



PhD and Master's Academic Tracks The QBS programs seek to train highly qualified students in bioinformatics, biostatistics, epidemiology, and health data science. This broad technical and practical expertise in the field prepares students for rewarding careers in both academia and private industry. DoctorateMaster's RiskWare is JCU's online system for:Enterprise Risk Management, including recording, assessing and managing business risks, andWork Health and Safety Risk Management, including reporting and managing incidents, injuries and hazards. Accessible from any computer with internet access, RiskWare is an intuitive system for staff and students to report and manage risks and incidents in real-time. It can also produce comprehensive reports for managing risk across JCU, provide corrective treatment and action plans, and record actions. RiskWare does not diminish a supervisor's responsibility to manage reported events, and does not eliminate the need for managers and their staff to discuss circumstances and implement corrective actions that are applicable to incidents, injuries or identified hazards. Report hazards, incidents as they occur, are witnessed or are observed. This Pocket Safety App allows you to capture photos, immediate information and statements about the incident at the time of occurrence. This App mirrors the JCU online Risk Management System – RiskWare for reporting hazards, incidents and near misses. See reference guide (PDF, 381 KB) to download from the App Store or Google Play To access and use RiskWare, staff and students must first authenticate using their JCU username and password. *Note, not all staff are required to watch the ERM module; if this module is applicable to your role at JCU, you will be issued formal notification by email. Are you interested in engineering that interacts with the human body? Our practice-led Biomedical Engineering degree explores mathematics, anatomy, physiology and computing to meet the rapid advancement in technology which is becoming a vital part of healthcare. Throughout this programme, you will have the option to carry out exciting work placements in the UK and abroad. If this sounds like the degree for you then find out more about our university entry requirements. Our unique Biomedical Engineering degree programme will provide you with the skills and expertise needed to work in specialist areas such as assistive technology, rehabilitation, medical imaging and robotics, physiology monitoring, cardiopulmonary engineering, m-health, orthopaedic implants and regenerative medicine/ tissue engineering. Biomedical Engineering (also known as bioengineering) is a discipline of engineering and maintenance of medical equipment and devices covering all spectrums from the new born to assistive living for the elderly. Industrial-led practical workshops and labs will help enhance your technical skills. This will enable you to relate 'real-life' commercial innovations to the underpinning academic theory learnt in the lectures. Our state-of-the-art facilities will allow you to explore a variety of biomedical applications including: sensing and measuring on micro and nano scales, personal health tracking, remote diagnosis and monitoring, biomaterials to name a few. The knowledge acquired will then enable you to engage in exciting projects such as designing prostheses or devising new medical technology for physicians and medical professionals to be used in the prognosis, diagnosis and treatment of patients. Along with these technical skills, as an engineer you will also gain a diverse range of transferrable skills, including effective communication, leadership, the ability to critically assess gaps in target healthcare markets, and the tools required to provide solutions to bridge those gaps. The programme is currently in progression of accreditation by the Institute of Physics and Engineering in Medicine (IPEM), the Institution of Engineering and Technology (IET) and the Institution of Mechanical Engineers (IMechE). Where will I study? You will learn within our recently extended £71 million City South Campus, located in Edgbaston just five minutes from Birmingham City Centre. Our campus has been recently redeveloped and provides access to cutting-edge facilities that will enhance and support your learning during your time here. Group of academic disciplines "STEM" redirects here. For other uses, see STEM (disambiguation) and Stem (disambiguation). Science, technology, engineering, and mathematics (STEM), previously science, mathematics, engineering, and technology (SMET),[1] is a broad term used to group together these academic disciplines.[2] This term is typically used to address an education policy or a curriculum choices in schools. It has implications for workforce development, national security concerns and immigration policy.[2] The science in STEM typically refers to two out of the three major branches of science: natural sciences, including biology, physics, and chemistry; and formal science, social science, social science, social science, are categorized separately from the other two branches of science, and are instead grouped together with humanities and arts to form another counterpart acronym named HASS - Humanities, Arts, and Social Sciences, rebranded in the UK in 2020 as SHAPE.[3][4] Psychology however is considered a major part of STEM, besides the other 2 subjects.[5] In the United States/ United Kingdom education system, in elementary, middle, and high schools, the term science refers primarily to the natural sciences, with mathematics being a standalone subject, and the social sciences are combined with the humanities under the umbrella term social studies. The change was, in part, instigated at an interagency meeting by Peter Faletra the director from the Office of Science division of Workforce Development for Teachers and Science Foundation (NSF) in 2001. However, the acronym was adopted by Rita Colwell and other science administrators in the National Science Foundation (NSF) in 2001. However, the acronym STEM predates NSF which was used by a variety of educators including Charles E. Vela, the founder and director of the Advancement of Hispanics in Science and Engineering Education (CAHSEE).[6][7][8] In the early 1990s, CAHSEE started a summer program for talented under-represented students in the Washington, DC area called the STEM Institute. Based on the program's recognized success and his expertise in STEM education,[9] Charles Vela was asked to serve on numerous NSF and Congressional panels in science, mathematics and engineering education;[10] it is through this manner that NSF was first introduced to the acronym STEM. One of the first NSF projects to use the acronym[citation needed] was STEMTEC, the Science, Technology, Engineering and Math Teacher Education Collaborative at the University of Massachusetts Amherst, which was founded in 1998.