

SkillsUSA 2015 Contest Projects

Television (Video) Production

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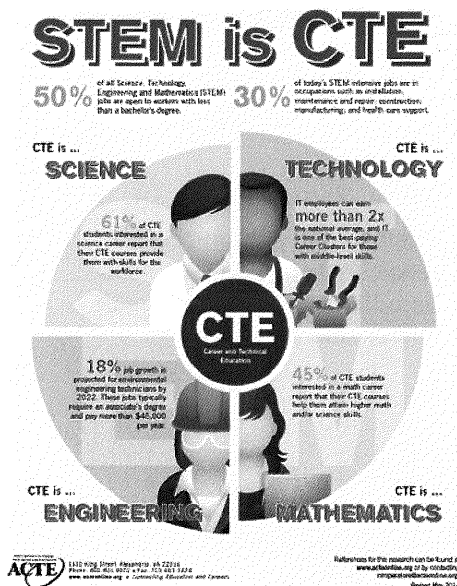
National Leadership and Skills Conference - SkillsUSA 2015 Video Production: Public Service Announcement

Prompt: "Career and Technical Education addresses the need for Science, Technical, Engineering and Mathematics (STEM) education. What is STEM and how is STEM a critical component of career and technical education and necessary for modern workers?"

There has been an enormous amount of attention given to STEM, Science, Technology, Engineering and Mathematics, education over the past several years. Yet this attention has been mostly limited to those careers requiring advanced degrees. In the 21st century economy, many jobs now require some STEM skills, and the vast majority of careers that are fueled by career and technical education (CTE) are frequently, STEM jobs.

Therefore the general public needs to understand that STEM is CTE (not the other way around...in that CTE is the embodiment of how to use STEM knowledge in an applied, important way). Being able to show the diversity of careers that a career and technical education lead to and exemplifying them as STEM is an important next step in building America's awareness of the value and role of this pathway for all learners.

Please see the following for more information:



<http://tinyurl.com/ncvut3e>



<http://tinyurl.com/qbs5plq>

STEM is CTE

50%

of all Science, Technology, Engineering and Mathematics (STEM) jobs are open to workers with less than a bachelor's degree.

30%

of today's STEM intensive jobs are in occupations such as installation, maintenance and repair; construction; manufacturing; and health care support.

CTE is ...

SCIENCE

61% of CTE students interested in a science career report that their CTE courses provide them with skills for the workforce.

CTE is ...

TECHNOLOGY

IT employees can earn **more than 2x** the national average, and IT is one of the best-paying Career Clusters for those with middle-level skills.

CTE

Career and Technical Education

18% job growth is projected for environmental engineering technicians by 2022. These jobs typically require an associate's degree and pay more than \$45,000 per year.

45% of CTE students interested in a math career report that their CTE courses help them attain higher math and/or science skills.

CTE is ...

ENGINEERING

CTE is ...

MATHEMATICS

CTE's Role in Science, Technology, Engineering & Math

For the last several years, concern has been growing about America's underinvestment and underperformance in the fields collectively known as STEM (science, technology, engineering and mathematics). These concerns have been heralded in several high-profile books, reports and policy proposals from groups ranging from U.S. business leaders to the National Governors Association.¹

What is STEM, and why is it drawing so much high-profile attention? STEM can be described as an "initiative for securing America's leadership in science, technology, engineering and mathematics fields and identifying promising strategies for strengthening the educational pipeline that leads to STEM careers."² The elements of science, technology, engineering and math are integral parts of our nation's critical economic sectors, from health care to energy, and infrastructure to national security. STEM careers include not only those requiring a research-based advanced math or science degree, but a broad range of related occupations in areas as diverse as aquaculture, automotive technology,

accounting and architecture. More careers than ever before require a deep understanding of science, technology, engineering or math principles.

Despite the increased importance and focus placed on preparing students for STEM fields, more must be done to ensure a fully developed, skilled STEM workforce that will help secure America's economic future. Career and technical education (CTE) programs offer an important instructional approach that strengthens students' understanding of STEM content and helps attract more individuals into STEM career pathways. Expanding and strengthening CTE programs are critical parts of the solution to the STEM challenge.

