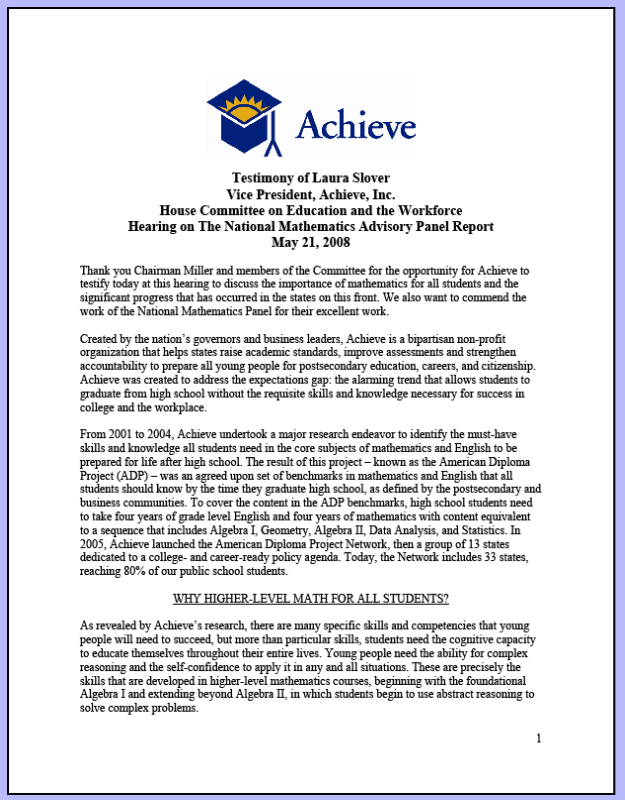


Each PPT presentation is a complement to the fact sheets and explores the topics further and graphically.



Other Resources





Achieve

Testimony of Laura Slover
Vice President, Achieve, Inc.
House Committee on Education and the Workforce
Hearing on The National Mathematics Advisory Panel Report
May 21, 2008

Thank you Chairman Miller and members of the Committee for the opportunity for Achieve to testify today at this hearing to discuss the importance of mathematics for all students and the significant progress that has occurred in the states on this front. We also want to commend the work of the National Mathematics Panel for their excellent work.

Created by the nation's governors and business leaders, Achieve is a bipartisan non-profit organization that helps states raise academic standards, improve assessments and strengthen accountability to prepare all young people for postsecondary education, careers, and citizenship. Achieve was created to address the expectations gap: the alarming trend that allows students to graduate from high school without the requisite skills and knowledge necessary for success in college and the workplace.

From 2001 to 2004, Achieve undertook a major research endeavor to identify the must-have skills and knowledge all students need in the core subjects of mathematics and English to be prepared for life after high school. The result of this project – known as the American Diploma Project (ADP) – was an agreed upon set of benchmarks in mathematics and English that all students should know by the time they graduate high school, as defined by the postsecondary and business communities. To cover the content in the ADP benchmarks, high school students need to take four years of grade level English and four years of mathematics with content equivalent to a sequence that includes Algebra I, Geometry, Algebra II, Data Analysis, and Statistics. In 2005, Achieve launched the American Diploma Project Network, then a group of 13 states dedicated to a college- and career-ready policy agenda. Today, the Network includes 33 states, reaching 80% of our public school students.

WHY HIGHER-LEVEL MATH FOR ALL STUDENTS?

As revealed by Achieve's research, there are many specific skills and competencies that young people will need to succeed, but more than particular skills, students need the cognitive capacity to educate themselves throughout their entire lives. Young people need the ability for complex reasoning and the self-confidence to apply it in any and all situations. These are precisely the skills that are developed in higher-level mathematics courses, beginning with the foundational Algebra I and extending beyond Algebra II, in which students begin to use abstract reasoning to solve complex problems.

1

- Policy Paper
- Congressional Testimony
- An annotated resource bank of math related studies, reports and other resources (Coming Soon)

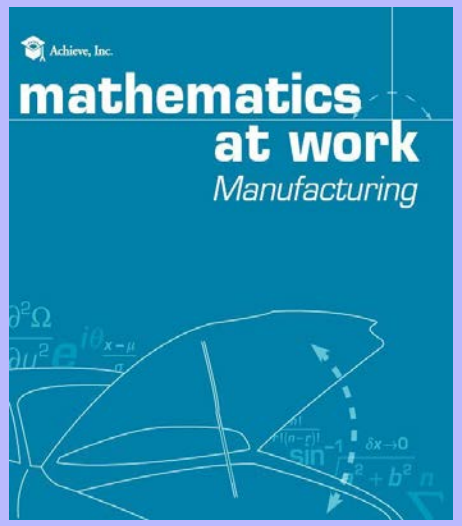
Mathematics at Work Brochures

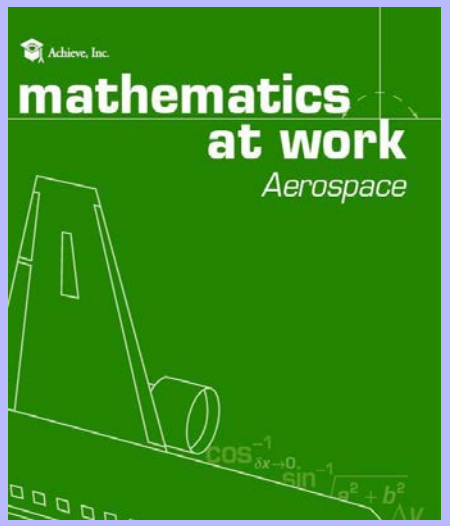
- Developed in collaboration with business leaders
- Highlight professions that are available to students with some postsecondary education but *less* than a four-year degree, offer a family-sustaining wage and provide opportunities for advancement