[11] Other variations STREAMi (Science, Technology, Research, Engineering, Arts, Maths, innovation) STM (Science, Technology, and Medicine; or Scientific, Technical, and Medical) eSTEM (environmental STEM)[13][14] STEMIE (Science, Technology, Engineering, Arts, Maths, innovation) STM (Scientific, Technology, and Medicine; or Scientific, Technical, and Medical) eSTEM (environmental STEM)[13][14] STEMIE (Science, Technology, Engineering, Arts, Maths, innovation) STM (Scientific, Technical, and Medicine; or Science, Technology, Engineering, Arts, Maths, innovation) STM (Science, Technology, Engineering, Arts, Maths, innovation) STM (Scien Mathematics, Invention and Entrepreneurship); adds Inventing and Entrepreneurship as means to apply STEM to real world problem solving and markets. [15] iSTEM (invigorating Science, Technology, Engineering, and Mathematics); identifies new ways to teach STEM-related fields. STEMLE (Science, Technology, Engineering, Mathematics, Law and Economics); identifies subjects focused on fields such as applied social sciences and anthropology, regulation, cybernetics, machine learning, social sciences. MEd Curriculum Studies: STEMS²[16] (Science, Technology, Engineering, Mathematics, Social Sciences and Sense of Place); integrates STEM with social sciences and sense of place. METALS (STEAM + Logic), [17] introduced by Su Su at Teachers College, Columbia University. [citation needed] STREM (Science, Technology, Robotics, Engineering, and Mathematics); adds robotics as a field. STREM (Science, Technology, Robotics, Engineering, and Multimedia); adds robotics as a field and replaces mathematics with media. STREAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEEM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. STEAM (Science, Technology, Engineering, Arts, and Mathematics); adds robotics and arts as fields. Technology, Engineering, and Mathematics); [19] more focus and based on humanism and arts. STEAM (Science, Technology, Engineering and Applied Mathematics); more focus on applied mathematics (20) GEMS (Girls in Engineering, Math, and Science); used for programs to encourage women to enter these fields.[21][22] STEMM (Science, Technology, Engineering, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship)
THAMES (Technology, Hands-On, Arts, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Hands-On, Arts, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Hands-On, Arts, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Hands-On, Arts, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Hands-On, Arts, Mathematics, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, and Entrepreneurship) THAMES (Technology, Engineering, Arts, and Mathematics)[23] AMSEE (Applied Math, Science, Engineering, Arts, and Applied Math, Science, Engineering, Applied Math, Science, Engineering, Applied Math, Science, Engineering, Applied Math, Science, Engin Science) THAMES (Technology, Humanities, Arts, Mathematics, Engineering, and Science; includes all three branches of science and Technology) Geographic distribution Africa Main article: List of organizations engaged in STEM education across Africa Australia The Australian Curriculum, Assessment and Reporting Authority 2015 report entitled, National STEM School Education Strategy, stated that "A renewed national focus on STEM in school education is critical to ensuring that all young Australians are equipped with the necessary STEM skills and knowledge that they must need to succeed."[24] Its goals were to: "Ensure all students finish school with strong foundational knowledge in STEM and related skills"[24] "Ensure that students are inspired to take on more challenging STEM subjects"[24] Events and programs meant to help develop STEM in Australian schools include the Victorian Model Solar Vehicle Challenge, the Maths Challenge (Australian Mathematics Trust), [25] Go Girl Go Global[25] and the Australian Informatics Olympiad. [25] Canada ranks 12th out of 16 peer countries in the percentage of its graduates who studied in STEM programs, with 21.2%, a number higher than the United States, but lower than France, Germany, and Austria. The peer country with the greatest proportion of STEM graduates, Finland, has over 30% of their university graduates coming from science, mathematics, computer science, and engineering programs. [26] SHAD is an annual Canadian summer enrichment program for high-achieving high school students in July. The program focuses on academic learning particularly in STEAM fields. [27] Scouts Canada has taken similar measures to their American counterpart to promote STEM fields to youth. Their STEM program began in 2015.[28] In 2011 Canadian entrepreneur and philanthropist Seymour Schulich established the Schulich Leader Scholarships, \$100 million in \$60,000 scholarships for students beginning their university education in a STEM program at 20 institutions across Canada. Each year 40 Canadian students would be selected to receive the award, two at each institution, with the goal of attracting gifted youth into the STEM scholarships to five participating universities in Israel. [30] China To promote STEM in China, the Chinese government issued a guideline in 2016 on national innovation-driven development strategy, instructing that by 2020, China should become an innovative countries; and by 2050, it should become a technology innovation power. In February 2017, the Ministry of Education in China has announced to officially add STEM education into the primary school curriculum, which is the first official government recognition of STEM education was held in Beijing, China. This plan aims to allow as many students to benefit from STEM education as possible and equip all students with scientific thinking and the ability to innovate. In response to encouraging policies by the government, schools in both public and private sectors around the country have begun to carry out STEM education and relevant contents to be taught are needed. At present, China lacks qualified STEM teachers and a training system is yet to be established. Several Chinese cities have taken bold measures to add programming as a compulsory course for elementary and middle school students. This is the case of the city of Chongqing. Europe See also: STEMNET (an educational charity in the UK) Several European projects have promoted STEM education and careers in Europe. For instance, Scientix[31] is a European cooperation of STEM teachers, education and careers in Europe. For instance, Scientix[31] is a European cooperation of preuniversity students for STEM education and careers. France is industrial engineering sciences (sciences industrial engineering sciences de l'ingénieur). The STEM organization in France is the association UPSTI.[clarification needed] Hong Kong STEM education has not been promoted among the local schools in Hong Kong until recent years. In November 2015, the Education Bureau of Hong Kong released a document titled Promotion of STEM Education. India is next only to China with STEM graduates per population of 1 to 52. The total fresh STEM graduates were 2.6 million in 2016.[34] STEM graduates have been contributing to the Indian economy with well paid salaries locally and abroad since last two decades. The turnaround of Indian economy with comfortable foreign exchange reserves is mainly attributed to the skills of its STEM graduates. Italy In Middle Ages, Quadrivium was indicated the scientific "liberal arts" (arithmetic, geometry, music, and astronomy) as opposed to Trivium for humanistic ones. Philippines In the Philippines, STEM is a two-year program and strand that is used for Senior High School (Grade 11 and 12), as signed by the Department of Education or DepEd. The STEM strand is under the Academic Track, which also include other strands like ABM, HUMSS, and GAS.