National STEM Crisis

• U.S. **behind** in student indicators.
• Foreign nationals **ahead** in jobs and degrees.
• **Urban** students are falling behind.
• Many plans exist to address this.
• New national STEM Initiative addresses programs and teachers.
The Problem: A Leaky Pipeline

STEM Pipeline — Leaking Badly

In 2001, there were a bit more than 4 million 9th graders. Four years later, 2.8 million of them graduated and 1.9 million went on to two- or four-year college; only 1.3 million were actually ready for college work. Fewer than 300,000 are majoring in STEM fields and only about 167,000 are expected to be STEM college graduates by 2011.

Source: NCES Digest of Education Statistics; Science & Engineering Indicators 2008
A Shrinking Skilled Workforce Pipeline...

For every 100 9th graders:

68 graduate on time;

of those, 40 enroll directly in college;

of those, 27 are still enrolled the following year;

of those, 18 earn an associates degree within 3 years or a B.A. within 6 years.

82 don’t make it!
Lost Talent in Higher Education
(Rounded numbers)

Advanced Degrees in Science and Engineering
Total: 121,000

Bachelor's Degrees in Science and Engineering
Total: 391,000

First Time Freshmen Interested in Science and Engineering
Total: 647,000

First Time Freshmen
Total: 2,194,000

High School Graduates
Total: 2,485,000

Non-Minority Men
Minority Men
Minority Women
Non-Minority Women

Minority = Black/African American, Hispanic, and American Indian

Source: Joan Burelli, NSF, based on 1999 Common Core of Data, U.S. Department of Education, National Center for Education Statistics (NCES); NCES, 1998 IPEDS Fall Enrollment Survey; UCLA Higher Education Research Institute, 1998 American Freshman Survey (estimate); and NCES, 1998 IPEDS Completions Survey
Skill Level Changes

1950

- Unskilled: 60%
- Skilled: 20%
- Professional: 20%

Today

- Unskilled: 15%
- Skilled: 65%
- Professional: 20%

National Summit on 21st Century Skills for 21st Century Jobs
STEM Pipeline from 9th Grade to Bachelor’s Degree for Low-Income Students in the U.S.

10,000 Students in the Bottom Income Quartile Start the 9th Grade

6,600 of 10,000 Students Earn a High School Diploma (8,200 total)

3,860 of 10,000 Students Go to College
76 are Declared STEM Majors vs 800 total

710 of 10,000 Students Earn a Bachelor’s Degree
30 BA/BS in STEM Fields vs 400
Prepare students for the requirements of the 21st century economy

How the demand for skills has changed

Economy-wide measures of routine and non-routine task input (US)

Mean task input as percentiles of the 1960 task distribution

- Non-routine interactive
- Non-routine analytic
- Routine manual
- Routine cognitive
- Non-routine manual

The kind of things that are easy to test and teach are disappearing fastest
Note: The categories of jobs that require STEM skills and understandings are expanding, generating additional demand for workers with STEM degrees.

Source: PCAST (2012) *Engage to Excel*, Fig. F-1, p.68
https://www.census.gov/dataviz/visualizations/stem/stem-html/
A Shifting Job Market

20th Century

Number of Jobs:
1 – 2 Jobs

Job Requirement:
Mastery of One Field

Teaching Model:
Subject Matter Mastery

Assessment Model:
Subject Matter Mastery

21st Century

10 – 15 Jobs

Critical Thinking Across Disciplines

Integration of 21st Century Skills into Subject Matter Mastery

Integration of 21st Century Skills into Subject Matter Mastery

Courtesy of Linda Froschauer
THE EMERGING HIGHER EDUCATION ECOSYSTEM

High School
- Dual Enrollments
- Teacher Education

Community College
- 4-yr. applied baccalaureates

The Workplace

Community College

Bachelor Students
Acquiring Specific Skills

4-Year Institution

Online Courses/MOOCs

NEW DIMENSIONS/OPPORTUNITIES

Post-Graduate Education?
Increasing retention of STEM majors from 40% to 50% would generate three-quarters of the 1 million additional STEM degrees over the next decade.

