Chapter 28A.188 RCW
SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION

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RCW 28A.188.010 STEM literacy. (1) As used throughout this chapter, "STEM" means science, technology, engineering, and mathematics.

(2) To provide focus and clarity to efforts to increase learning opportunities and improve educational outcomes in STEM, the following definition of STEM literacy is adopted: STEM literacy means the ability to identify, apply, and integrate concepts from science, technology, engineering, and mathematics to understand complex problems and to innovate to solve them. STEM literacy is achieved when a student is able to apply his or her understanding of how the world works within and across the four interrelated STEM disciplines to improve the social, economic, and environmental conditions of the local and global community.

(3) The component parts of STEM literacy are:

(a) Scientific literacy, which is the ability to use scientific knowledge and processes in physics, chemistry, biology, and earth and space science to understand the natural world and to participate in decisions that affect it;

(b) Technological literacy, which is the ability to use new technologies, understand how technologies are developed, and have skills to analyze how new technologies affect individuals, the nation,

and the world. Technology is the innovation, change, or modification of the natural environment to satisfy perceived human needs and wants;

(c) Engineering literacy, which is the understanding of how technologies are developed through the engineering design process. Engineering design is the systematic and creative application of scientific and mathematical principles to practical ends, such as the design, manufacture, and operation of efficient and economic structures, machines, processes, and systems; and

(d) Mathematical literacy, which is the ability to analyze, reason, and communicate ideas effectively through posing, formulating, solving, and interpreting solutions to mathematical problems in a variety of situations. [2013 2nd sp.s. c 25 s 1.]

RCW 28A.188.020 Statewide director for math, science, and technology—Duties—Reporting. The superintendent of public instruction shall provide support for statewide coordination for math, science, and technology, including employing a statewide director for math, science, and technology. The duties of the director shall include, but not be limited to:

(1) Within funds specifically appropriated therefor, obtain a statewide license, or otherwise obtain and disseminate, an interactive, project-based high school and middle school technology curriculum that includes a comprehensive professional development component for teachers and, if possible, counselors, and also includes a systematic program evaluation. The curriculum must be distributed to all school districts, or as many as feasible, by the 2007-08 school year;

(2) Within funds specifically appropriated therefor, supporting a public-private partnership to assist school districts with implementing an ongoing, inquiry-based science program that is based on a research-based model of systemic reform and aligned with the Washington state science grade level expectations;

(3) Within funds specifically appropriated therefor, supporting a public-private partnership to provide enriching opportunities in mathematics, engineering, and science for underrepresented students in grades kindergarten through twelve using exemplary materials and instructional approaches;

(4) In an effort to increase precollege and prework interest in math, science, and technology fields, in collaboration with the community and technical colleges, the four-year institutions of higher education, and the workforce training and education coordinating board, conducting outreach efforts to attract middle and high school students to careers in math, science, and technology and to educate students about the coursework that is necessary to be adequately prepared to succeed in these fields;

(5) Coordinating youth opportunities in math, science, and technology, including facilitating student participation in school clubs, state-level fairs, national competitions, and encouraging partnerships between students and university faculty or industry to facilitate such student participation;

(6) Developing and maintaining public-private partnerships to generate business and industry assistance to accomplish the following:

(a) Increasing student engagement and career awareness, including increasing student participation in the youth opportunities in subsection (5) of this section;

(b) Creation and promotion of student scholarships, internships, and apprenticeships;

(c) Provision of relevant teacher experience and training, including on-the-job professional development opportunities;

(d) Upgrading kindergarten through twelfth grade school equipment and facilities to support high quality math, science, and technology programs;

(7) Assembling a cadre of inspiring speakers employed or experienced in the relevant fields to speak to kindergarten through twelfth grade students to demonstrate the breadth of the opportunities in the relevant fields as well as share the types of coursework that are necessary for someone to be successful in the relevant field;

(8) Providing technical assistance to schools and school districts, including working with counselors in support of the math, science, and technology programs;

(9) Subject to available funding, working with the state board for community and technical colleges to develop high-demand applied baccalaureate programs that align with high quality secondary science, technology, engineering, and mathematics programs and career and technical education programs; and

(10) Reporting annually to the legislature about the actions taken to provide statewide coordination for math, science, and technology. [2013 c 55 s 1; 2007 c 396 s 15. Formerly RCW 28A.300.515.]