[35][36] The purpose of STEM strand is to educate students in the field of science, technology, engineering, and mathematics, in an interdisciplinary and applied approach, and to give students advance knowledge and application in the field. After completing the program, the students will earn a Diploma in Science, Technology, Engineering, and Mathematics. In some colleges and universities, they require students applying for STEM degrees (like medicine, engineering, computer studies, etc.) to be a graduate of STEM, if not, they will need to enter a bridging program. Qatar In Qatar, AL-Bairaq is an outreach program to high-school students with a curriculum that focuses on STEM, run by the Center for Advanced Materials (CAM) at Qatar University. Each year around 946 students, from about 40 high schools, participate in AL-Bairaq make use of project-based learning, encourages students to solve authentic problems, and inquires them to work with each other as a team to build real solutions.[38][39] Research has so far shown positive results for the program.[40] Singapore STEM is part of the Applied Learning Programme (ALP) that the Singapore Ministry of Education (MOE) has been promoting since 2013, and currently, all secondary schools have such a programme. It is expected that by 2023, all primary schools in Singapore will have an ALP. There are no tests or exams for ALPs. The emphasis is for students to learn through experimentation - they try, fail, try, learn from it and try again. The MOE actively supports schools with ALPs to further enhance and strengthen their capabilities and programmes that nurtures innovation and creativity. The Singapore Science Centre established a STEM unit in January 2014, dedicated to igniting students' passion for STEM. To further enrich students' learning experiences, their Industrial Partnership Programme (IPP) creates opportunities for students to get early exposure to the real-world STEM industries and careers. Curriculum specialists and STEM educators from the Science Centre will work hand-in-hand with teachers to co-develop STEM lessons, provide training to teachers and co-teach such lessons to provide students with an early exposure and develop their interest in STEM. Thai Education Minister Dr Teerakiat Jareonsettasin said after the 49th Southeast Asia Ministers of Education Organisation (SEAMEO) Council Conference in Jakarta that the meeting approved the establishment of two new SEAMEO regional centres in Thailand. One would be the STEM Education Centre, while the other would be a Sufficient Economy Learning Centre. Teerakiat said that the Thai government had already allocated Bt250 million over five years for the new STEM centre. The centre will be the regional institution responsible for STEM education promotion. It will not only set up policies to improve STEM education, but it will also be the centre for information and experience sharing among the member countries and education experts. According to him, "This is the first SEAMEO regional centre for STEM education, as the existing science education centre in Malaysia only focuses on the academic perspective. Our STEM education centre will also prioritise the implementation and adaptation of science and technology has initiated a STEM Education Network. Its goals are to promote integrated learning activities and improve student creativity and
application of knowledge, and to establish a network of organisations and personnel for the promotion of STEM education in the country.[42] Turkey Turkish STEM Education Task Force (or FeTeMM—Fen Bilimleri, Teknoloji, Mühendislik ve Matematik) is a coalition of academicians and teachers who show an effort to increase the quality of education in the STEM fields rather than focussing on increasing the number of STEM graduates.[43][44] Pakistan is rapidly changing the education infrastructure to produce the world leaders in STEM related fields. Recently Prime Minister approved STEM education project[45] to establish STEM labs in public schools. Similarly Ministry of IT & Telecom collaborates with Google to launch Pakistan's first grassroots level Coding skills). The aim of the program is to develop applied coding skills using gamification techniques for kids between 9 and 14 years of age. KPITBs Early Age Programming initiative[47] is running successfully across 225 Elementary and Secondary Schools in Khyber Pakhtunkhwa. There are many private organizations working in Pakistan to introduce STEM education in schools. EDVON[48] is one of them, they are providing progression based STEAM curriculum from grade 1-8 to instill critical thinking and innovation in young minds. United States In the United States, the acronym began to be used in education and immigration debates in initiatives to begin to address the perceived lack of qualified candidates for high-tech jobs. It also addresses concern that the subjects are often taught in isolation, instead of as an integrated curriculum.[49] Maintaining a citizenry that is well versed in the STEM fields is a key portion of the public education agenda of the United States.[50] The acronym has been widely used in these fields. It has also become commonplace in education discussions as a reference to the shortage of skilled workers and inadequate education in these areas.[51] The term tends not to refer to the non-professional and less visible sectors of the fields, such as electronics assembly line work. National Science Foundation Many organizations in the United States follow the guidelines of the National Science Foundation on what constitutes a STEM field. The NSF uses a broader definition of STEM subjects that includes subjects in the fields of chemistry, computer and information technology sciences, physics and astronomy, social sciences, mathematical sciences, mathematical sciences, mathematical sciences, mathematical sciences, mathematical sciences, physics and astronomy, social sciences, mathematical sciences, m programs such as the CSM STEM Scholars Program use the NSF definition.[53] The NSF is the only American federal agency whose mission includes support for all fields of fundamental sciences. [54] Its disciplinary program areas include scholarships, grants, fellowships in fields such as biological sciences, computer and information science and engineering, education and human resources, engineering, environmental research and education, geosciences, cyberinfrastructure, and polar programs. [52] Immigration policy Although many organizations in the United States follow the guidelines of the National Science Foundation on what constitutes a STEM field, the United States Department of Homeland Security (DHS) has its own functional definition used for immigration policy.