

119TH CONGRESS
1ST SESSION

S. 1602

To coordinate Federal research and development efforts focused on modernizing mathematics in STEM education through mathematical and statistical modeling, including data-driven and computational thinking, problem, project, and performance-based learning and assessment, interdisciplinary exploration, and career connections, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MAY 5, 2025

Ms. HASSAN (for herself and Mrs. BLACKBURN) introduced the following bill; which was read twice and referred to the Committee on Health, Education, Labor, and Pensions

A BILL

To coordinate Federal research and development efforts focused on modernizing mathematics in STEM education through mathematical and statistical modeling, including data-driven and computational thinking, problem, project, and performance-based learning and assessment, interdisciplinary exploration, and career connections, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Mathematical and Sta-
3 tistical Modeling Education Act”.

4 **SEC. 2. MATHEMATICAL AND STATISTICAL MODELING EDU-
5 CATION.**

6 (a) FINDINGS.—Congress finds the following:

7 (1) The mathematics taught in schools, includ-
8 ing statistical problem solving and data science, is
9 not keeping pace with the rapidly evolving needs of
10 the public and private sector, resulting in a STEM
11 skills shortage and employers needing to expend re-
12 sources to train and upskill employees.

13 (2) According to the Bureau of Labor Statis-
14 tics, the United States will need 1,000,000 addi-
15 tional STEM professionals than it is on track to
16 produce in the coming decade.

17 (3) The field of data science, which is relevant
18 in almost every workplace, relies on the ability to
19 work in teams and use computational tools to do
20 mathematical and statistical problem solving.

21 (4) Many STEM occupations offer higher
22 wages, more opportunities for advancement, and a
23 higher degree of job security than non-STEM jobs.

24 (5) The STEM workforce relies on computa-
25 tional and data-driven discovery, decision making,
26 and predictions, from models that often must quan-

1 tify uncertainty, as in weather predictions, spread of
2 disease, or financial forecasting.

3 (6) Most fields, including analytics, science, eco-
4 nomics, publishing, marketing, actuarial science, op-
5 erations research, engineering, and medicine, require
6 data savvy, including the ability to select reliable
7 sources of data, identify and remove errors in data,
8 recognize and quantify uncertainty in data, visualize
9 and analyze data, and use data to develop under-
10 standing or make predictions.

11 (7) Rapidly emerging fields, such as artificial
12 intelligence, machine learning, quantum computing,
13 and quantum information, all rely on mathematical
14 and statistical concepts, which are critical to prove
15 under what circumstances an algorithm or experi-
16 ment will work and when it will fail.

17 (8) Military academies have a long tradition in
18 teaching mathematical modeling and would benefit
19 from the ability to recruit students with this exper-
20 tise from their other school experiences.

21 (9) Mathematical modeling has been a strong
22 educational priority globally, especially in China,
23 where participation in United States mathematical
24 modeling challenges in high school and higher edu-
25 cation is orders of magnitude higher than in the

1 United States, and Chinese teams are taking a ma-
2 jority of the prizes.

3 (10) Girls participate in mathematical modeling
4 challenges at all levels at similar levels as boys, while
5 in traditional mathematical competitions girls par-
6 ticipate less and drop out at every stage. Students
7 cite opportunity for teamwork, using mathematics
8 and statistics in meaningful contexts, ability to use
9 computation, and emphasis on communication as
10 reasons for continued participation in modeling chal-
11 lenges.

12 (b) DEFINITIONS.—In this section:

13 (1) DIRECTOR.—The term “Director” means
14 the Director of the National Science Foundation.

15 (2) FEDERAL LABORATORY.—The term “Fed-
16 eral laboratory” has the meaning given such term in
17 section 4 of the Stevenson-Wydler Technology Inno-
18 vation Act of 1980 (15 U.S.C. 3703).

19 (3) FOUNDATION.—The term “Foundation”
20 means the National Science Foundation.