Many students who abandon STEM majors perform well in their introductory courses and would make valuable additions to the STEM workforce.
CT Careers in STEM

- 75% of CT jobs require STEM
- Healthcare
- Aerospace
- Computers
- BioScience
- Financial
- Maritime
- Manufacturing


- Total, All Occupations: 8.5%
- Total STEM Occupations (excl. mgrs. & teachers): 13.5%
CT STEM

Middle skill jobs are STEM (between high school and 4 year college education)

• All top 10 2 year degrees are STEM

• Most are in healthcare/manufacturing.
Manufacturing in Connecticut

- Manufacturing Establishments in Connecticut = 4,937
- Manufacturing Employment = 171,800
- Average Annual Compensation = $89,238 (26% higher than other sectors)
- Connecticut Manufacturing Output = $28.9 billion, 13.4% of regional economy
New Haven Area

- CT Dept of Labor stats for NH:
  - **Health/BioScience** Careers (all levels) (technicians, medical, research, labs, practioners, etc....)
  - Green Technologies & Manufacturing (all levels, high tech skills)
- **are** where the jobs are!
Example of choices/pathways!

- **INDUSTRY GRADUATE DEGREE**
- **APPLIED INDUSTRY BACHELOR’S DEGREE**
- **ASSOCIATE DEGREE WITH MULTIPLE SPECIALTIES**
- **ASSOCIATE DEGREE WITH SPECIALTY**
- **DIPLOMA + SPECIALTY**
- **HIGH SCHOOL DIPLOMA**

**EDUCATION PATH**

**ENGINEER, BUSINESS MANAGER**

**ENGINEER, MANAGER**

**ENGINEERING TECHNICIAN**

**ENGINEERING TECHNICIAN**

**CERTIFIED PRODUCTION TECHNICIAN**

**OPERATOR**

**CAREER PATH**

**CERTIFICATION PATH**
STEM vs Non-STEM

**STEM**
Percent earning more than average for own education level*

- Less than HS: 75.4%
- HS/GED: 75.2%
- Some College/No Degree: 71.3%
- Associate's: 66.2%
- Bachelor's: 56.1%
- Master's: 51.9%
- Professional: 16.4%
- Doctoral: 39.4%

**Non-STEM**
Percent earning more than average for own education level*

- Less than HS: 39.2%
- HS/GED: 39.9%
- Some College/No Degree: 37.8%
- Associate's: 40.4%
- Bachelor's: 33.6%
- Master's: 31.9%
- Professional: 33.9%
- Doctoral: 32.6%

*across all occupations
Employment projections of STEM jobs in 2018: 8 million
People with lower levels of education in STEM make more than people with higher levels of education in non-STEM.

- 63 percent of Associate’s degrees in STEM earn more than Bachelor’s degrees in non-STEM occupations.
- 65 percent of Bachelor’s degrees in STEM earn more than Master’s degrees in non-STEM occupations.
- 47 percent of Bachelor’s degrees in STEM occupations earn more than PhDs in non-STEM occupations.
- Certificate holders in engineering earn more than Associate’s degree-holders in business and more than Bachelor’s degree-holders in education.
STEM CAREERS

www.newhavenscience.org/STEM

Guide to STEM Careers/Education for New Haven
Link to STEM Programs In New Haven, Yale Community Science
Parent Guide to Preparation for STEM, (Espanol)
Link to CT STEM JOBS Website
Interactive STEM Career Pathways Tool)

STEM at CT Community Colleges

STEM Programs at CT Community Colleges/State Universities
STEM Programs by College
STEM Career Descriptions!