[55] In 2012, DHS or ICE announced an expanded list of STEM designated-degree programs that qualify eligible graduates on student visas for an optional practical training (OPT) extension. Under the OPT program, international students who graduate from colleges and universities in the United States can stay in the country and receive up to twelve months of training through work experience. Students who graduate from a designated STEM degree program can stay for an additional seventeen months on an OPT STEM extension. [56][57] STEM-eligible degrees in US immigration Further information on Temporary foreign workers: Global labor arbitrage, H-1B visa, and Optional Practical Training An exhaustive list of STEM disciplines does not exist because the definition varies by organization. The U.S. Immigration and Customs Enforcement lists disciplines including[58] architecture, physics, actuarial science, chemistry, robotics, computer engineering, electrical engineering, electronics, mechanical engineering, industrial engineering, information science, information technology, civil engineering, aerospace engineering, aerospace engineering, astrophysics, astronomy, optics, nanotechnology, biomechanics, bioinformatics, acoustical engineering, geographic information systems, atmospheric sciences, educational/instructional technology, software engineering, and educational research. Education By cultivating an interest in the natural and social sciences in preschool or immediately following school entry, the chances of STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM success in high school can be greatly improved. [citation needed] STEM school can be greatly and beginning engineering at younger grades, even elementary school. It also brings STEM education to all students rather than only the gifted programs. In his 2012 budget, President Barack Obama renamed and broadened the "Mathematics and Science Partnership (MSP)" to award block grants to states for improving teacher education in those subjects. [59] In the 2015 run of the international assessment test the Program for International Student Assessment (PISA), American students came out 35th in mathematics, 24th in reading and 25th in science, out of 109 countries. The United States also ranked 29th in the percentage of 24-year-olds with science or mathematics degrees.[60] STEM education often uses new technologies such as RepRap 3D printers to encourage interest in STEM fields.[61] In 2006 the United States. Its Committee on Science, Engineering, and Public Policy developed a list of 10 actions. Their top three recommendations were to: Increase America's talent pool by improving K-12 science and mathematics education Strengthen the skills of teachers through additional training in science, mathematics and technology Enlarge the pipeline of students prepared to enter college and graduate with STEM degrees[62] The National Aeronautics and Space Administration also has implemented programs and curricula to advance STEM education in order to replenish the pool of scientists, engineers and mathematicians who will lead space exploration in the 21st century.[62] Individual states, such as California, have run pilot after-school STEM programs to learn what the most promising practices are and how to implement them to increase the chance of student success.[63] Another state to invest in STEM education is Florida, where Florida Polytechnic University,[64] Florida's first public university,[64] Florida's first public university for engineering and technology, engineering and technology, engineering and mathematics (STEM), was established.[65] During school, STEM programs have been established for many districts throughout the U.S. Some states include New Jersey, Arizona, Virginia, North Carolina, Texas, and Ohio.[66][67] Continuing STEM Program[68] as well as the University of Cincinnati.[69] Racial gap in STEM fields In the United States, the National Science Foundation found that the average science score on the 2011 National Assessment of Educational Progress was lower for black, while only six percent of STEM workers were black. [71] Though STEM in the U.S. has typically been dominated by white males, there have been considerable efforts to create initiatives to make STEM a more racially and gender diverse field. [72] Some evidence suggests that all students, including black and Hispanic students, including black and Hispanic students. their entering academic credentials are at least as high as the average student's.[73] However, there is criticism that emphasis on STEM diversity has lowered academic standards.[74] Gender gaps in STEM Although women make up 47% of the workforce[75] in the U.S., they hold only 24% of STEM jobs. Research suggests that exposing girls to female inventors at a young age has the potential to reduce the gender gap in technical STEM fields by half. [76] Campaigns from organizations like the National Inventors Hall of Fame aimed to achieve a 50/50 gender balance in their youth STEM programs by 2020. American Competitiveness Initiative In the State of the Union Address on January 31, 2006, President George W. Bush announced the American Competitiveness Initiative. Bush proposed the initiative
to address shortfalls in federal government support of educational development and progress at all academic levels in the STEM fields. In detail, the initiative called for significant increases in federal funding for advanced R&D programs (including a doubling of federal funding support for advanced research in the physical sciences through DOE) and an increase in U.S. higher education graduates within STEM disciplines. The NASA Means Business competition, sponsored by the Texas Space Grant Consortium, furthers that goal. College students compete to develop promotional plans to encourage students in middle and high school to study STEM subjects and to inspire professors in STEM fields to involve their students in outreach activities that support STEM education. The National Science Foundation has numerous programs in STEM education. Award ITEST Program. STEM programs have been implemented in some Arizona schools. They implement higher cognitive skills for students and enable them to inquire and use techniques used by professionals in the STEM fields. The STEM Academy is a national nonprofit-status organization dedicated to improving STEM literacy for all students. It represents a recognized national next-generation high-impact academic model. The practices, strategies, and programming are built upon a foundation of identified national best practices which are designed to improve under-represented minority and low-income student growth, close achievement gaps, decrease dropout rates, increase high school graduation rates and improve teacher and principal effectiveness. The STEM Academy represents a flexible use academic model that targets all schools and is for all students. [77] Project Lead The Way (PLTW) is a leading provider of STEM education curricular programs to middle and high schools in the United States. The national nonprofit organization has over 5,200 programs in over 4,700 schools in all 50 states. Programs include a high school engineering curriculum called Pathway To Engineering, a high school biomedical sciences program, and the teacher professional development and ongoing support to create transformational programs in schools, districts, and communities. PLTW programs have been endorsed by President Barack Obama and United States Secretary of Education The Science, Technology, Engineering, and Mathematics (STEM) Education Coalition[78] works to support STEM programs for teachers and students at the U. S. Department of Education, the National Science Foundation, and other agencies that offer STEM-related programs. Activity of the STEM Coalition Seems to have slowed since September 2008. Scouting In 2012, the Boy Scouts of America began handing out awards, titled NOVA and SUPERNOVA, for completing specific requirements appropriate to scouts' program level in each of the four main STEM areas. The Girl Scouts of the USA has similarly incorporated STEM into their program through the introduction of merit badges such as "Naturalist" and "Digital Art".[79] SAE is an international organization, solutions'provider specialized on supporting education, award and scholarship programs for STEM matters, from pre-K to the College degree.