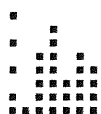
The Concerns

TOO FEW STEM PROFESSIONALS

To regain a high level of American economic competitiveness and well-being, American-based industries need to perpetuate a steady stream of innovative

IN THIS BRIEF:

This Issue Brief will explore the integral role CTE programs and initiatives play in addressing the STEM challenge and securing America's leadership in innovation. CTE programs offer students a deeper understanding of STEM career pathways, build interest in STEM-related careers by making math and science content more relevant and tangible to students, and help grow the STEM workforce pipeline by encouraging more students from underrepresented populations to enter these career fields.



STEM-intensive Career Clusters and Sample Careers

Agriculture, Food and Natural Resources	Health Science	Information Technology	Manufacturing	Science, Technology, Engineering and Mathematics	Transportation, Distribution and Logistics
<ul style="list-style-type: none"> • Veterinarian • GPS Technician • Food and Drug Inspector 	<ul style="list-style-type: none"> • Dietician • Pharmacy Technician • Microbiologist 	<ul style="list-style-type: none"> • 3-D Animator • Network Administrator • Computer Programmer 	<ul style="list-style-type: none"> • Electrical Engineer • Safety Technician • Wind Turbine Machinist 	<ul style="list-style-type: none"> • Statistician • Lab Technician • Drafter 	<ul style="list-style-type: none"> • Aerospace Engineer • Logistics Analyst • Diesel Engine Specialist

technologies and processes. Policymakers and business leaders have emphasized that this ability to innovate is predicated on the readiness of a large pool of talented individuals with expertise in the principles of science, technology, engineering and advanced mathematics. The demand for U.S. STEM professionals is expanding rapidly, but the supply of STEM talent is not increasing to meet the growing need.

Two main factors are affecting the supply side of the STEM equation. First, the looming retirement of the baby boom generation will significantly affect the STEM labor force. The number of current scientists and engineers retiring will increase rapidly over the next decade. Twenty-six percent of people with science and engineering degrees currently working are 50 years or older. Second, too few students are currently choosing to prepare for STEM careers. From 1985 to 2005, the number of bachelor's degrees earned in engineering fell from 77,572 to 66,133, and the number of associate degrees in engineering technology fell from 53,700 to 28,800.³

The United States is standing still or falling behind in terms of producing home-grown STEM talent. At the same time, other nations, particularly population-rich ones like India and China, are rapidly increasing the number of STEM professionals that their secondary and postsecondary education systems produce.⁴

These sobering facts indicate that the United States is struggling to keep up with increasing global competition for talent, which depends in large measure on STEM education. The U.S. business community has set a goal of doubling the annual number of U.S. science, technology, engineering and mathematics bachelor's-level graduates to 400,000 by 2015.⁵

An exponentially higher level of STEM technicians with associate degrees or certificates will also be needed across a broad spectrum of industries in the future. Demand for STEM professionals with education and training above a high school diploma but below a bachelor's degree is expected to grow significantly in the coming years.⁶ For example, veterinary technicians, nursing assistants, pharmacy technicians, forensic-science technicians and dental hygienists are all among the fastest-growing occupations projected by the Bureau of Labor Statistics.⁷

LACK OF BASIC SCIENCE AND MATH SKILLS

While some of the deficit in STEM professionals can be attributed to lack of interest, there is growing concern that students are not gaining the foundational skills necessary to be successful in STEM career areas even if they choose that path.

Low student performance is evidenced on the U.S. National Assessment of Educational Progress (NAEP). Math scores for 17-year-olds were essentially unchanged from 2004 to 2008, despite the fact that students are taking more and higher-level math courses in high school.⁸ In fact, test results showed that 41 percent of those students did not even have an understanding of moderately complex math procedures and reasoning, such as finding averages and making decisions based on graphs.⁹

According to the 2006 Programme for International Student Assessment (PISA), U.S. students performed much worse in science and math than students from other industrialized countries.¹⁰ Of the 30 countries tested, students from 16 countries performed higher than U.S. students in science, and students from 23 countries performed higher than the United States in math.