Finding—Intent—2007 c 396: "The legislature finds that knowledge, skills, and opportunities in mathematics, science, and technology should be increased for all students in Washington. The legislature intends to foster capacity between and among the educational sectors to enable continuous and sustainable growth of the learning and teaching of mathematics, science, and technologies. The legislature intends to foster high quality mathematics, science, and technology programs to increase the number of students in the kindergarten through twelfth grade pipeline who are prepared and aspire to continue in the areas of mathematics, science, and technology, whether it be at a college, university, or in the workforce." [2007 c 396 s 12.]

Captions not law—2007 c 396: See note following RCW 28A.305.215.

RCW 28A.188.030 STEM education innovation alliance. (1) The STEM education innovation alliance is established to advise the governor and to provide vision, guidance, assistance, and advice to support the initiatives under this chapter, as well as other current or proposed programs and initiatives across the spectrum of early learning through postsecondary education, that are intended to increase learning opportunities and improve educational outcomes in STEM.

(2) The governor's office, in consultation with the superintendent of public instruction, shall invite representatives of STEM businesses, business and labor organizations with expertise in STEM fields, one or more nonprofit organizations with a mission to enhance STEM education from early learning through postsecondary education, school districts and institutions of higher education that have demonstrated leadership and innovation in STEM education, and

STEM educators to participate in the alliance. Representatives from the governor's office, the office of the superintendent of public instruction, and other state education agencies shall also participate as members of the alliance.

(3) The STEM education innovation alliance shall initiate its work by aligning and combining previous STEM education strategic plans into a single, cohesive, and comprehensive STEM framework for action and accountability. The framework must concentrate on a limited number of selected and specific measures that are meaningful indicators of progress in increasing STEM learning opportunities and in achieving the intended longer-term outcomes of such efforts. The framework must use measures that are quantifiable and based on data that are regularly and reliably collected statewide.

(4) Staff support for the STEM education innovation alliance shall be provided by the governor's office and the office of financial management, with support from the office of the superintendent of public instruction and other state education agencies as necessary. [2013 2nd sp.s. c 25 s 2.]

RCW 28A.188.040 STEM education report card—Coordination of data collection and analysis—Reports by education agencies and the employment security department. (1) The STEM education innovation alliance shall develop a STEM education report card, based on the STEM framework for action and accountability, to monitor progress in increasing learning opportunities and aligning strategic plans and activities in order to prepare students for STEM-related jobs and careers, with the longer-term goal of improving educational, workforce, and economic outcomes in STEM.

(2) The report card must:

(a) Illustrate the most recent data for the indicators and measures of the STEM framework for action and accountability;

(b) Provide information from state education agencies that indicates the extent that activities and resources are aligned with and support the STEM framework for action and accountability;

(c) Provide data regarding current and projected STEM job openings in the state; and

(d) Be prominently displayed on a website designed for this purpose.

(3)(a) The education data center under RCW 43.41.400 must coordinate data collection and analysis to support the report card.

(b) The state education agencies must annually report on how their policies, activities, and expenditures of public resources align with and support the STEM framework for action and accountability. The focus of the reporting under this subsection is on programs and initiatives specifically identified in law or budget proviso as related to STEM education. The agencies must use a common metric for the reporting, designed by the education data center in consultation with the STEM education innovation alliance. For the purposes of this section, "state education agencies" includes the office of the superintendent of public instruction, the student achievement council, the state board for community and technical colleges, the workforce training and education coordinating board, the professional educator standards board, the state board of education, and the department of children, youth, and families.

(c) The employment security department must create an annual report on current and projected job openings in STEM fields and submit the report to the education data center for inclusion in the STEM education report card.

(4) The STEM education innovation alliance must publish the first STEM education report card with baseline data on the identified measures by January 10, 2014, and must update the report card by each January 10th thereafter. [2018 c 58 s 30; 2013 2nd sp.s. c 25 s 3.]

Effective date—2018 c 58: See note following RCW 28A.655.080.