Green Programs at CT Community Colleges
Get Into Energy, Career Pathways in Energy Careers!
Profiles of Different Types of Energy Careers:
Training Programs for Energy Careers:
Scholarships for Energy Careers
Women's Guide to Sustainable Careers
Architecture, Construction, Engineering Mentoring Program (ACE)
Science
- **Architectural Drafters** (Annual Salary: $56,297) **Atmospheric and Space Scientists** (Annual Salary: $76,234)
- **Biofuels/Biodiesel Technology and Product Development Managers** (Annual Salary: $118,081)
- **Biological Technicians** (Annual Salary: $47,075)
- **Bioinformatics Technicians** (Annual Salary: $42,364)
- **Brownfield Redevelopment Specialists and Site Managers** (Annual Salary: $94,605)
- **Chemical Equipment Operators and Tenders** (Annual Salary: $42,691)
- **Chemical Technicians** (Annual Salary: $45,384)
- **Crop and Livestock Managers** (Annual Salary: $73,334)
- **Environmental Restoration Planners** (Annual Salary: $66,817)
- **Environmental Science and Protection Technicians, Including Health** (Annual Salary: $42,999)
- **First-Line Supervisors/Managers of Agricultural Crop and Horticultural Workers** (Annual Salary: $44,499)
- **First-Line Supervisors/Managers of Animal Husbandry and Animal Care Workers** (Annual Salary: $44,499)
- **First-Line Supervisors/Managers of Aquacultural Workers** (Annual Salary: $44,499)
- **Fish and Game Wardens** (Annual Salary: $48,817)
- **Food Science Technicians** (Annual Salary: $48,839)
- **Forest and Conservation Workers** (Annual Salary: $45,420)
- **Geodetic Surveyors** (Annual Salary: $56,584)
- **Natural Sciences Managers** (Annual Salary: $117,444)
- **Physicists** (Annual Salary: $110,968)
- **Soil and Water Conservationists** (Annual Salary: $71,760)
- **Wind Turbine Service Technicians** (Annual Salary: $49,283)
- **Zoologists and Wildlife Biologists** (Annual Salary: $69,202)
- **Computer and Information Scientists, Research** (Annual Salary: $118,989)
- **Computer and Information Systems Managers** (Annual Salary: $117,757)
- **Computer Science Teachers, Postsecondary** (Salary Unavailable)
- **Database Administrators** (Annual Salary: $71,929)
- **Graphic Designers** (Annual Salary: $54,526)
- **Network Systems and Data Communications Analysts** (Annual Salary: $77,539)
- **Security Management Specialists** (Annual Salary: $72,626)
- **Aerospace Engineering and Operations Technicians** (Annual Salary: $58,939)
- **Aircraft Mechanics and Service Technicians** (Annual Salary: $55,910)
- **Automotive Engineering Technicians** (Annual Salary: $49,368)
- **Automotive Master Mechanics** (Annual Salary: $43,614)
- **Avionics Technicians** (Annual Salary: $59,906)
- **Civil Drafters** (Annual Salary: $54,678)
- **Civil Engineering Technicians** (Annual Salary: $56,380)
- **Electrical Engineering Technicians** (Annual Salary: $57,114)
- **Electromechanical Equipment Assemblers** (Annual Salary: $31,617)
- **Electronics Engineering Technologists** (Annual Salary: $63,280)
- **Engineering Managers** (Annual Salary: $118,081)
- **Engineering**
- **Materials Engineers** (Annual Salary: $85,651) **Materials Scientists** (Annual Salary: $116,053)
- **Marine Engineers** (Annual Salary: $85,794)
- **Mechanical Engineering Technicians** (Annual Salary: $49,368)
- **Mechatronics Engineers** (Annual Salary: $83,246)
- **Nanosystems Engineers** (Annual Salary: $83,246)
- **Nuclear Equipment Operation Technicians** (Annual Salary: $75,480)
- **Numerical Tool and Process Control Programmers** (Annual Salary: $50,636)
www.newhavenscience.org/STEM

STEM Career exploration

For each video… let’s discuss:
What problems does this career solve?
What type of student would be interested?
What do they need to be ready for this career?
The following interactive matrix provides links to STEM programs offered at the 12 Connecticut Community Colleges, as well as careers associated with each program. Clicking on a dot will bring you to the program’s web page. Clicking on a sample career will bring you to detailed information about the occupation. Go to the Community College System website to search by college campus, associate’s degree, certificate programs, bachelor degrees, graduate degrees, or by non-credit certificates.

<table>
<thead>
<tr>
<th>Programs</th>
<th>Type</th>
<th>ACH</th>
<th>CHC</th>
<th>HCC</th>
<th>MCC</th>
<th>NVC</th>
<th>NVCC</th>
<th>SCC</th>
<th>TCC</th>
<th>CSU</th>
<th>EC</th>
<th>SC</th>
<th>U</th>
<th>WC</th>
<th>SU</th>
<th>Sample Careers</th>
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</thead>
<tbody>
<tr>
<td>Civil Engineering Technology</td>
<td>Bach Deg</td>
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<td></td>
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<td></td>
<td></td>
<td>Civil engineer; Civil drafter</td>
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<tr>
<td>Clean Water Management</td>
<td>Cred Cert</td>
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<td></td>
<td></td>
<td>Environmental compliance inspector; Water resource specialist; Soil and water conservationist</td>
</tr>
<tr>
<td>Computer Aided Design</td>
<td>Cred Cert</td>
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<td></td>
<td></td>
<td>Commercial and industrial designer; Civil drafter</td>
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<tr>
<td>Computer Aided Design/Drafting</td>
<td>Assec Deg</td>
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<td></td>
<td></td>
<td></td>
<td>Architectural drafter; Civil drafter; Architect</td>
</tr>
<tr>
<td>Computer Aided Drafting (CAD)</td>
<td>Cred Cert</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Commercial and industrial designer</td>
</tr>
<tr>
<td>Computer Aided Drafting: 3D</td>
<td>Cred Cert</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Commercial and industrial designer; Civil drafter; Architectural drafter</td>
</tr>
</tbody>
</table>