In addition, scores in the United States were much more closely correlated to socioeconomic status than in other countries. For the U.S. students who took the PISA, 18 percent of the variance was related to socioeconomic status, while only 14 percent of the variance was related to socioeconomic status in other countries.¹¹ This U.S. income-based achievement gap is further evidenced by the fact that lower-income U.S. students scored an average of 23 points below higher-income students on the math portion of the 2005 12th-grade NAEP.¹²

Achievement gaps also exist among U.S. students based on race and ethnicity, and the gaps are even more dramatic when gender is added. Hispanic and black students lag behind white students on practically every measure of science and math proficiency.¹³ On the mathematics portion of the SAT college entrance exam, Asian-American and white students' scores are much higher and are increasing more rapidly than those of black and Hispanic students. Boys significantly outperform girls across all four race/ethnicity categories.¹⁴

Given the demographic trends of rapidly increasing non-white and less-advantaged populations in the United States, this pattern of low performance among disadvantaged students is a serious concern for the potential future of the STEM workforce.

CTE Provides a Solution

In facing these serious challenges, there is also reason for optimism in America's ability to ignite interest in STEM-related careers and strengthen the STEM literacy of the entire student population. The reason for that optimism stems from a growing level of STEM innovation that has evolved from CTE.

CTE has long been a leader in the integration of high-level academics and technology. For example, CTE courses in agriculture, nutrition and health care have always contained strong science components, in many places earning students core academic credits. During the last decade, however, literally thousands of new cutting-edge, STEM-intensive CTE programs have been launched or expanded in schools across the nation. As these programs move to larger-scale implementation, they have amazing potential to help many additional students prepare for and pursue careers in STEM areas.

CTE programs and related initiatives provide key advantages in addressing the STEM challenge and securing America's leadership in innovation. CTE programs offer students a deeper

understanding of STEM career pathways in order to facilitate student transitions into these areas, build interest in STEM and STEM-related careers by making math and science content more relevant and tangible to students through integration, and help grow the STEM workforce pipeline by encouraging more students from underrepresented populations to enter these career fields.

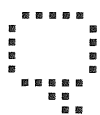
PROVIDING CAREER EXPLORATION AND PATHWAYS

There is a significant challenge in American culture of attracting students to actively pursue STEM careers. According to a recent survey about teen attitudes toward STEM, students are exhibiting a renewed openness toward pursuing STEM professions and showing more interest in developing marketable STEM skills as the nation's economic future becomes more tenuous. However, the survey also indicates that youths' lack of understanding of STEM creates a serious obstacle. "Nearly two-thirds of teens indicated that they may be discouraged from pursuing a career in STEM because they do not know anyone who works in these fields (31 percent) or understand what people in these fields do (28 percent)."¹⁵

CTE programs, integrated with active career exploration and career advising, help students understand the breadth of careers that have a relationship to STEM and the varied pathways that can lead to those careers. Courses in areas like aviation and aerospace, information technology, engineering, game design, health care, nanotechnology, and simulation and robotics expose students to curricula and careers they may have never even imagined.

Embedded in CTE programs are the support services necessary to help students pursue these rigorous courses and career opportunities, including mentors, career and technical student organizations, and work-based learning opportunities, such as job shadowing and internships, to connect youth with caring adult role models.

STEM-intensive courses are being taught throughout CTE through the use of career clusters, an approach that gives students a broader understanding of the world of careers. There are 16 career clusters containing 81 distinct career pathways.¹⁶ While STEM-related careers exist across the 16 clusters, six are considered STEM intensive: Agriculture, Food and Natural Resources; Health Science; Information Technology; Manufacturing; Science, Technology, Engineering and Mathematics;



“CTE courses, through the thoughtful integration of STEM concepts, can help all students become more STEM literate and increase the chances that these students consider STEM-related careers.”

and Transportation, Distribution and Logistics. Within these systems, students can learn more about career options, take personalized career assessments, and better understand the challenging mathematics and science courses they will need to pursue STEM careers.

Through coherent “programs of study,” authorized in the federal Carl D. Perkins Career and Technical Education Act, CTE at the secondary level is linked to postsecondary experiences leading to certificates, associate degrees and bachelor’s degrees. This is especially critical in STEM fields. While not all STEM professions require bachelor’s or more advanced degrees, almost all require some amount of postsecondary education and training.

According to a workforce analysis conducted in 2007, about half of all U.S. jobs fall in the category of “middle skill” jobs—“those that require more than high school, but less than a four-year degree.”¹⁷ A large percentage of these middle skill jobs relate directly to STEM.

Through programs of study, CTE students can explore and then enter into a definitive career pathway with the assurance that knowledge and skills will transfer between secondary and postsecondary education, and then into a high-skill, high-wage, high-demand job opportunity. CTE programs put students on a pathway to immediate job opportunities and lifelong career advancement in STEM areas.