RCW 28A.188.050 Statewide STEM organization. (1) To the extent funds are appropriated specifically for this purpose, the office of financial management shall contract with a statewide nonprofit organization with expertise in promoting and supporting STEM education from early learning through postsecondary education. The purpose of the contract is to identify, test, and develop scalable, cost-effective, and evidence-based approaches for increasing learning opportunities and improving educational outcomes in STEM that are aligned with the STEM framework for action and accountability. The activities to be conducted under the contract shall be as provided in this section, with specific performance expectations negotiated between the office of the governor, the office of financial management, and the selected organization.

(2) Under the terms of the contract, the organization selected under this section shall:

(a) Conduct a statewide communications campaign to expand awareness of the importance of STEM literacy and the opportunities presented by STEM education and careers, particularly as a strategy to close the educational opportunity gap for disadvantaged students and promote economic development in disadvantaged communities;

(b) Expand regional networks of schools, institutions of higher education, educational service districts, STEM businesses, and community-based organizations to align STEM learning opportunities with best practices and local economic development;

(c) Establish an innovation fund and offer competitive grants to support innovative practices in STEM education, from early learning through postsecondary education, including developing models of interdisciplinary instruction and project-based learning;

(d) Expand STEM professional development opportunities for educators, faculty, and principals, including developing technology-enabled learning systems to support implementation of state learning standards; and

(e) Create opportunities to extend STEM learning into early learning programs. [2013 2nd sp.s. c 25 s 4.]

RCW 28A.188.060 Identification and dissemination of resources and materials to encourage interdisciplinary instruction and project-based learning. (1) Subject to funds appropriated specifically for this purpose, the office of the superintendent of public instruction, in consultation with the STEM education innovation alliance, must identify and disseminate resources and materials to elementary, middle, and high schools that are intended to encourage and increase interdisciplinary instruction and project-based learning in STEM.

(2) In collaboration with work groups of STEM educators and using the work of regional STEM networks and innovation grant recipients under RCW 28A.188.050, the office of the superintendent of public instruction must:

(a) Identify interdisciplinary STEM instructional modules appropriate for different grade levels;

(b) Identify project-based learning models, projects, lessons, and guides appropriate for different grade levels; and

(c) Make the information collected in this section, including online resource guides, available for teachers to incorporate into their classroom instruction.

(3) The office of the superintendent of public instruction must also disseminate information and research on best practices in interdisciplinary instruction and project-based learning in STEM. [2013 2nd sp.s. c 25 s 5.]

RCW 28A.188.070 Specialized courses in science, technology, engineering, and mathematics (STEM)—Grants to high schools—Selection criteria—Data collection by education data center—Reports. (1) Subject to funds appropriated for this purpose, the office of the superintendent of public instruction shall allocate grants to high schools to implement specialized courses in science, technology, engineering, and mathematics (STEM) careers as provided by a national multidisciplinary science, technology, engineering, and mathematics program. Grant funds must be allocated on a one-time basis and may be used to purchase course curriculum and equipment, initial course student materials, and support professional development for course teachers.

(2) The superintendent of public instruction must select grant recipients based on the criteria in this subsection (2). This is a competitive grant process. Successful high school applicants must:

(a) Demonstrate engaged and committed high school and district leadership and faculty in support of expanding specialized STEM courses;

(b) Demonstrate that faculty are appropriately trained to offer specialized STEM courses or a plan for faculty to obtain the appropriate training;

(c) Demonstrate capacity to offer the specialized STEM courses and maximize the use of grant resources by addressing: Availability of appropriate physical space, meeting program technology requirements, providing projected enrollment at the high school and from area high schools as appropriate, planned hours and days each week the program is to be offered, and other specific program requirements set forth by the superintendent of public instruction;

(d) Provide the plan for course implementation that includes a beginning date for first classes as well as plans for recruiting and retaining students in the course;

(e) Provide a plan to promote opportunities for students to acquire college credit;

(f) Demonstrate a history of successful partnerships within the community and partner support for implementing specialized STEM courses. Partner support may include one or more of the following: Supplying materials, instruction support, internships, mentorships, apprenticeships, and other program components;

(g) Demonstrate connections to community and technical college programs as well as links to four-year higher education institution STEM programs; and

(h) Demonstrate capacity to continue the course in years succeeding the initial grant year.