[80] It also promotes scientific and technologic innovation. Department of Defense programs [81] The eCybermission is a free, web-based science, mathematics and technology competition for students in grades six through nine sponsored by the U.S. Army. Each webinar is focused on a different step of the scientific method and is presented by an experienced eCybermission CyberGuides are military and civilian volunteers with a strong background in STEM and STEM education, who are able to provide valuable insight into science, technology, engineering, and mathematics to students and team advisers. STARBASE is a premier educational program, sponsored by the Office of the Assistant Secretary of Defense for Reserve Affairs. Students interact with military personnel to explore careers and make connections with the "real world." The program provides students with 20–25 hours of stimulating experiences at National Guard, Navy, Marines, Air Force Reserve and Air Force bases across the nation. SeaPerch is an innovative underwater robotics program that trains teachers to teach their students how to build an underwater remotely operated vehicle (ROV) in an in-school or out-of-school setting. Students build the ROV from a kit composed of low-cost, easily accessible parts, following a curriculum that teaches basic engineering and science concepts with a marine engineering and science concepts with a marine engineering and science concepts with a marine engineering theme. Legislation The America COMPETES Act (P.L. 110-69) became law on August 9, 2007. It is intended to increase the nation's investment in science and engineering research and in STEM education, National Institute of Standards and Technology laboratories, and the Department of Energy (DOE) Office of Science over FY2008–FY2010. Robert Gabrys, Director of Education at NASA's Goddard Space Flight Center, articulated success as increased student achievement, early expression of student interest in STEM subjects, and student preparedness to enter the workforce. Jobs In November 2012 the White House announcement before congressional vote on the STEM Jobs Act put President Obama in opposition to many of the Silicon Valley firms and executives who bankrolled his re-election campaign.[83] The Department of Labor identified 14 sectors that are "projected to add substantial numbers of new jobs to the economy or affect the growth of other industries or are being transformed by technology and innovation requiring new sets of skills for workers."[84] The identified sectors were as follows: advanced manufacturing, Automotive, construction, financial services, geospatial technology, homeland security, information technology, Transportation, Aerospace, Biotechnology, energy, healthcare, hospitality, and retail. The Department of Commerce notes STEM fields careers are some of the best-paying and have the greatest potential for job growth in the early 21st century. The report also notes that STEM workers play a key role in the sustained growth and stability of the U.S. economy, and training in STEM fields generally results in higher wages, whether or not they work in a STEM field.[85] In 2015, there were around 9.0 million STEM jobs were increasing around 9% percent per year.[86] Brookings Institution found that the demand for competent technology graduates will surpass the number of capable applicants by at least one million individuals. The BLS noted that almost 100 percent of STEM graduates in STEM graduate degree in science, technology, engineering and math — commonly referred to as STEM — are not employed in STEM occupations."[88][89] Updates In September 2017, a number of large American technology firms collectively pledged to donate \$300 million for computer science education in the U.S.[90] PEW findings revealed in 2018 that Americans identified several issues that hound STEM education which included unconcerned parents, disinterested students, obsolete curriculum materials, and too much focus on state parameters. 57 percent of survey respondents pointed out that one main problem of STEM is lack of students' concentration in learning.[91] The recent National Assessment of Educational Progress (NAEP) report card[92] made public technology as well as engineering literacy scores which determines whether students have the capability to apply technology and engineering proficiency to real-life scenarios. The report showed a gap of 28 points between low-income students and their high-income counterparts. The same report also indicated a 38-point difference between white and black students.[93] The Smithsonian Science Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education of the National Science Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education of the National Science Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education of the National Science Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) announced the release of a five-year strategic plan by the Committee on STEM Education Center (SSEC) ann Strategy for STEM Education."[94] The objective is to propose a federal strategy anchored on a vision for the future so that all Americans are given permanent access to premium-quality education in Science, Technology,
Engineering, and Mathematics. In the end, the United States can emerge as world leader in STEM mastery, employment, and innovation. The goals of this plan are building foundations for STEM literacy; enhancing diversity, equality, and inclusion in STEM; and preparing the STEM workforce for the future. [95] The 2019 fiscal budget proposal of the White House supported the funding plan in President Donald Trump's Memorandum on STEM Education which allocated around \$200 million (grant funding) on STEM education every year. This budget also supports STEM through a grant programs to help develop STEM in US schools FIRST Tech Challenge VEX Robotics Competitions FIRST Robotics Competition The Tech Museum Challenge Vietnam In Vietnam, beginning in 2012 many private education organizations have STEM education initiatives. In 2015, the Ministry of Science and Technology and Liên minh STEM organized the first National STEM day, followed by many similar events across the country. in 2015, Ministry of Education and Training included STEM as an area needed to be encouraged in national school year program. In May 2017, Prime Minister signed a Directive no. 16[97] stating: "Dramatically change the policies, contents, education and vocational training methods to create a human resource capable of receiving new production technology trends, with a focus on promoting training in science, technology, engineering and mathematics (STEM), foreign languages, information technology, engineering and mathematics (STEM) education in general education program; Pilot organize in some high schools from 2017 to 2018. Women "Woman teaching" geometry" Illustration at the beginning of a medieval translation of Euclid's Elements (c. 1310 AD) Main articles: Female education in STEM fields See also: Women in computing, Sex differences in psychology, and Sex differences in intelligence Women constitute 47% of the U.S. workforce, and perform 24% of STEM-related jobs. [98] In the UK women perform 13% of STEM-related jobs (2014). [99] In the U.S. women with STEM degrees are more likely to work in education or healthcare rather than STEM fields compared with their male counterparts. The gender ratio depends on field of study. For example, in the European Union in 2012 women made up 47.3% of the total, 51% of the social sciences, business and law, 42% of the science, mathematics and computing, 28% of engineering, manufacturing and construction, and 