

Date of Hearing: April 6, 2022

ASSEMBLY COMMITTEE ON EDUCATION
Patrick O'Donnell, Chair
AB 2565 (Blanca Rubio) – As Introduced February 17, 2022

SUBJECT: Elementary and secondary education: Mathematics and Science Educator Excellence Block Grant

SUMMARY: Establishes the California Mathematics and Science Educator Excellence Program for the purpose of strengthening mathematics and science instruction, and appropriates an unspecified sum to the Superintendent of Public Instruction (SPI) to be apportioned for specified education-related purposes. Specifically, **this bill:**

- 1) Appropriates an unspecified sum to the SPI to support the California Partnership for Mathematics and Science Education statewide and regional communities of practice.
- 2) Appropriates an unspecified sum to the SPI to for professional development for elementary, middle, and high school teachers on instructional practices aligned with state mathematics and science frameworks.
- 3) Defines a “community of practice” as a model for professional learning and collaboration used by the California Partnership for Math and Science Education that builds educators’ capacities to advance access to meaningful mathematics and science teaching and learning statewide, and that promotes relationship building, connects participants with experts and researchers, and advances equity and access in mathematics and science education through resource development and shared learning, among other activities to improve instruction.

EXISTING LAW:

- 1) Appropriates the use of one-time funds for professional development, induction for beginning teachers with a focus on relevant mentoring, instructional materials, technology infrastructure, employee benefits, and any other investments necessary to support implementation of the common core academic content standards in English language arts and mathematics, the implementation of English language development standards, and the implementation of the Next Generation Science standards. (Education Code (EC) 41207.45 (d)(2)).
- 2) Established the Local Solutions Grant program in the 2018-19 state budget, which provided \$125 million to the CTC to administer in the form of grants to address teacher shortages. \$75 million in grants was provided to support teacher residency programs to prepare new special education, science, mathematics, or bilingual teachers. An additional \$50 million was made available to recruit, prepare, and retain special education teachers.
- 3) Established the Governor's Teaching Fellowships Program, which awarded \$20,000 fellowships to candidates who committed to teach in a high priority school for four years.

FISCAL EFFECT: Unknown

COMMENTS:

Roll-out of new science standards in 2018. In 2013, the State Board of Education (SBE) adopted the Next Generation Science Standards (NGSS) as California's content standards in science, with some modifications of the national standards in which they are based. The science framework was adopted by the SBE in 2016 which identifies three components: science and engineering practices, disciplinary core ideas, and crosscutting concepts. The NGSS appendices were also adopted to assist teachers in the implementation of the new science standards and to aid in the development of the new science curriculum framework. In contrast to California's previous science standards, the NGSS shifts focus from having students memorize scientific information to teaching students how to think critically about core scientific ideas, how to connect key concepts across disciplines, and how to implement processes used by practicing scientists.

In 2017, CDE, the California Science Teachers Association (CSTA), county offices of education (COEs), and several other organizations began offering multiple two-day symposia to help teachers and administrators understand the new standards and develop plans for implementation in their schools. CSTA reported that some school districts were already implementing NGSS using materials that they have developed themselves.

According to CSTA, the focus of NGSS on hands-on, discovery-based learning through experimentation necessitates access to a wide variety of instructional materials, including materials that will allow students to learn about natural phenomena by constructing models, as well as computer software to support data analysis and computational thinking.

Poor access to high-quality STEM education. Science, Technology, Engineering and Mathematics (STEM) education includes four specific disciplines—science, technology, engineering, and mathematics—in an interdisciplinary and applied approach. STEM teaches and trains students to engage in critical thinking, inquiry, problem solving, collaboration, and what is often referred to in engineering as design thinking. In recent years the state has undertaken a number of policy reforms to address STEM teaching and assessment practices, curriculum, and policies that expand STEM opportunities for all students.