Not all program details are available at each college website, nor is every course offered every semester. Please contact the college directly for course schedules.
<table>
<thead>
<tr>
<th>#</th>
<th>SOC</th>
<th>JOB TITLE</th>
<th>EDUCATION</th>
<th>WAGES</th>
<th>OUTLOOK</th>
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<tbody>
<tr>
<td>1</td>
<td>19-2041</td>
<td>ENVIRONMENTAL SCIENTIST AND SPECIALIST</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>17-3027</td>
<td>MECHANICAL ENGINEERING TECHNICIAN</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>19-4031</td>
<td>CHEMICAL TECHNICIAN</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>15-1011</td>
<td>COMPUTER AND INFORMATION SCIENTIST (RESEARCH)</td>
<td></td>
<td>$$$$$$</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>19-3091</td>
<td>ANTHROPOLOGIST AND ARCHEOLOGIST</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>19-2032</td>
<td>MATERIALS SCIENTIST</td>
<td></td>
<td>$$$$</td>
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<tr>
<td>7</td>
<td>17-2199.10</td>
<td>WIND ENERGY ENGINEER</td>
<td></td>
<td>$$$$$$</td>
<td></td>
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<tr>
<td>8</td>
<td>19-4092</td>
<td>FORENSIC SCIENCE TECHNICIAN</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>17-3031</td>
<td>SURVEYING AND MAPPING TECHNICIAN</td>
<td></td>
<td>$$$</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>43-5111</td>
<td>WEIGHTER, MEASURER, AND SAMPLER (RECORD-KEEPING)</td>
<td></td>
<td>$$$</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>19-4021</td>
<td>BIOLOGICAL TECHNICIAN</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>17-1022</td>
<td>SURVEYOR</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>17-2031</td>
<td>BIOMEDICAL ENGINEER</td>
<td></td>
<td>$$$$$$</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>19-2010</td>
<td>ASTRONOMER AND PHYSICIST</td>
<td></td>
<td>$$$$$$</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>19-2021</td>
<td>ATMOSPHERE AND SPACE SCIENTIST</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>17-3024</td>
<td>ELECTRO-MECHANICAL TECHNICIAN</td>
<td></td>
<td>$$$</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>17-1022.01</td>
<td>GEODE蒂C SURVEYOR</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>17-2051</td>
<td>CIVIL ENGINEER</td>
<td></td>
<td>$$$$</td>
<td></td>
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<tr>
<td>19</td>
<td>17-3025</td>
<td>ENVIRONMENTAL ENGINEERING TECHNICIAN</td>
<td></td>
<td>$$$</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>17-3011</td>
<td>ARCHITECTURAL AND CIVIL DRAFTER</td>
<td></td>
<td>$$$$</td>
<td></td>
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<tr>
<td>21</td>
<td>17-2199.08</td>
<td>ROBOTICS ENGINEER</td>
<td></td>
<td>$$$$$$</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>17-3029</td>
<td>ENGINEERING TECHNICIAN (EXCEPT DRAFTERS)</td>
<td></td>
<td>$$$$</td>
<td></td>
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<tr>
<td>23</td>
<td>15-1099.13</td>
<td>VIDEOGAME DESIGNER</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>17-2121</td>
<td>MARINE ENGINEER AND NAVAL ARCHITECT</td>
<td></td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>17-2072</td>
<td>ELECTRONICS ENGINEER (EXCEPT COMPUTER)</td>
<td></td>
<td>$$$$$$</td>
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</tr>
</tbody>
</table>

**HOW TO READ THIS CHART** On the chart above, you will find 25 career ideas in STEM. Here are explanations of what abbreviations or symbols mean. For detailed information, please see the occupational descriptions on the following pages.

**SOURCE:** The information on the chart and for occupations on the following pages is excerpted from the Occupational Outlook Handbook, 2010-11 Edition (www.bls.gov/oco) and O*Net Online (online.onetcenter.org). Inexact or ambiguous information has been interpreted. These jobs are only ideas; always do additional research to make college and career decisions and see what career works for you.