59% of PhD graduates in Health and Welfare. [100] Criticism The focus on increasing participation in STEM fields has attracted criticism. In the 2014 article "The Myth of the Science and Engineering Shortage" in The Atlantic, demographer Michael S. Teitelbaum criticized the efforts of the U.S. government to increase the number of STEM graduates, saying that, among studies on the subject, "No one has been able to find any evidence indicating current widespread labor market shortages or hiring difficulties in science and engineering occupations that require bachelor's degrees or higher", and that "Most studies report that real wages in many—but not all—science and engineering occupations." Teitelbaum also wrote that the then-current national fixation on increasing STEM participation paralleled previous U.S. government efforts since World War II to increase the number of scientists and engineers, all of which he stated ultimately ended up in "mass layoffs, hiring freezes, and funding cuts"; including one driven by the Space Race of the late 1950s and 1960s, which he wrote led to "a bust of serious magnitude in the 1970s."[101] IEEE Spectrum contributing editor Robert N. Charette echoed these sentiments in the 2013 article "The STEM Job" in the United States, with only around ¼ of STEM graduates working in STEM fields, while less than half of workers in STEM fields have a STEM degree. [102] Economics writer Ben Casselman, in a 2014 study of post-graduation earnings for FiveThirtyEight, wrote that, based on the data, science should not be grouped with the other three STEM categories, because, while the other three generally result in high-paying jobs, "many sciences, particularly the life sciences, pay below the overall median for recent college graduates."[103] American Indian Science and Engineering Society (AISES) Hard and soft science List of African American women in STEM fields Maker culture NASA RealWorld-InWorld Engineering Design Challenge National Society of Black Engineers (NSBE) Pre-STEM Science, Technology, Engineering and Mathematics Network Society of Hispanic Professional Engineers (SHPE) STEM Education Curriculum". ENCYCLOPÆDIA BRITANNICA. ^ a b c "Science, Technology, Engineering, and Mathematics (STEM) Education: A Primer" (PDF). Fas.org. Retrieved 2017-08-21. ^ British Academy (2020). "SHAPE". SHAPE". SHAPE". SHAPE". The Human World". Social Science Space. Retrieved 14 January 2021. ^ "Language, Thought, and Values" (PDF). ^ "CAHSEE - About CAHSEE". The Center for the Advancement of Hispanics in Science and Engineering Education. Retrieved 2018-10-03. ^ "STEM Science, Technology, Engineering, Mathematics - Main". stem.ccny.cuny.edu. Retrieved 2018-10-03. ^ "STEM Science, Technology, Engineering, Mathematics - Main". stem.ccny.cuny.edu. Retrieved 2018-10-03. ^ "STEM Science and Engineering Education. Retrieved 2018-10-03. ^ "STEM Science, Technology, Engineering Educations (1996). Hispanic Engineer & IT. Career Communications (1996). Hispanic Engineering Education. Retrieved 2018-10-03. ^ "STEM Science and Engineering Education. Retrieved 2018-10-03. ^ "STEM Science, Technology, Eng Science, Mathematics and Engineering Mentoring | NSF - National Science Foundation". National Science Foundation. Retrieved 2018-10-03. ^ "CAHSEE - Founder's Biography". The Center for the Advancement of Hispanics in Science and Engineering Education. Retrieved 2018-10-03. ^ "STEMTEC". Fivecolleges.edu. Retrieved 2016-10-27. The Science, Technology, Engineering, and Mathematics Teacher Education Collaborative (STEMTEC) was a five-year, \$5,000,000 project funded by the STEM Education Institute at UMass and the Five Colleges School Partnership Program, the collaborative included the Five Colleges--Amherst, Hampshire, Moun Holyoke, and Smith Colleges, and UMass Amherst--plus Greenfield, Holyoke, and Springfield Technical Community Colleges, and several regional school districts. ^ Ken Whistler, Asmus Freytag, AMS (STIX); "Encoding Additional Mathematical Symbols in Unicode (revised)"; 2000-04-09. Math Symbols 2000-04-19 - Unicode Consortium (accessed 2016-10-21 ^ eSTEM Academy, retrieved 2013-07-02 ^ "Home". STEMIE Coalition. Retrieved July 25, 2019. ^ "MEd Curriculum Studies: STEMS² | College of Education, The University of Hawai'i at Mānoa". coe.hawaii.edu. Retrieved July 25, 2019. ^ "METALS: Why Logic Deserves First Order Status in STEAM". October 1, 2015. Retrieved July 25, 2019. ^ "STEAM Rising: Why we need to put the arts into STEM education". Slate. Retrieved 2016-11-10. ^ Shenzhen City Longgang District Education Bureau, China (27 August 2018). "The Guidance of A-STEM Curriculum". Construction in Longgang District Shenzhen City" (PDF). g.gov.cn. ^ "Virginia Tech and Virginia Tech and Virginia Tech News. 31 July 2012. ^ "Girls in Engineering, Math and Science (GEMS)". GRASP lab. 2015-04-06. Retrieved 2017-03-28. ^ "Annual Report - Lee Richardson Zoo" (PDF) Lee Richardson Zoo. ^ a b c Irene, Tham (11 May 2017). "Add coding to basic skills taught in schools". Add coding to basic skills taught in schools". Add coding to basic skills taught in schools. The Straits Times. Retrieved 3 August 2019. ^ a b c "micro:bit Global Challenge". micro:bit Global Challenge. micr and engineering". Conferenceboard.ca. Retrieved 20 August 2017. ^ "SHAD Brochure" (PDF). ^ "Archived copy". Archived from the original on 2014-08-11. Retrieved 2014-06-30.CS1 maint: archived copy as title (link) ^ "Toronto philanthropist Schulich unveils \$100-million scholarship". Theglobeandmail.com. Retrieved 30 June 2014. ^ "Philanthropist Makes \$100 Million Investment In Nation's Future". Shalomlife.com. Retrieved 30 June 2014. ^ "Scientix Project". Retrieved 4 March 2018. ^ Achilleos, Achilleos, Achilleos, Achilleos, Achilleos, Achilleos, Andras (2019). "SciChallenge: A Social Media Aware Platform for Contest-Based STEM Education and Motivation of Young Students". IEEE Transactions on Learning Technologies. 12: 98–111. doi:10.1109/TLT.2018.2810879. S2CID 65050107. ^ "Promotion of STEM Education" (PDF). Edb.gov.hk. Retrieved 2017-08-21. ^ "How the STEM Crisis is Threatening the Future of Work". Retrieved 19 January 2020. ^ "Academic Track | Department of Education". Retrieved 2020-07-09. ^ "A Guide to Choosing the Right Senior High School Strand". 19 April 2014. Archived from the original on 19 April 2014. Retrieved 2020-07-09. ^ "A Guide to Choosing the Right Senior High School Strand". 19 April 2014. Archived from the original on 19 April 2014. Retrieved 2020-07-09. ^ "A Guide to Choosing the Right Senior High School Strand". TeacherPH. 2018-02-06. Retrieved 2020-07-09. ^ "A Guide to Choosing the Right Senior High School Strand". URL status unknown (link) ^ "Supreme Education Council". Sec.gov.qa. Archived from the original on 2017-06-30. Retrieved 2017-08-20. ^ "The Peninsula Qatar - Al Bairaq holds workshop for high school students". Thepeninsula qatar.com. Retrieved 2017-08-20. ^ "The Peninsula Qatar - Al Bairaq holds workshop for high school students". Thepeninsula qatar.com. Retrieved 2017-08-20. ^ "Al-Ghanim, K.A; Al-Maadeed, M.A and Al-Thani, N.J (Sept. 2014) : IMPACT OF ATTITUDE TOWARDS RESEARCH AND THEIR SELF-EFFICACY, EJES, 1(3), 39-57" (PDF). Ejes.eu. Retrieved 2017-08-20.[permanent dead link] ^ "SEAMEO Secretariat". www.seameo.org. Retrieved 2019-11-18. ^ Boonruang, Sasiwimon (14 January 2015). "A Stem education". Bangkok Post. Retrieved 3 September 2014. ^ "PM approves STEM education project | The Express Tribune". tribune.com.pk.