There is wide acknowledgement that many California students have insufficient access to high quality STEM education. The SPI's STEM Education Task Force, in a 2014 report on STEM education titled *INNOVATE: A Blueprint for Science, Technology, Engineering and Mathematics in California Public Education*, found:

Many of California's students lack consistent access to high-quality STEM education. Although the importance of STEM learning has been widely acknowledged, several factors have limited access to STEM education: the focus on English language arts and skill-based mathematics required by No Child Left Behind; insufficient focus on science as well as on STEM education in the classroom; lack of access to high-quality STEM materials and instruction; insufficient opportunities for students to engage in hands-on, inquiry based learning; and insufficient professional preparation by teachers at all levels.

In recognition of this problem of access, the SPI's STEM Education Task Force recommended that the state make access to high-quality STEM experiences and programs universal to all K-12

students through a variety of opportunities in school, expanded learning, and community partnerships through informal, formal, and digital pathways.

A 2016 review of STEM education studies conducted by the U.S. Department of Education's Institute of Education Sciences shows that access to advanced math and science courses in high school is a strong predictor for success in post-secondary STEM courses. This finding holds true for both male and female students, and across all ethnicities examined. However, certain populations, including Hispanic and African American students, take fewer high-level high school math and science courses, even though their interest levels in STEM subjects match those of their white peers.

Limited access to STEM education is of concern not only at the high school level, but in elementary grades as well. In 2011, WestEd, the Lawrence Hall of Science at UC Berkeley, and SRI International issued a report on elementary STEM education in California. Among their key findings: 40% of K-5 teachers report that their students receive 60 minutes or less of science instruction per week, less than 15% have received any science-related professional development in the previous three years, and only a third of elementary school teachers feel very prepared to teach science. In addition, the authors found that racial inequities in STEM knowledge are already apparent in elementary school: in 2009, the state's fourth graders performed at the lowest level nationally on the National Assessment of Educational Progress (NAEP) science test, and fewer than 10% of African American and Hispanic fourth graders scored proficient, compared to 41 and 45% of their white and Asian peers, respectively. Altogether, these findings led the authors to conclude that "children rarely encounter high-quality science learning opportunities in California elementary schools because the conditions that would support them are rarely in place."

In 2012, the President's Council of Advisors on Science and Technology stated that the United States will need 1 million more STEM professionals than the country will produce at the current rate over the next decade, if the country is to maintain its status as a global leader in science and technology. The above report raises the question of whether today's K-12 students are being adequately and equitably prepared to take full advantage of emerging opportunities in STEM professions.

Revision of the Mathematics framework. The CDE, Instructional Quality Commission (IQC), and SBE have commenced the revision process for the *Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve (Mathematics Framework)*. The framework is important guidance designed to help educators align classroom teaching with California's rigorous math learning standards. The revised Mathematics Framework reflects input from California parents, educators, students, and others who commented during the first 60-day field review period in early 2021 and during the IQC's May 2021 meeting. The draft is also responsive to the direction of the IQC provided during the meeting. The purpose of the revised Mathematics Framework is to achieve excellence in math teaching and learning through curriculum and instructional approaches grounded in research and reflective of best practices across the globe. The revised Mathematics Framework provides guidance for mathematics learning for all students at all levels of math, including calculus, and ensures students have a wide variety of options including pursuing STEM in college and in their careers. According to the CDE, as of May 2021, the IQC recommended the Mathematics Framework draft to the SBE, pending a second 60-day period of public review and comment. That review period began on March 14, 2022, and will continue through May 16, 2022. The public review and comment

period is an opportunity for interested groups to provide comments and suggested edits to the SBE.

Rural NGSS instruction. According to a 2020 Education Resources Information Center (ERIC) report, *Teaching Science in Rural Elementary Schools: Affordances and Constraints in the Age of NGSS*, providing science instruction is an ongoing priority and challenge in elementary grades, especially in high-need rural schools. When the NGSS were introduced in 2013, there was a significant shift in the way science was taught. The report concluded that science instruction in the elementary grades is particularly challenging due to the responsibility of teaching multiple subjects. Additionally, the report suggests that the availability of professional development includes access to professional development from experts and those outside of a school, as well as time and opportunities to collaborate with other teachers at the school site. Professional development is a proposed way to break down teacher isolation and to build networks with other teachers. Supportive principals can also serve as an important resource for rural teachers. Principal support of rural teachers manifests itself in a number of ways, including developing a constructive school culture as well as facilitating teacher access to professional development. The study found that teachers from rural schools had been focusing on implementation of the Common Core State Standards (CCSS) and had done little to support implementation of the NGSS. Given the physical isolation of most rural schools, online professional development may be particularly useful in supporting rural elementary science instruction.