(3)(a) The education data center in the office of financial management must, with the office of the superintendent of public instruction, collect student course enrollment and course completion information.

(b) The education data center must: (i) Study mathematics and science course-taking patterns of students completing specialized STEM courses; and (ii) follow the students to employment or further training and education in the two years following high school. This study must be designed to inform policymakers about the extent to which specialized science, technology, engineering, and mathematics classes taken by students reduce mathematics remediation of students entering the workplace, apprenticeships, community and technical colleges, and four-year institutions of higher education. Study findings must be reported annually beginning January 2014 and each January thereafter through January 2018 to the governor, appropriate state agencies, and the appropriate education and fiscal committees of the legislature. [2011 2nd sp.s. c 1 s 4. Formerly RCW 28A.700.120.]

Findings—Intent—2011 2nd sp.s. c 1: See note following RCW 28A.700.100.

RCW 28A.188.080 Mathematics, engineering, and science achievement program—Findings and intent. The legislature finds that high technology is important to the state's economy and the welfare of its citizens. The legislature finds that certain groups, as characterized by sex or ethnic background, are traditionally underrepresented in mathematics, engineering, and the science-related professions in this state. The legislature finds that women and minority students have been traditionally discouraged from entering the fields of science and mathematics including teaching in these fields. The legislature finds that attitudes and knowledges acquired during the kindergarten through eighth grade prepare students to succeed in high school science and mathematics programs and that special skills necessary for these fields need to be acquired during the ninth through twelfth grades. It is the intent of the legislature to promote a mathematics, engineering, and science achievement program to help increase the number of people in these fields and teaching in these fields from groups underrepresented in these fields. [1989 c 66 s 1; 1984 c 265 s 1. Formerly RCW 28A.625.200, 28A.03.430.]

Implementation—Funding required—1984 c 265: "Implementation of this act shall be subject to funds being appropriated or otherwise available for such purposes." [1984 c 265 s 6.]

RCW 28A.188.082 Mathematics, engineering, and science achievement program—Establishment and administration—Goals. A program to increase the number of people from groups underrepresented in the fields of mathematics, engineering, and the physical sciences in this state shall be established by the University of Washington.

The program shall be administered through the University of Washington and designed to:

(1) Encourage students in the targeted groups in the common schools, with a particular emphasis on those students in middle and junior high schools and the sixth through twelfth grades, to acquire the academic skills needed to study mathematics, engineering, or related sciences at an institution of higher education;

(2) Promote the awareness of career opportunities including the career opportunities of teaching in the fields of science and mathematics and the skills necessary to achieve those opportunities among students sufficiently early in their educational careers to permit and encourage the students to acquire the skills;

(3) Promote cooperation among institutions of higher education, the superintendent of public instruction and local school districts in working towards the goals of the program; and

(4) Solicit contributions of time and resources from public and private institutions of higher education, high schools, middle and junior high schools, and private business and industry. [1990 c 286 s 1; 1989 c 66 s 2; 1984 c 265 s 2. Formerly RCW 28A.625.210, 28A.03.432.]

Implementation—Funding required—1984 c 265: See note following RCW 28A.188.080.

RCW 28A.188.084 Mathematics, engineering, and science achievement program—Coordinator—Staff. A coordinator shall be hired to administer the program. Additional staff as necessary may be hired. [1984 c 265 s 3. Formerly RCW 28A.625.220, 28A.03.434.]

Implementation—Funding required—1984 c 265: See note following RCW 28A.188.080.

RCW 28A.188.086 Mathematics, engineering, and science achievement program—Selection standards. The coordinator shall develop standards and criteria for selecting students who participate in the program which may include predictive instruments to ascertain aptitude and probability of success. The standards shall include requirements that students take certain courses, maintain a certain grade point average, and participate in activities sponsored by the program. Women and students from minority groups, which are traditionally underrepresented in mathematics and science-related professions and which meet the requirements established by the coordinator shall be selected. [1984 c 265 s 4. Formerly RCW 28A.625.230, 28A.03.436.]

Implementation—Funding required—1984 c 265: See note following RCW 28A.188.080.