21 (4) INSTITUTION OF HIGHER EDUCATION.—The
22 term “institution of higher education” has the
23 meaning given such term in section 101(a) of the
24 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

1 (5) MATHEMATICAL MODELING.—The term
2 “mathematical modeling” has the meaning given
3 such term in the 2019 Guidelines for Assessment
4 and Instruction in Mathematical Modeling Edu-
5 cation (GAIMME) report, 2nd edition.

6 (6) OPERATIONS RESEARCH.—The term “oper-
7 ations research” means the application of scientific
8 methods to the management and administration of
9 organized military, governmental, commercial, and
10 industrial processes to maximize operational effi-
11 ciency.

12 (7) STATISTICAL MODELING.—The term “sta-
13 tistical modeling” has the meaning given such term
14 in the 2021 Guidelines for Assessment and Instruc-
15 tion in Statistical Education (GAISE II) report.

16 (8) STEM.—The term “STEM” means the
17 academic and professional disciplines of science,
18 technology, engineering, and mathematics, including
19 computer science.

20 (c) PREPARING EDUCATORS TO ENGAGE STUDENTS
21 IN MATHEMATICAL AND STATISTICAL MODELING.—The
22 Director shall make awards on a merit-reviewed, competi-
23 tive basis to institutions of higher education and nonprofit
24 organizations (or a consortium thereof) for research and
25 development to advance innovative approaches to support

1 and sustain high-quality mathematical modeling education
2 in schools that are operated by local educational agencies,
3 including statistical modeling, data science, operations re-
4 search, and computational thinking. The Director shall en-
5 courage applicants to form partnerships to address critical
6 transitions, such as middle school to high school, high
7 school to college, and school to internships and jobs.

8 (d) APPLICATION.—An entity seeking an award
9 under subsection (c) shall submit an application at such
10 time, in such manner, and containing such information as
11 the Director may require. The application shall include the
12 following:

13 (1) A description of the target population to be
14 served by the research activity for which such an
15 award is sought, including student subgroups de-
16 scribed in section 1111(b)(2)(B)(xi) of the Elemen-
17 tary and Secondary Education Act of 1965 (20
18 U.S.C. 6311(b)(2)(B)(xi)), students experiencing
19 homelessness, and children and youth in foster care.

20 (2) A description of the process for recruitment
21 and selection of students, educators, or local edu-
22 cational agencies to participate in such research ac-
23 tivity.

24 (3) A description of how such research activity
25 may inform efforts to promote the engagement and

1 achievement of students, including students from
2 groups historically underrepresented in STEM, in
3 prekindergarten through grade 12 in mathematical
4 modeling and statistical modeling using problem-
5 based learning with contextualized data and com-
6 putational tools.

7 (4) In the case of a proposal consisting of a
8 partnership or partnerships with one or more local
9 educational agencies and one or more researchers, a
10 plan for establishing a sustained partnership that is
11 jointly developed and managed, draws from the ca-
12 pacities of each partner, and is mutually beneficial.

13 (e) PARTNERSHIPS.—In making awards under sub-
14 section (c), the Director shall encourage applications that
15 include all of the following:

16 (1) Partnership with a nonprofit organization
17 or an institution of higher education that has exten-
18 sive experience and expertise in increasing the par-
19 ticipation of students in prekindergarten through
20 grade 12 in mathematical modeling and statistical
21 modeling.

22 (2) Partnership with a local educational agency,
23 a consortium of local educational agencies, or Tribal
24 educational agencies.

1 (3) An assurance from school leaders to make
2 reforms and activities proposed by the applicant a
3 priority.

4 (4) Ways to address critical transitions, such as
5 middle school to high school, high school to college,
6 and school to internships and jobs.

7 (5) Input from education researchers and cog-
8 nitive scientists, as well as practitioners in research
9 and industry, so that what is being taught is up-to-
10 date in terms of content and pedagogy.

11 (6) A communications strategy for early con-
12 versations with parents, school leaders, school
13 boards, community members, employers, and other
14 stakeholders.