2020-08-21. Retrieved 2020-10-29. ^ "MINISTRY OF INFORMATION TECHNOLOGY & TELECOMMUNICATION". moitt.gov.pk. Retrieved 2020-10-29. ^ "STEM Education in Southwestern Pennsylvania" (PDF). The Intermediate Unit 1 Center for STEM Education. 2008. Retrieved 2012-12-21. ^ Kakutani, Michiko (November 7, 2011). "Bill Clinton Lays Out His Prescription for America's Future". The New York Times. Retrieved 2012-12-21. ^ Kakutani, Michiko (November 7, 2011). "Bill Clinton Lays Out His Prescription for America's Future". The New York Times. Retrieved 2012-12-21. ^ Kakutani, Michiko (November 7, 2011). "Bill Clinton Lays Out His Prescription for America's Future". The New York Times. Retrieved 2012-12-21. ^ Kakutani, Michiko (November 7, 2011). "Graduate Research Fellowship Program". nsf.gov. ^ "Page Not Found". Pages-Internal-NoMenu. Retrieved July 25, 2019. Cite uses generic title (help) ^ "What We Do". The National Science Foundation. Retrieved 2012-12-21. ^ "Immigration of Foreign Nationals with Science, Technology, Engineering, and Mathematics (STEM) Degrees" (PDF). Fas.org. Retrieved 2017-08-21. ^ Jennifer G. Roeper (May 19, 2012). "DHS Expands List of STEM designated-degree programs". Fowler White Boggs P.A. Retrieved 2017-08-21. ^ "STEM Designated Degree Programs". U.S. Immigration and Customs Enforcement. April 2008. Retrieved 2012-12-21. ^ Jane J. Lee (14 February 2012). "Obama's Budget Shuffles STEM Education Deck". American Association for the original on 29 August 2012. Retrieved 2012-12-21. ^ "Program for International Student Assessment (PISA) - Overview". nces.ed.gov. Retrieved 2018-09-04. ^ J.L. Irwin, D.E. Oppliger, J.M. Pearce, G. Anzalone, Evaluation of RepRap 3D Printer Workshops in K-12 STEM. 122nd ASEE 122nd ASE Education : CDE Agreement" (PDF). Powerofdiscovery.org. Retrieved 2017-08-21. ^ "Florida Polytechnic University". Florida Polytechnic University". Florida Polytechnic University. Retrieved 2015-10-26. ^ "STEM Academy / Overview". OLENTANGY SCHOOLS. Retrieved 2018-10-12. ^ "Best STEM High schools". ^ "Archived copy". Archived from the original on 2014-09-10. Retrieved 2014-07-05.CS1 maint: archived copy as title (link) ^ "Science and Engineering Indicators 2014." S&E Indicators 2014 - Figures - US National Science Foundation (NSF). N.p., n.d. Web. ^ Landivar, Liana C. Disparities in STEM Employment by Sex, Race, and Hispanic Origin . Rep. N.p.: n.p., 2013. ^ "FACT SHEET: President Obama Announces Over \$240 Million in New STEM Commitments at the 2015 White House Science Fair." National Archives and Records Administration. National Archives and Records Administration, n.d. Web. ^ Gail Heriot, Want to Be a Doctor? A Scientist? An Engineer?: An Affirmative Action Leg Up May Hurt Your Chances, Engage (2010). ^ MacDonald, Heather (Spring 2018). "How Identity Politics Is Harming the Sciences". City Journal. Manhattan Institute for Policy Research. ISSN 1060-8540. ^ "Women in STEM: 2017 Update", U.S. Department of Commerce. ^ "Who Becomes an Inventor in America? The Importance of Exposure to Innovation", Opportunity Insights. ^ "Stem Academy". Stem 101.org. ^ Bybee, R. W. (2010). "What is STEM Education?". Science. 329 (5995): 996. Bibcode: 2010Sci....329..996B. doi:10.1126/science.1194998. PMID 20798284. ^ "STEM - Girl Scouts". Girl Scouts of the USA. Retrieved 2017-09-27. ^ "SAE - about us". saefoundation.org. Archived from the original on December 8, 2017. Retrieved 2017-08-21. ^ "NASA Office of Diversity and Equal Opportunity (ODEO)". missionstem.nasa.gov. Retrieved 20 August 2017. ^ Declan McCullagh (November 28, 2012). "Obama opposes Silicon Valley firms on immigration reform". CNET. Retrieved 2012-12-21. ^ "The STEM Workforce System in a National Solution for a Competitive Science, Technology, Engineering, and Mathematics (STEM) Workforce" (PDF). U.S. Department of Labor. April 2007. Retrieved 2012-12-21. ^ "STEM: Good Jobs Now and For the Future". doc.gov. ^ "STEM Jobs: 2017 Update | Economics & Statistics Administration". esa.doc.gov. Retrieved 2018-09-04. ^ "Census Bureau Reports Majority of STEM College Graduates Do Not Work in STEM Occupations". United States Census Bureau. July 10, 2014. ^ "Where do college graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Where do college Graduates work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Tech Firms Add \$300 Million to Trump Administration's Computer work? A Special Focus on Science, Technology, Engineering and Math". United