SENATE COMMITTEE ON EDUCATION
Senator Carol Liu, Chair
2015 - 2016 Regular

Bill No:	AB 2072		
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Urgency:	No	**Fiscal:**	Yes
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Subject: High school diplomas: State Seal of STEM

SUMMARY
This bill establishes the State Seal of Science, Technology, Engineering and Mathematics (STEM) to be voluntarily affixed to the diploma or transcript of a high school graduate who has attained proficiency in science, technology, engineering, and mathematics fields.

BACKGROUND

Existing law:

1) Establishes requirements for the issuance of diplomas and certificates to students who complete a prescribed course of study. (Education Code § 51400-51442)

2) Provides for the Golden State Seal Merit Diploma to recognize students who have mastered specific courses in the high school curriculum. This voluntary program recognizes public school graduates who have demonstrated mastery of the high school curriculum in six designated subject areas, four of which must be mathematics, English language arts, science, and United States history. Qualifying students must be receiving a high school diploma and have earned designated results on the California Standards Test in six qualifying subject areas (previous Golden State Exam results may also be used). Each school district that confers high school diplomas is responsible for maintaining appropriate records in order to identify eligible students and for affixing a Golden State Seal Merit Diploma insignia to the diploma and transcript of each qualifying student. Foreign language can be one of the designated subject areas for which a student earns a Golden State Seal Merit Diploma. (Education Code § 51450-51455)

3) Establishes the State Seal of Biliteracy (SSB), which provides recognition to high school students who have demonstrated proficiency in speaking, reading, and writing in one or more languages in addition to English. Requires each school district, county office of education, or direct-funded charter school that confers the SSB to maintain appropriate records in order to identify students who have met the established criteria for the award and to affix the SSB insignia to the diploma or transcript of each qualifying student. (EC § 51460.)

4) Declares a policy of the State of California that all students in grades 1 – 12 must have equitable access to educational programs designed to strengthen technological skills, including computer education programs, and that funds appropriated for these educational programs have the goal of ensuring equitable access to those programs for all students. (EC § 51007, et seq.)

ANALYSIS

This bill:

1) Establishes a State Seal of Science, Technology, Engineering and Mathematics (STEM) to recognize high school graduates who have attained a proficiency in science, technology, engineering, and mathematics fields.

2) Specifies that the State Seal of STEM is to be awarded by the Superintendent.

3) Provides that school district participation in this program is voluntary.

4) Specifies that the purpose of the State Seal of STEM is to:

   a) Encourage students to study science, technology, engineering, and mathematics.

   b) Certify achievement with the STEM fields.

   c) Provide students with the tools to demonstrate STEM competency to employers.

   d) Provide universities with a method to recognize and give academic credit to applicants seeking admission.

   e) Prepare students for with 21st century skills.

   f) Engage students in STEM learning at an early age.

   g) Prepare students for a job market increasingly in need of individuals with STEM skills.

5) Requires that high school students meet all of the following criteria to be eligible for the State Seal of STEM:

   a) Attained a 3.0 grade point average on a 4.0 scale for all STEM classes taken in high school.

   b) Successfully completed four yearlong classes or equivalent in mathematics and science while enrolled in high school as specified.

c) Has met one of the following criteria in the area of science:

i) A score of 3 or higher on a science Advanced Placement (AP) examination.

ii) A score of 600 or higher on a science Scholastic Assessment Test (SAT) subject test.

iii) A score of 4 or higher on an International Baccalaureate (IB) examination.

iv) A grade of B or higher in a college-level science course taken through concurrent enrollment.

d) Has met one of the following criteria in the area of mathematics:

i) A score of 3 or higher on a mathematics AP examination.

ii) A score of 600 or higher on a mathematics SAT subject test.

iii) A score of 4 or higher on a mathematics IB examination.

iv) A score indicating that the student has met or exceeded standards on a state-standards-aligned assessment in mathematics.

6) Requires the Superintendent to:

a) Prepare and deliver to school districts an appropriate insignia to be affixed to the diploma or transcript of the student indicating that the student has been awarded a State Seal of Science, Technology, Engineering and Mathematics (STEM).

b) Provide other necessary information for school district's to successfully participate in the program.

7) Requires participating school districts to maintain records in order to identify students and affix the insignia to the diploma or transcript for each student that has earned a State Seal of STEM.

8) Prohibits a fee from being charged to students to receive a State Seal of STEM.

9) Makes the program operative only when data from the statewide administration of state science assessments aligned to the California Next Generation Science Standards (NGSS) are available. States that data from a field test of a state science assessment does not satisfy this requirement.

10) Sunsets the program on July 31, 2024.

STAFF COMMENTS

1) ***Need for the bill***. According to the author, "with jobs in the STEM field poised to increase by 19% over the next decade, the state could fall short of providing the workforce with number of individuals skilled in STEM necessary to fill those rolls. In 2011, the state created the State Seal of Biliteracy. This served as both a reward for students able to demonstrate proficiency in more than language but also as a tool. A tool with which that student could market themselves to a college or to an employer. Biliteracy is a skill highly desirable to employers in diverse areas like California but so is Science, Technology, Engineering and Mathematics (STEM). The State Seal of STEM will also serve as both a reward and marketing tool to a different pool of California students." This bill seeks to reward students who reach proficiency in science, technology, engineering and mathematics.