15 (7) Resources for parents, school leaders, school
16 boards, community members, and other stakeholders
17 to build skills in modeling and analytics.

18 (f) USE OF FUNDS.—An entity that receives an
19 award under this section shall use the award for research
20 and development activities to advance innovative ap-
21 proaches to support and sustain high-quality mathe-
22 matical modeling education in public schools, including
23 statistical modeling, data science, operations research, and
24 computational thinking, which may include the following:

1 (1) Engaging prekindergarten through grade 12
2 educators in professional learning opportunities to
3 enhance mathematical modeling and statistical prob-
4 lem solving knowledge, and developing training and
5 best practices to provide more interdisciplinary
6 learning opportunities.

7 (2) Conducting research on curricula and teach-
8 ing practices that empower students to choose the
9 mathematical, statistical, computational, and techno-
10 logical tools they will apply to a problem, as is re-
11 quired in life and the workplace, rather than pre-
12 scribing a particular approach or method.

13 (3) Providing students with opportunities to ex-
14 plore and analyze real data sets from contexts that
15 are meaningful to the students, which may include
16 the following:

17 (A) Missing or incorrect values.

18 (B) Quantities of data that require choice
19 and use of appropriate technology.

20 (C) Multiple data sets that require choices
21 about which data are relevant to the current
22 problem.

23 (D) Data of various types including quan-
24 tities, words, and images.

1 (4) Taking a school or district-wide approach to
2 professional development in mathematical modeling
3 and statistical modeling.

4 (5) Engaging rural local agencies.

5 (6) Supporting research on effective mathe-
6 matical modeling and statistical modeling teaching
7 practices, including problem- and project-based
8 learning, universal design for accessibility, and ru-
9 brics and mastery-based grading practices to assess
10 student performance.

11 (7) Designing and developing pre-service and
12 in-service training resources to assist educators in
13 adopting transdisciplinary teaching practices within
14 mathematics and statistics courses.

15 (8) Coordinating with local partners to adapt
16 mathematics and statistics teaching practices to le-
17 verage local natural, business, industry, and commu-
18 nity assets in order to support community-based
19 learning.

20 (9) Providing hands-on training and research
21 opportunities for mathematics and statistics edu-
22 cators at Federal laboratories, at institutions of
23 higher education, or in industry.

24 (10) Developing mechanisms for partnerships
25 between educators and employers to help educators

1 and students make connections between their mathe-
2 matics and statistics projects and topics of relevance
3 in today's world.

4 (11) Designing and implementing professional
5 development courses and experiences, including men-
6 toring for educators, that combine face-to-face and
7 online experiences.

8 (12) Reducing gaps in access to learning oppor-
9 tunities for students from groups historically under-
10 represented in STEM.

11 (13) Providing support and resources for stu-
12 dents from groups historically underrepresented in
13 STEM.

14 (14) Addressing critical transitions, such as
15 middle school to high school, high school to college,
16 and school to internships and jobs.

17 (15) Researching effective approaches for en-
18 gaging students from groups historically underrep-
19 resented in STEM.

20 (16) Any other activity the Director determines
21 will accomplish the goals of this section.

22 (g) EVALUATIONS.—All proposals for awards under
23 this section shall include an evaluation plan that includes
24 the use of outcome oriented measures to assess the impact
25 and efficacy of the award. Each recipient of an award

1 under this section shall include results from such evalua-
2 tive activities in annual and final project reports.

3 (h) ACCOUNTABILITY AND DISSEMINATION.—

4 (1) EVALUATION REQUIRED.—The Director
5 shall evaluate the portfolio of awards made under
6 this section. Such evaluation shall—

7 (A) use a common set of benchmarks and
8 tools to assess the results of research conducted
9 under such awards and identify best practices;
10 and

11 (B) to the extent practicable, integrate the
12 findings of research resulting from the activities
13 funded through such awards with the findings
14 of other research on students' pursuit of de-
15 grees or careers in STEM.