**# JOB NUMBER** This corresponds to the number of the description of the occupation found on the following pages.

**SOC STANDARD OCCUPATIONAL CODE** Use this number to look up more information about this occupation in career information databases.

**EDUCATION** The minimum level of education usually needed to enter the occupation.

- On-the-job training
- Postsecondary vocational training
- Associate’s degree
- Bachelor’s degree
- Master’s degree
- Doctoral degree, first professional degree, or Ph.D.

**WAGES**

- The average pay for the occupation.
- $0.10–10 dollars per hour
- $10.01–20 dollars per hour
- $20.01–30 dollars per hour
- $30.01–40 dollars per hour
- $40.01–50+ dollars per hour

**OUTLOOK** Opportunities for finding employment.

- Keen competition. There may be fewer job openings than job seekers.
- Good or favorable. The number of job openings and the number of job seekers may be roughly equal.
- Very good or excellent. There may be more job openings than job seekers.
OUR FUTURE DEMANDS STEM

SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

The U.S. will have more than 1.8 million job openings in science, technology, engineering and math (STEM)-related occupations by 2018. These include scientists, doctors, software developers and engineers. Yet, there will be a significant shortage of qualified college graduates to fill these careers. For the U.S. to succeed and continue to play a leadership role in addressing tough global challenges, we must do a better job of engaging students in these subjects and encouraging them to pursue careers in STEM-related fields. Here is a look at how early education plays a part in inspiring students to seek a higher education in STEM and what motivates students to pursue STEM-related fields.

The U.S. ranks 25th out of 30 in an international assessment of high schoolers’ performance in math.

The U.S. Department of Labor has projected that by 2018, the U.S. will have more than 1.8 million job openings in STEM fields.

ONLY 16% OF BACHELOR’S DEGREES IN 2020 WILL SPECIALIZE IN STEM.

POSITIVE ASPECTS OF STEM LEARNING IN EARLY EDUCATION

4 in 5 STEM college students made the decision to study STEM in high school or earlier.

1 in 5 STEM college students decided to study STEM in middle school or earlier.

81% of male STEM college students say that games or toys sparked their interest in STEM; the top factor for men.

51% of STEM college students and parents of K-12 students do not feel that preparing students for careers in STEM is a top priority for K-12 schools in the U.S.

65% of female STEM college students say a teacher or class sparked their interest in STEM; the top factor for women.

49% of women pursuing STEM degrees chose STEM to make a difference.

49% of men

64% of women

FEEL THEIR K-12 EDUCATION PREPARED THEM WELL FOR STEM.

WHY ARE STUDENTS MAJORING IN STEM?

68% THEY FIND IT STIMULATING AND/OR CHALLENGING

5.3% THEY WANT TO HELP SOCIETY

4.8% THEY WANT TO EARN A LOT OF MONEY
4 in 5 STEM college students made the decision to study STEM in high school or earlier.

1 in 5 STEM college students decided to study STEM in middle school or earlier.

49% of women pursuing STEM degrees chose STEM to make a difference.

61% of male STEM college students say that games or toys sparked their interest in STEM; the top factor for men.

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68% of female STEM college students say a teacher or class sparked their interest in STEM; the top factor for women.

49% of men

64% of women

Feel their K-12 education prepared them well for STEM.

WHY ARE STUDENTS MAJORING IN STEM?*

- 68% They find it stimulating and/or challenging
- 68% Say good salary
- 66% Say job potential

WHY DO PARENTS THINK STEM SHOULD BE A PRIORITY?*

- 53% Say to ensure the U.S. remains competitive in the global market
- 51% Say to produce next-generation innovators
- 36% Say to have well-paying careers
- 30% Say to have fulfilling careers

Unemployment rate for STEM workers went from 1.8% to 5.3%, while non-STEM workers went from 4.8% to almost 10%.

STEM occupations are growing by 17%, while others are growing at 9.8%.

Microsoft understands the importance of STEM and is working to make technology accessible to all.
STEM Students: What Can Parents and Schools Do to Help Kids and Teens Become Interested in STEM?

Base: All College Students (n=500)

Q950: What can parents and schools do to help kids and teens become interested in science, technology, engineering, and mathematics?