Arguments in support. The California Association of Science Educators states, “AB 2565 will reflect the combined efforts of state partners with deep experience in teacher-centered professional learning, including members of California Teachers Association (CTA) Instructional Leadership Corps, the California Partnership for Math and Science Education (CAPMSE), California Association of Science Educators (CASE), California Math Council (CMC), The Education Trust-West (ETW), and many others. AB 2565 will benefit students by ensuring that they get the science education they need to be prepared for a world in which STEM careers are fast growing and where understanding science is a key to many of the problems we face from climate change to pandemics.”

Recommended Committee Amendments. Staff recommends that the bill be amended as to:

- 1) Support existing and expand statewide and regional Communities of Practice to support implementation of the mathematics and science standards and frameworks to school districts, COEs, and regions with the highest needs including LEAs as defined with Local Control Funding Formula (LCFF) unduplicated pupil groups, students with disabilities, and offering limited course sequences options. All professional learning materials and resources would be developed in collaboration with teachers, made available statewide at no cost, and used by the California Partnership for Math and Science Education to strengthen members’ capacity.
- 2) Support local professional development for teachers, paraprofessional educators, classified employees, teacher leaders and administrators working in schools with high proportions of students who meet the LCFF criteria of unduplicated pupils and those who work with students with disabilities.

- 3) Authorize funds to be used to support teams of teachers, administrators, and content specialists to serve as instructional leaders and coaches aligned with the adopted frameworks for CCSS Math and CA NGSS.

No background information was provided by the author's office for this bill.

Related legislation. AB 578 (Mullin) of the 2019-2020 Session would have established the California STEM Teaching Pathway Act of 2019 for the purpose of recruiting, preparing, supporting, and retaining qualified STEM professionals as mathematics, science, and computer science teachers in California. This bill was held in the Assembly Appropriations Committee.

SB 436 (Allen) of the 2017-2018 Session would have established the California STEM Professional Teaching Pathway, to be administered by the California Center on Teaching Careers, for the purpose of recruiting, training, supporting, and retaining qualified STEM professionals, including military veterans, as mathematics and science teachers in California. This bill was held in the Assembly Education Committee.

AB 2265 (Oberholte) of the 2017-2018 Session would have established a State Seal of STEM to recognize high school graduates who attained a high level of proficiency in science, technology, engineering, and mathematics fields. This bill was held in the Assembly Appropriations Committee.

AB 2186 (Thurmond) of the 2017-2018 Session would have, upon appropriation by the Legislature, required the commission to establish the Golden State Science, Technology, Engineering, and Mathematics (STEM) Teacher Grant Program administered by the Commission on Teacher Credentialing. This bill was held in the Senate Appropriations Committee.

AB 2609 (O'Donnell) of the 2017-2018 Session would have established the California Scientist-to-Teacher Pathway Program for the purposes of recruiting, training, supporting, and retaining qualified STEM scientists as STEM teachers in kindergarten through grade 12. This bill was held in the Assembly Appropriations Committee.

AB 2237 (Olsen) of the 2015-2016 Session would have established a program for purposes of providing grants to school districts for the establishment of up to 100 partnership academies dedicated to training young people in STEM occupations. This bill was held in the Assembly Appropriations Committee.

SB 300 (Hancock) Chapter 480, Statutes of 2013, requires the state board to consider the adoption of a revised curriculum framework and evaluation criteria for instructional materials in science on or before January 31, 2016, and would require the revised curriculum framework to be based on specified science content standards and to include English language development strategies, as specified, and strategies to address the needs of pupils with disabilities.

REGISTERED SUPPORT / OPPOSITION:

Support

The Education Trust – West (co-sponsor)
California Association of Science Educators (co-sponsor)
Biomimicry Institute

California Mathematics Council
Exploratorium, the
Office of the Riverside County Superintendent of Schools
Sci-lingual Education
Silicon Valley Mathematics Initiative

Opposition

None on file

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