RCW 28A.188.088 Local program centers. The coordinator shall establish local program centers throughout the state to implement *RCW 28A.625.210 through 28A.625.230. Each center shall be managed by a center director. Additional staff as necessary may be hired. [1990 c 33 s 521; 1984 c 265 s 5. Formerly RCW 28A.625.240, 28A.03.438.]

***Reviser's note:** RCW 28A.625.210 through 28A.625.230 were recodified as RCW 28A.188.082 through 28A.188.086 pursuant to 2013 2nd sp.s. c 25 s 8.

Implementation—Funding required—1984 c 265: See note following RCW 28A.188.080.

RCW 28A.188.090 Lighthouse programs—Science, technology, engineering, and mathematics focus. (1) Subject to funds appropriated for this purpose, the superintendent of public instruction shall designate schools at the elementary, middle, and high school level to serve as resources and examples of how to combine the following best practices:

(a) A small, highly personalized learning community;

(b) An interdisciplinary curriculum with a strong focus on science, technology, engineering, and mathematics delivered through a project-based instructional approach; and

(c) Active partnerships with businesses and the local community to connect learning beyond the classroom.

(2) The designated elementary, middle, and high schools shall serve as lighthouse programs and provide technical assistance and advice to other schools and communities in the initial stages of creating an alternative learning environment focused on science, technology, engineering, and mathematics. The designated schools must have proven experience and be recognized as model programs.

(3) In addition, the office of the superintendent of public instruction shall work with the designated elementary, middle, and high schools to publicize the models of best practices in science, technology, engineering, and mathematics instruction used by the designated schools and shall encourage other schools and communities to work with the designated schools to replicate similar models. [2012 c 151 s 1; 2010 c 238 s 2. Formerly RCW 28A.630.065.]

Intent—2010 c 238: "(1) The legislature has made a commitment to support multiple strategies to improve teaching and learning of science, technology, engineering, and mathematics in Washington's public schools. In recent years, Washington has adopted new technology, mathematics, and science learning standards; initiated funding for middle schools to provide a career and technical program in science, technology, engineering, and mathematics at the same rate as a high school operating a similar program; provided professional development for mathematics and science teachers; created a scholarship program to encourage students to enter mathematics and science degree programs; supported career and technical education in high-demand fields; and authorized alternative ways for teachers to earn certification in the mathematics and science fields.

(2) At the local level, school districts and their communities are also finding new ways to improve teaching and learning of science, technology, engineering, and mathematics. Some districts have combined several best practices into promising learning models for students. For example, Aviation high school in the Highline school district offers a small, highly personalized learning community that is focused on interdisciplinary immersion in science, technology, engineering, and mathematics using a hands-on, project-based curriculum. Delta high school in the Tri-Cities is a collaboration among three school

districts, a skill center, two institutions of higher education, a community foundation, and local business leaders. The science and math institute at Point Defiance in Tacoma offers students field-based applied learning using the natural, historical, and community resources of a large metropolitan park. These schools draw students from across regions who are seeking an exciting, rigorous, and nontraditional learning experience. Other schools and communities across the state are seeking to replicate these innovative learning models.

(3) The legislature intends to support continued expansion of the type of innovation and creativity displayed by Aviation, Delta, and the science and math institute by designating so-called "lighthouse" high schools to serve as resources and examples of best practices in science, technology, engineering, and mathematics instruction." [2010 c 238 s 1.]

RCW 28A.188.092 Lighthouse programs—Science, technology, engineering, and mathematics education lighthouse account. The science, technology, engineering, and mathematics education lighthouse account is created in the custody of the state treasurer. The purpose of the account is to support schools designated as lighthouse schools under *RCW 28A.630.065 to serve as resources to other schools and communities interested in replicating similar models. Revenues to the account may include gifts from the private sector, federal funds, any appropriations made by the state legislature, or revenues from other sources. Grants to the designated lighthouse schools and their administration shall be paid from the account. Only the superintendent of public instruction or the superintendent's designee may authorize expenditures from the account. The account is subject to allotment procedures under chapter 43.88 RCW, but an appropriation is not required for expenditures. [2012 c 151 s 2. Formerly RCW 28A.630.066.]

***Reviser's note:** RCW 28A.630.065 was recodified as RCW 28A.188.090 pursuant to 2013 2nd sp.s. c 25 s 8.