"Fun games—see how science, technology, engineering, and mathematics are actually applicable to real life." —Engineering Student

"Expose them at an early age, show them it is fun and interesting." —Biomedical Sciences Student

"Parents can be more hands on and supportive in teaching their children outside of school to help reinforce what is learned in school. Schools should also have a lot more hands on and visual learning rather than always reading from the textbook. For example, instead of reading about photosynthesis take the students outside and show them photosynthesis." —Pre-Med Student

The word cloud illustrates keywords used by students to indicate how parents and schools can make STEM more interesting for kids. Larger words represent higher frequencies while smaller words represent lower frequencies.
Motivations for STEM Careers

The 2009 Lemelson-MIT Invention Index is a survey that gauged teens’ inspirations for pursuing STEM careers.

30% To help protect the environment
26% To improve society
25% To pursue a passion
18% To get famous and make money
1% Other

*2009 Lemelson-MIT Invention Index includes a nationally representative survey sample size of 500 teens.*
Among careers tested, the two careers parents most want their child to pursue are scientist and engineer; overall, half of parents say they would like their child to pursue a STEM career. On the other hand, parents think their kids are more interested in becoming performers or artists.

**Parent and Child Career Hopes**
Reported by parents; top responses shown

<table>
<thead>
<tr>
<th>Career</th>
<th>Parents Want</th>
<th>Child Wants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientist</td>
<td>17%</td>
<td>24%</td>
</tr>
<tr>
<td>Engineer</td>
<td>9%</td>
<td>17%</td>
</tr>
<tr>
<td>Physician/Dentist</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>IT Professional</td>
<td>15%</td>
<td>4%</td>
</tr>
<tr>
<td>Computer Scientist</td>
<td>15%</td>
<td>8%</td>
</tr>
<tr>
<td>Mathematician</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Other STEM Career</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Teacher</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>15%</td>
<td>7%</td>
</tr>
<tr>
<td>Business Executive</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Lawyer</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>Artist or Designer</td>
<td>11%</td>
<td>19%</td>
</tr>
<tr>
<td>Financial Professional</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Actor/Musician/Performer</td>
<td>10%</td>
<td>21%</td>
</tr>
<tr>
<td>Military Personnel</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Professional Athlete</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>No Preferences/Don’t Know</td>
<td>18%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Parents who give their child’s school an “A” on its ability to prepare students for careers in STEM are more likely to say their child wants to pursue a STEM career (52% vs. 38% give school a “B” or lower).

Dads are more likely to want their child to pursue a STEM career (57% vs. 44% moms).
Parents and STEM students agree that there is room for improvement in K–12 STEM education — only 1 in 5 STEM students feel they were extremely well-prepared for their college STEM courses.

**STEM College Students: How Well Did Your K–12 Education Prepare You for College?**

- Extremely well: 20%
- Very well: 35%
- Somewhat well: 35%
- Not well at all: 8%
- Not sure: 3%

**REPORT CARD**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Total Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28%</td>
</tr>
<tr>
<td>B</td>
<td>41%</td>
</tr>
<tr>
<td>C</td>
<td>22%</td>
</tr>
<tr>
<td>D</td>
<td>7%</td>
</tr>
<tr>
<td>F</td>
<td>3%</td>
</tr>
</tbody>
</table>

Average Grade: B

**Females in STEM are more likely than males to say they were extremely/well-prepared (64% vs. 49%)**

- What did your school do to help prepare you?
  
  “AP courses were offered at my high school so I was able to gain a good foundation in Calculus and Physics.”

  “My schools prepared me for college workloads by sometimes giving college entry level work. Also quite often we would be given opportunities to take a college course or something of that sort.”

- What could your school have done to better prepare you?
  
  “More in-depth curriculum.”

  “Offer more AP courses and also more opportunities for hands-on experience and programs with each field.”

  “More application, less theory.”

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**Base: All Qualified Respondents (College Students: n=500, Parents of Child in Grades K–12: n=854)**

Q910: How well did your K–12 education (elementary through high school) prepare you for your college courses in science, technology, engineering and/or math?

Q915: What could your school have done to better prepare you/What did your school do that helped prepare you for your college courses in STEM? (OPEN END)

Q1055: What grade would you give your child’s school on its ability to prepare students for careers in science, technology, engineering and/or mathematics?
The majority of college students and parents believe that preparing students for careers in STEM should be a priority for K–12 schools in the U.S.; however, only half believe it actually is a top priority in schools.