16 (2) REPORT ON EVALUATIONS.—Not later than
17 180 days after the completion of the evaluation
18 under paragraph (1), the Director shall submit to
19 Congress and make widely available to the public a
20 report that includes the following:

21 (A) The results of the evaluation.

22 (B) Any recommendations for administra-
23 tive and legislative action that could optimize
24 the effectiveness of the awards made under this
25 section.

1 (i) FUNDING.—\$10,000,000 for each of the fiscal
 2 years 2026 through 2030 is authorized to be used by the
 3 Directorate for STEM Education of the Foundation to
 4 carry out this section.

5 **SEC. 3. NASEM REPORT ON MATHEMATICAL AND STATIS-**
 6 **TICAL MODELING EDUCATION IN PRE-**
 7 **KINDERGARTEN THROUGH 12TH GRADE.**

8 (a) STUDY.—Not later than 180 days after the date
 9 of the enactment of this Act, the Director shall seek to
 10 enter into an agreement with the National Academies of
 11 Sciences, Engineering, and Medicine (in this section re-
 12 ferred to as “NASEM”) (or if NASEM declines to enter
 13 into such an agreement, another appropriate entity) under
 14 which NASEM, or such other appropriate entity, agrees
 15 to conduct a study on the following:

16 (1) Factors that enhance or barriers to the im-
 17 plementation of mathematical modeling and statis-
 18 tical modeling in elementary and secondary edu-
 19 cation, including opportunities for and barriers to
 20 the use of modeling to integrate mathematical and
 21 statistical ideas across the curriculum, including the
 22 following:

23 (A) Pathways in mathematical modeling
 24 and statistical problem solving from kinder-
 25 garten to the workplace so students are able to

1 identify opportunities to use their school mathe-
2 matics and statistics in a variety of jobs and
3 life situations and so employers can benefit
4 from students' school learning of data science,
5 computational thinking, mathematics, statistics,
6 and related subjects.

7 (B) The role of community-based prob-
8 lems, service-based learning, and internships for
9 connecting students with career preparatory ex-
10 periences.

11 (C) Best practices in problem-, project-,
12 and performance-based learning and assess-
13 ment.

14 (2) Characteristics of teacher education pro-
15 grams that successfully prepare teachers to engage
16 students in mathematical modeling and statistical
17 modeling, as well as gaps and suggestions for build-
18 ing capacity in the pre-service and in-service teacher
19 workforce.

20 (3) Mechanisms for communication with stake-
21 holders, including parents, administrators, and the
22 public, to promote understanding and knowledge of
23 the value of mathematical modeling and statistical
24 modeling in education.

1 (b) PUBLIC STAKEHOLDER MEETING.—In the course
2 of completing the study described in subsection (a),
3 NASEM or such other appropriate entity shall hold not
4 fewer than one public meeting to obtain stakeholder input
5 on the topics of such study.

6 (c) REPORT.—The agreement under subsection (a)
7 shall require NASEM, or such other appropriate entity,
8 not later than 24 months after the effective date of such
9 agreement, to submit to the Director, the Secretary of
10 Education, and the Congress a report containing the fol-
11 lowing:

12 (1) The results of the study conducted under
13 subsection (a).

14 (2) Recommendations to modernize the proc-
15 esses described in subsection (a)(1).

16 (3) Recommendations for such legislative and
17 administrative action as NASEM, or such other ap-
18 propriate entity, determines appropriate.

19 (d) FUNDING.—\$1,000,000 for each of the fiscal
20 years 2026 through 2030 is authorized to be used by the
21 Directorate for STEM Education of the Foundation to
22 carry out this section.

23 **SEC. 4. LIMITATIONS.**

24 (a) LIMITATION ON FUNDING.—Amounts made avail-
25 able to carry out sections 2 and 3 shall be derived from

1 amounts appropriated or otherwise made available to the
2 Foundation.

3 (b) SUNSET.—The authority to provide awards under
4 this Act shall expire on September 30, 2029.

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