



Attracting Youth to STEM

Science, technology, engineering and mathematics (STEM) education is of critical importance to the economy. STEM skill-sets empower manufacturers to maximize their growth and success. As part of the advanced manufacturing sector, it is a necessary priority to attract young people to STEM careers. The following list highlights several STEM models that we recommend.

PROJECT LEAD THE WAY

Website: www.pltw.org

Description: Project Lead The Way (PLTW) is the leading provider of rigorous and innovative STEM education curricular programs used in elementary, middle, and high schools across the U.S. STEM education programs like the one offered by PLTW engage students in activities, projects, and problem-based learning, which provides hands-on classroom experiences. Students create, design, build, discover, collaborate and solve problems while applying what they learn in math and science. They're also exposed to STEM fields through professionals from local industries who supplement the real-world aspect of the curriculum through mentorships and workplace experiences.

More than 4,700 schools in all 50 states and the District of Columbia are offering PLTW courses to their students in the 2012-13 school year. In addition, PLTW trains more than 3,000 teachers each year to instruct its engaging, rigorous STEM education curriculum. PLTW was recently cited by the Harvard Graduate School of Education as a "model for 21st century career and technical education." It was also recently recognized as one of the top STEM programs ready for full implementation across the nation.

STAR

Website: <http://starteacherresearcher.org/>

Description: The STEM Teacher And Researcher (STAR) program is a nine-week summer research internship for aspiring K-12 science and mathematics teachers. STAR aims to produce excellent K-12 STEM teachers by providing aspiring teachers with opportunities to do authentic STEM research and helping them translate their research experience into classroom practice.

The program is coordinated by the Center for Excellence in STEM Education on behalf of the California State University system in partnership with national research laboratories associated the Department of Education (DOE), the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), and the National Optical Astronomy Observatory (NOAO). Over the past 6 summers STAR has offered 290 placements at 15 research sites in Alaska, Arizona, California, Colorado, Maryland, Tennessee, the Virgin Islands, and Washington.

FIRST

Website: <http://www.usfirst.org/>

Description: The mission of For Inspiration and Recognition of Science and Technology (FIRST) is to inspire young people to be science and technology leaders, by engaging them in exciting mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

Several programs are supported by FIRST:

- FIRST Robotics Competition for Grades 9-12
- FIRST Tech Challenge for Grades 7-12
- FIRST LEGO League for Grades 4-8
- Junior FIRST LEGO League for Grades K-3
- FIRST Place for ages 6 to adult

When combined, these programs have an overall reach of 350,000+ students, 32,650 teams, 28,000+ robots, 64,000+ Mentors/adult supporters, and 66,000+ other Volunteers (e.g. events Volunteers, Operational and Affiliate Partners). Finally, FIRST's scholarship program had more than \$16 million in college scholarships in 2013, which translated into more than 750 scholarship opportunities.

MESA

Website: <http://mesa.ucop.edu/>

Description: Mathematics, Engineering, Science Achievement (MESA) is nationally recognized for its innovative and effective academic development program. MESA engages thousands of educationally disadvantaged students so they excel in math and science and graduate with math-based degrees. MESA partners with all segments of California higher education as well as K-12 institutions.

MESA has had remarkable student outcomes. Of MESA high school graduates, 53 percent went on to postsecondary education STEM majors. Of the MESA seniors, 76 percent went on to college, compared to the state average of 41 percent. Of the MESA high school graduates who went to college, 24 percent went to the University of California, 22 percent went to the California State University, 21 percent went to the California Community Colleges, 7 percent went to independent California universities or colleges, 26 percent went to other institutions, mostly out-of-state universities or colleges. Of those MESA community college students who transferred to four-year institutions, 97 percent entered these colleges and universities as math or science majors. Of the California MESA community college students who transferred to four-year institutions, 49 percent transferred to the University of California, 44 percent transferred to the California State University, 7 percent transferred to independent California universities and colleges, out-of-state universities and colleges, and others.

GIRLSTART

Website: <http://www.girlstart.org/>

Description: Girlstart develops and implements a range of innovative, research- and standards-based education and mentorship programs designed to promote girls' early engagement and academic success in STEM, encourage girls' aspirations and persistence in STEM education and careers, and incubate a talented and diverse STEM workforce.

Since 1997, Girlstart has served over 40,000 girls and 6,000 teachers and families with school-based programs, professional development for teachers, summer camps, STEM career conferences and expos, large-scale science events for families, and more. Girlstart was recently recognized as one of the top STEM programs ready for full implementation across the nation.

ST MATH

Website: <http://www.mindresearch.net/programs/>

Description: Spatial-Temporal (ST) Math is the leader in visual math instruction and represents the highest quality and most effective blended learning math solution in K-12 education. Created by MIND Research Institute, ST Math is game-based instructional software for K-5 and secondary intervention and is designed to boost math comprehension and proficiency through visual learning. Integrating with classroom instruction, ST Math incorporates the latest research in learning and the brain and promotes mastery-based learning and mathematical understanding. The ST Math software games use interactive, graphically-rich animations that visually represent mathematical concepts to improve conceptual understanding and problem-solving skills.

Schools that fully implement ST Math see double, and even triple, the growth in math proficiency than comparable schools. A 2013 study confirmed that ST Math made a statistically significant impact on student math performance across 45 high-need low-performing LAUSD elementary schools based on an increased percentage of students scoring proficient and advanced on the California Standards Test in 2011. ST Math was recently recognized as one of the top STEM programs ready for full implementation across the nation.

TRAVELING SPACE MUSEUM

Website: <http://travelingspacemuseum.org/>

Description: The Traveling Space Museum (TSM) brings full-scale and fully functional simulators into schools and uses them as STEM teaching tools. One of their programs is an all-day "Space Day" event. Specializing in the use of full-scale simulators as teaching tools, TSM's many interactive attractions include the only full-motion flight simulator and the only jet aircraft to visit schools regularly. Students climb in and work real hardware that an astronaut would use. Another program offered by TSM is an after school academy, which provides 4-6 weeks of highly interactive aerospace education curriculum for elementary and middle school students.

TSM has helped inspire more than 300,000 students at day-long Space Day events in more than 20 states, and has received numerous awards & honors for their efforts.