### The State of STEM Education in the U.S.

% agree among students and parents

<table>
<thead>
<tr>
<th>Statement</th>
<th>STEM College Students</th>
<th>Parents of K–12 Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM can help prepare students to become the world's next innovators and address the world's toughest problems.</td>
<td>95%</td>
<td>94%</td>
</tr>
<tr>
<td>A stronger emphasis on STEM is necessary in order to equip future U.S. generations with 21st century skills such as critical thinking.</td>
<td>93%</td>
<td>94%</td>
</tr>
<tr>
<td>Preparing students for careers in STEM should be a top priority for schools in the U.S.</td>
<td>87%</td>
<td>93%</td>
</tr>
<tr>
<td>Compared to other countries, the U.S. is doing a poor job of teaching STEM.</td>
<td>66%</td>
<td>76%</td>
</tr>
<tr>
<td>Preparing students for careers in STEM is a top priority for schools in the U.S.</td>
<td>49%</td>
<td>49%</td>
</tr>
</tbody>
</table>

**Base:** All Qualified Respondents (College Students: n=500, Parents of Child in Grades K–12: n=854)

Q940/Q1060: How strongly do you agree or disagree with each of the following statements?

Q1050: How willing would you be to spend extra money to help your child(ren) be successful in their math and science classes?

**Female** students are more likely than their male counterparts to say that preparing students for STEM should be a top priority in K–12 schools (92% vs. 84%) — another indication of how important K–12 education is for girls.

While parents may feel that K–12 schools are not meeting expectations when it comes to STEM, many are not extremely willing to spend their own money helping their children be successful in their math and science classes (24% extremely willing vs. 37% very willing, 34% somewhat willing, and 5% not at all willing).

76% of parents feel that the U.S. is doing a poor job of teaching STEM compared to other countries.
So why do parents feel that STEM education should be a priority? About half say it’s to ensure that the U.S. remains competitive in the global marketplace and also to produce the next generation of innovators. Preparing students to have well-paying and fulfilling careers are less important.

**Parents: Why Should Preparing Students for STEM Careers Be a Top Priority for Schools in the U.S.?**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>To ensure the U.S. remains competitive in the global marketplace</td>
<td>53%</td>
</tr>
<tr>
<td>To produce the next generation of innovators</td>
<td>51%</td>
</tr>
<tr>
<td>To prepare people that are equipped to find solutions to the world's problems</td>
<td>44%</td>
</tr>
<tr>
<td>In the future, most or all jobs will require at least a basic understanding of math and science</td>
<td>42%</td>
</tr>
<tr>
<td>To enable students to have well-paying careers in the future</td>
<td>36%</td>
</tr>
<tr>
<td>To enable students to have fulfilling careers in the future</td>
<td>30%</td>
</tr>
</tbody>
</table>

**Base:** Parents who agree that STEM preparation should be a top priority for schools (n=774)

Q1065: Why do you think preparing students for careers in STEM should be a top priority for schools in the United States. Please select up to three responses.

Parents in high-income households are least likely to give enabling students to have well-paying careers as a reason (29% in $75K+ households vs. 37% in <$35K, 42% $35–49.9K, 46% in $50–74.9K).

Dads are more likely than moms to list this is a reason (62% vs. 47% moms).

Moms are more likely than dads to list this as a reason (36% vs. 22% dads).
Although a good K–12 education is necessary for building a foundation and interest in STEM, students say that having a passion for STEM and studying hard are the two most important factors to their success. External factors, such as K–12 education, mentors and role models, are less important.

**Female** students are more likely to cite “studying hard” as an important success factor (81% vs. 60% males).

**Female** students are more likely than males to say “supportive parents” is an important success factor (50% vs. 37% males).

### STEM Students: How Important Is Each Factor to Your Success?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
<th>Absol. Essential/Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a passion for it</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Studying hard</td>
<td>67%</td>
<td></td>
</tr>
<tr>
<td>Going to a good college</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>Supportive parents</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>A good K-12 education</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>Having a good mentor</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Having a role model</td>
<td>19%</td>
<td></td>
</tr>
</tbody>
</table>
Nearly three-quarters of STEM students report that their parents had at least some influence on their decision to study STEM; many parents want their child to pursue a STEM career and almost none discourage it.

**Students: Parent Influence and Encouragement**

*How influential were your parents on your decision to study STEM?*

- Percentage that said “At least somewhat influential”: 73%
  - Mother: 19%
  - Father: 18%

*Growing up, to what extent did your parents encourage or discourage you from pursuing a career in STEM?*

- Percentage that said “Encouraged”: 67%
  - Mother: 20%
  - Father: 18%

Parents: How influential do you think you will be on your child’s future career path?