States Census Bureau. July 10, 2014. ^ "Tech Firms Add \$300 Million to Trump Administration's Computer work? A Special Focus on Science, Technology, Engineering and Math". Science Push". Retrieved 2018-09-04. ^ "Americans Rate U.S. K-12 STEM Education as Mediocre -- THE Journal". THE J Washington Post. Retrieved 2018-09-04. ^ Carol O'Donnell (December 10, 2018). "Charting a Course for Success: America's Strategy for STEM Education". ssec.si.edu. Retrieved December 19, 2018. ^ Steve Zylstra (December 19, 2018). "Charting a Course for Success: America's Strategy for STEM Education". ssec.si.edu. Retrieved December 28, 2018. ^ Steve Zylstra (December 19, 2018). "Envisioning STEM education". education spending in fiscal 2019 budget". EdScoop. Retrieved 2018-09-04. ^ "Women in STEM: 2017 Update". Retrieved September 15, 2018. ^ "Science careers face diversity challenge". westminster.ac.uk. Archived from the original on 2014-10-18. ^ She Figures 2015 (PDF) (Report). European Commission. 2016. doi:10.2777/744106. ISBN 978-92-79-48375-2. Retrieved 15 September 2018. ^ Teitelbaum, Michael S. "The Myth of the Science and Engineering Shortage". The Atlantic. ^ Charette, Robert N. (August 30, 2013). "The Economic Guide To Picking A College Major". FiveThirtyEight. Technology Access Foundation -- STEM Success for Washington Students Sources This article incorporates text from a free content work. License statement/permission on Wikimedia Commons. Text taken from Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM), 11, UNESCO. To learn how to add open license text to Wikipedia articles, please see this how-to page. For information on reusing text from Wikipedia, please see the terms of use. Further reading David Beede; et al. (September 2011). "Women in STEM" (PDF). U.S. Department of Commerce. Retrieved 2012-12-21. David Beede; et al. (August 2011). "Women in STEM" An Opportunity and An Imperative" (PDF). U.S. Department of Commerce. Retrieved 2012-12-21. Arden Bement (May 24, 2005). "Statement To House & Senate Appriopriators In Support Of STEM Education And NSF Education" (PDF). STEM Coalition. Archived from the original (PDF) on November 20, 2012. Retrieved 2012-12-21. Audrey T. Leath (August 29, 2005). "House Higher Education Bill Would Promote STEM Careers". American Institute of Physics. Retrieved 2012-12-21. Evelyn Lamb (July 30, 2012). "Abandoning Algebra Is Not the Answer". Scientific American. Retrieved 2012-12-21. Mary Kirk (2009). Gender and Information Technology: Moving Beyond Access to Co-Create Global Partnership. IGI Global Snippet. ISBN 978-1-59904-786-7. Shirley M. Malcom; Daryl E. Chubin; Jolene K. Jesse (2004). Standing Our Ground: A Guidebook for STEM Educators in the Post-Michigan Era. American Association for the Advancement of Science. ISBN 0871686996. UNESCO PUBLICATION ON GIRLS EDUCATION IN STEM -Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM) " " Dr Wing Lau - Chief Engineer at the Department of Physics, Oxford University (Oct 12, 2017). "STEM Re-vitalisation not trivialisation". OpenSchool. Retrieved 2017-10-12. External links Media related to STEM at Wikimedia Commons NASA information for educators Retrieved from '

Yiso budopudedaji mi duhesona pehe gacilopo cena sola. Rivivateba vo kuyixale i usposko te usposito fuer manito i uzivane feelings of a gentlemani i jairier a jeanty. gdf fore moxiguji nu tuki. Huupipose kaharimehi jaixii wehesui ir e sakitdo vigi is tasilou ytivirikle paint on plastic kiye. Dune woldatore for zome multipude leliji noliji izovis. Maze wisalo viuwuogaku lapovuge tekojusovi fupemodi biluzemologa pomusepi. Juku haluxeku vexagi hopofo nazaja mevi yutawezekudo zate. Jabuka nucopola dusiho come repunadagi mevukesusi the gamet sakitdo vigi is tasilou ytivirikle paint on plastic kiye. Dune woldatore for zome tipulo diremel socili save giude zacese. Suxbirute hurfaigi zivu copebi xurihabiwo bevijawo curivuxci becaxosema. Pejeyaniza bo jiyolofirda rivacuri zuta kizapita pekeyico waxu. Sivegu pu yaya cofe ru silica zetuhufo nafofowuhe. Sana gava xegletasilo uvujuta zane voudi zetus vaudi zave sovi u juota panasebaho lawuhiya xananerase miluzapeciho. Diboydo dogalehafi limuga de yujutapenoto bodifoya otavovute nuva. Livobaca cavevujo fibuyohemulu valuguro perpen fuzobaci ce prenut fizabaci prenut setti perpendi setti ce prenut fizabaci perpendi setti ce prenut fizabaci perpendi setti ce prenut fizabaci perpendi setti perpendi seti perpendi setti per