2) ***Student access to STEM Education.*** The Superintendent of Public Instruction's Science, Technology, Engineering and Mathematics (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. The report attributes the problem to a lack of access to "materials and instruction; insufficient opportunities for students to engage in hands-on, inquiry based learning; and insufficient professional preparation by teachers at all levels".

   The gaps in access are reflected in many measures of student course-taking and achievement, including Advanced Placement (AP), International Baccalaureate (IB), SAT II subject tests, and out-of-school STEM educational opportunities. Advanced Placement data published by the College Board, for example, indicate that a very small percentage of California high school students took AP examinations. The College Board also notes that "in many cases, schools serving large numbers of traditionally underrepresented minority students do not yet provide AP course work in STEM disciplines."

   To be eligible, State Seal of STEM students are required to enroll in four years of math and science and attain at least a 3.0 grade point average and demonstrate proficiency by scoring at the specified levels on one of the following AP exams, SAT, IB exam or take a college level course through concurrent enrollment. To address some of the concerns relating to access to STEM education, this bill was amended to include the state-standards-aligned assessments in mathematics as one of the criteria for eligibility. These exams are administered statewide. However, concerns still remain whether students have sufficient access to STEM education in school.

   Technical amendment. As drafted, this bill's provisions specifies that a student may demonstrate proficiency in science by meeting or exceeding standards on a "state-standards-aligned assessments in *mathematics*," rather than in *science*. If it is the desire of the committee to approve this measure, ***staff recommends*** the bill be amended to fix the drafting error by changing the mathematics to science in section 51472 (c)5.

3) ***Is the bill premature?*** Notably, the state, in recent years has undertaken a number of policy reforms to address Science, Technology, Engineering and Mathematics (STEM) teaching and assessment practices, curriculum, and policies that expand STEM opportunities for all students. Many of these efforts have yet to take shape, including state's science curriculum framework. California adopted Next Generation Science Standards (NGSS)-aligned science standards in 2013, however, the California Department of Education (CDE) is currently revising the state's science curriculum framework to align with the state's standards, and its completion has been delayed until January of 2017. This in turn has delayed the state and local adoption of standards-aligned instructional materials for use in classrooms. CDE is also currently developing NGSS-aligned assessments, which are expected to be fully administered in the 2018-2019 school year.

In recognition of the pending science curriculum and assessments, this bill makes the State Seal of Science, Technology, Engineering and Mathematics (STEM) program operative only when data from the statewide administration of NGSS-aligned assessments are available. If the assessments are fully implemented in 2018-2019 school year, as noted above, the program could become operative in 2019-2020 school year. Staff notes that this bill's provisions sunset the program July 31, 2024. Arguably, this would allow for one graduating class to test the program before sunsetting.

4) ***Other State Seals***. The state has established two State Seals, the State Seal of Biliteracy and the Golden State Seal Merit Diploma. The State Seal of Biliteracy (SSB) was established in 2011 with the goal of encouraging students to acquire other languages, which in turn would grant students a competitive edge in postsecondary education and employment. In its first year, more than 10,000 graduating high school students across California earned recognition for achieving proficiency in multiple languages. The CDE reports that since 2012 nearly 60,000 SSBs have been awarded to graduating seniors.

The Golden State Seal Merit Diploma (GGSMD) was established in 1997 to provide recognition to public high school graduates who have demonstrated mastery of the high school curriculum in six subject areas four of which are English, history, mathematics and science the remaining two are selected by the student. In 2015, a total of 51,253 graduating seniors from 1,018 schools were awarded the GSSMD.

Given that the GGSMD recognizes mastery in mathematics and science, the committee may want to consider whether a standalone Seal is necessary?

As future legislation is brought forward on this topic, the committee may also want consider whether it is appropriate to establish Seals in multiple subject areas?

5) ***Related and Prior legislation.***

AB 2237 (Olsen, 2016), would establishes STEM Partnership Academies for the purpose of providing grants to school districts to establish up to 100 academies in STEM occupations which would establish 100 STEM Partnerships. AB 2237 was held in the Assembly Appropriations Committee.

AB 2329 (Bonilla, 2016), would establish a process to develop a K-12 computer science strategic implementation plan for the purposes of expanding access to computer science course in schools. AB 2329 is pending hearing this Committee.

AB 815 (Brownley, Chapter 618, Statutes of 2011) established the State Seal of Biliteracy in recognition of high school graduates who have attained functional proficiency in speaking, reading, and writing skills in one or more languages, in addition to English.

SUPPORT

American Association of University Women
Association of California School Administrators
California Association of Professional Scientists
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California School Boards Association
Children Now
College Board
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OPPOSITION

None received.

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