- Percentage that said “At least somewhat influential”: 73%
  - Extremely influential: 15%
  - Very influential: 27%
  - Somewhat influential: 55%
  - Not at all influential: 5%

Females more likely than males to say their mother was extremely influential and encouraged a lot.

While few parents have discouraged STEM careers, students who have parents in STEM careers are more likely to say their parent influenced and encouraged them.

**Base:** College Students with mother/father in life (variable base)

Q880: How influential were your mother and father on your decision to be pre-med/to study in your area or major?

Q890: When you were growing up, to what extent did you mother and father encourage or discourage you from pursuing a career in science, technology, engineering or mathematics?

**Base:** All Parents of Child in Grades K–12 (n=854)

Q1015: How influential do you think you will be on your child(ren)’s future, specifically the career path they may decide to pursue?
Parents have high, unmet expectations for schools when it comes to STEM education, but are they willing to help make up the difference themselves?

Parents: How Willing Would You Be to Spend Money to Help Your Child Be Successful in Math and Science?

- 61% Extremely/very willing
- 24% Very willing
- 37% Somewhat willing
- 34% Not at all willing

Parents: How Confident Are You Helping Your Child With Their Math and Science Homework?

- 13% Not at all confident
- 38% Very confident
- 27% Somewhat confident
- 22% Extremely confident

Dads (58% vs. 42% moms) and parents in STEM careers (68% vs. 43% non-STEM careers) are more confident in their abilities to help.

Parents: If You Had an Extra $100 to Spend Each Month on Your Child, How Would You Be Most Likely to Spend It?

- 22% Music, art, or dance lessons
- 15% Enrichment program in math or science
- 12% Sports team expenses
- 12% Clothing
- 11% Entertainment
- 6% Enrichment program in reading or LA
- 3% A cell phone
- 19% Some other way

Base: All Parents of Child in Grades K–12 (n=854)

Q1045: How confident are you that you have the skills to help your child with their math and science homework if they asked for your assistance?
Q1050: How willing would you be to spend money to help your child(ren) be successful in their math and science classes?
Q1030: Assuming all of your child’s basic needs are met, if you had an extra $100 to spend each month on your child, in which of the following ways would you be most likely to spend that money?
Students are choosing to pursue a STEM degree, not because someone encouraged or told them to or even because the U.S. is in need, but to secure their own futures and because they find it intellectually stimulating/challenging.

### Reasons College Students Choose STEM Degrees

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good salary out of school</td>
<td>68%</td>
</tr>
<tr>
<td>It's intellectually stimulating/challenging</td>
<td>58%</td>
</tr>
<tr>
<td>The job potential</td>
<td>66%</td>
</tr>
<tr>
<td>It's my passion</td>
<td>54%</td>
</tr>
<tr>
<td>I have always enjoyed games/toys, books, participating in clubs focused on this subject</td>
<td>45%</td>
</tr>
<tr>
<td>I received good grades in this subject in school</td>
<td>43%</td>
</tr>
<tr>
<td>To make a difference</td>
<td>39%</td>
</tr>
<tr>
<td>Our country is in need of college graduates focused in these areas</td>
<td>25%</td>
</tr>
<tr>
<td>A family member has similar education/career</td>
<td>19%</td>
</tr>
<tr>
<td>I was encouraged by a teacher or guidance counselor</td>
<td>17%</td>
</tr>
<tr>
<td>My parents told me I had to</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

#### #1 reason for **males and pre-med** students

Male students are more likely to pursue STEM because they have always enjoyed games/toys, etc. (51% vs. 35% females).

#### #1 reason for **females and engineering & science** students

Female students are more likely than male students to say that they chose STEM to make a difference (49% vs. 34% males).

#### #1 reason for **technology** students (Note: Does not make top 3 list for any other major)

Of all STEM students, pre-med are most likely to give this is a reason (67% vs. 50% in science, 35% in engineering and 12% in technology).

Black and Hispanic students are less likely than white and Asian students to say they chose STEM because they were encouraged by a teacher or guidance counselor.
How can Parents HELP encourage STEM? (see brochure!)

• See brochure
• Create INTEREST, be POSITIVE!
• Guide them to STEM careers!
• Everyday science, encourage curiosity
• EXPERIENCES, informal and programs
• Perseverance, especially in math
What do they need?

- MATH, 4 years in high school, problem solving
- SCIENCE, lab based (including chemistry, maybe physics)
- STEM SKILLS: same as 21st century skills
- Be involved: STEM programs and mentoring