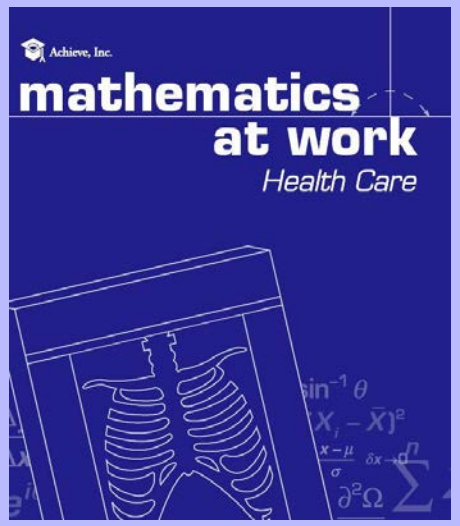
Mathematics at Work Brochures

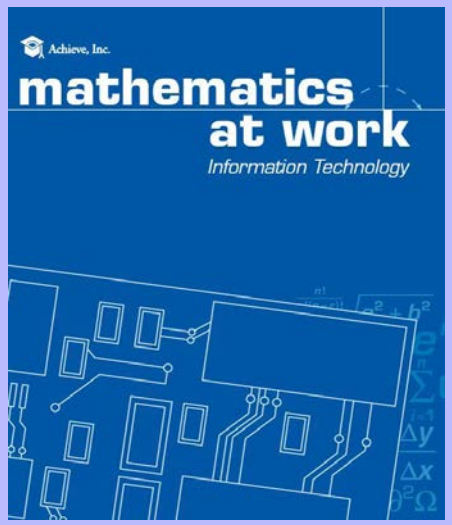
- Topics include:
  - *Aerospace: Aircraft Maintenance Technicians*
  - *Information Technology: Network Technicians / Systems Analysts*
  - *Construction: Contractors*
  - *Advanced Manufacturing: Engineering Technicians (developed with Toyota)*
  - *Heath Care: Radiologic Technologists*
  - *Semiconductors: Manufacturing Specialists and Technicians (Coming - developed with Texas Instruments)*
  - *Infrastructure: Civil Engineering Technicians (Coming – developed with the Armed Services)*

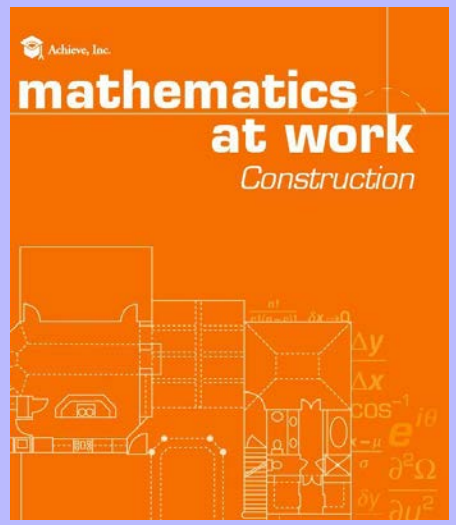
Mathematics at Work Brochures











Achieve
American Diploma Project Network

Achieve, Inc.

The development of the Mathematics at Work brochures could not have been possible without the support of the following companies and organizations. Their expertise and insights were invaluable in bringing these brochures to life.

- American Hospital Association (AHA)
- American Society of Radiologic Technologists (ASRT)
- Associated General Contractors of America (AGC)
- Automotive Youth Education Services (AYES)
- Aviation Institute of Maintenance
- Bill & Melinda Gates Foundation
- Cisco Systems, Inc.
- Collin County Community College District
- Computer Technology Industry Association (CompTIA)
- Dallas County Community College District
- Dell
- DFW Semiconductor & Technology Executive Council
- EDS
- Federal Aviation Administration (FAA)
- FutureJobs
- Greater Dayton Area Hospital Association
- Hawaii Department of Education
- Herbert Chock & Associates, Inc.
- Intel Corporation
- National Aeronautics and Space Administration (NASA)
- National Association of State Directors of Career and Technical Education (NASDCTE)
- Partnership for 21st Century Skills (P21)
- Pearson
- Perot Systems
- Plano Medical Center
- STMicroElectronics
- States' Career Clusters Initiative
- Texas Instruments (TI)
- Toyota Motor Corporation
- U.S. Department of Education
- Wittenberg University

How Mathematics at Work is Being Used Across the Country

- **Stan Robertson, Educator, Andover, NH:** “The brochures will be great for students and their parents to help answer the question, "Why are we learning this stuff and when will we ever use it?!“
- **Michele Steppe, Math Teacher, Baltimore, MD**: “I am a 14 year engineer turned math teacher. This information would benefit me as an educator AND as a parent of three strong math students.”
- **Amanda Lipton:** “I am the program manager at Fast Forward for a project called HomeFront Readiness, aimed at veterans who are struggling to transition from military to civilian life. The Achieve publications will be very helpful as the veterans search for new careers and branch out into higher education.”
- **Kathleen McNally, Educator, Spring Mills, PA:** “I am currently involved in work with states who are pairing mathematics and CTE teachers to develop integrated anchor projects, [and] the examples would be very helpful to stimulate ideas.”

More Information

Math Works:
www.Achieve.org/MathWorks

Contact Achieve for Questions and Hard Copy Requests: Kate Blosveren & Sandy Boyd
Kblosveren@achieve.org
Sboyd@achieve.org

math works

Math Works

Advocacy Kit

Achieve

American Diploma Project Network