

115TH CONGRESS
1ST SESSION

H. R. 2305

To direct the Secretary of Education to award grants to State educational agencies to develop comprehensive plans to strengthen elementary and secondary computer science education, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 3, 2017

Mr. CÁRDENAS (for himself, Mr. POLIS, Mr. KILMER, and Ms. ESTY of Connecticut) introduced the following bill; which was referred to the Committee on Education and the Workforce, and in addition to the Committee on Science, Space, and Technology, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To direct the Secretary of Education to award grants to State educational agencies to develop comprehensive plans to strengthen elementary and secondary computer science education, 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,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Computer Science in
5 STEM Act of 2017”.

1 **SEC. 2. FINDINGS.**

2 The Congress finds the following:

3 (1) Computer science is transforming industry,
4 creating new fields of commerce, driving innovation
5 in all fields of science, and bolstering productivity in
6 established economic sectors.

7 (2) Computer science underpins the information
8 technology sector of the United States economy,
9 which is a significant contributor to the economic
10 output of the United States.

11 (3) The Bureau of Labor Statistics projects
12 that from 2008 through 2018 more than 1,500,000
13 high-wage computing jobs will be created in the
14 United States economy, making high-wage com-
15 puting one of the fastest growing occupational fields.

16 (4) The breadth of industries requiring com-
17 puting professionals is diverse, two-thirds of com-
18 puting jobs are in sectors other than information
19 technology, including manufacturing, defense, health
20 care, finance, and government.

21 (5) Providing students with computer science
22 education in elementary and secondary school is crit-
23 ical for student success in the 21st century and for
24 strengthening the workforce.

25 (6) Elementary and secondary computer science
26 education gives students a deeper knowledge of the

1 fundamentals of computing, yielding critical thinking
2 skills that will serve them throughout their lives in
3 numerous fields.

4 (7) Computer science courses in elementary and
5 secondary schools are fading from the national land-
6 scape at a time when they are most needed. The
7 Computer Science Teachers Association (CSTA) has
8 found that introductory secondary school computer
9 science courses have decreased in number by 17 per-
10 cent since 2005 and the number of Advanced Place-
11 ment (AP) computer science courses has decreased
12 by 33 percent.

13 (8) Significant disparities in access to computer
14 science education exist for minorities. Research in
15 the Los Angeles Unified School District, the second
16 largest and one of the most diverse school districts
17 in the United States, found college-preparatory com-
18 puter science courses were commonly missing in
19 schools with high numbers of Latino and African-
20 American students.

21 (9) Only 14 States allow computer science
22 courses to count toward a student's secondary school
23 graduation requirements, chilling student interest in
24 computer science courses.

1 (10) The CSTA has found that many States do
2 not have a certification or licensure process for com-
3 puter science teachers, and where certification proc-
4 esses do exist, such processes often have no connec-
5 tion to computer science content.

6 (11) Computer science education has been en-
7 cumbered by confusion regarding the related but dis-
8 tinct concepts of computer science education, tech-
9 nology education, and the use of technology in edu-
10 cation.

11 (12) Computer science education courses have
12 often been placed within the vocational education
13 pathways in schools, creating a focus on applied in-
14 formation technology skills rather than a focus on
15 developing fundamental computer science knowledge.

16 (13) With the growing importance of computing
17 in society, the need for students to understand the
18 fundamentals of computing, and the significant chal-
19 lenges computer science education faces in elemen-
20 tary and secondary education, broad support for
21 computer science education is needed to catalyze re-
22 form.

1 **SEC. 3. AMENDMENT TO THE AMERICA COMPETES REAU-**
2 **THORIZATION ACT OF 2010.**

3 Section 2(2) of the America COMPETES Reauthor-
4 ization Act of 2010 (42 U.S.C. 6621 note) is amended
5 by inserting “, and computer science” after “and mathe-
6 matics”.

7 **SEC. 4. STATE COMPREHENSIVE PLANNING GRANTS.**

8 (a) PROGRAM AUTHORIZED.—The Secretary of Edu-
9 cation shall award grants to State educational agencies to
10 develop comprehensive plans to strengthen elementary and
11 secondary computer science education in accordance with
12 this section.

13 (b) OBJECTIVES.—A comprehensive plan developed
14 under this section shall outline strategies for achieving the
15 following objectives:

16 (1) Provide an engaging and rigorous computer
17 science education intended to ensure students are
18 prepared for the 21st century.

19 (2) Assess the State’s needs for computer
20 science education, particularly for underrepresented
21 populations.

22 (3) Ensure access to computer science courses,
23 particularly at low-performing schools and for low-
24 income students and students underrepresented in
25 computing.

1 (4) Ensure that students are exposed to grade-
2 appropriate computer science concepts in kinder-
3 garten through grade 12 and that computer science
4 courses at the secondary level are viewed as part of
5 the standard curriculum students need to be ready
6 for postsecondary education and careers.

7 (5) Ensure that teachers have the appropriate
8 background, skills, and access to resources to teach
9 computer science.

10 (c) CONTENTS OF COMPREHENSIVE PLANS.—A
11 State educational agency that receives a grant under sub-
12 section (a) shall develop a comprehensive plan that meets
13 the objectives described in subsection (b) and includes the
14 following:

15 (1) An assessment of elementary and secondary
16 computer science education in such State.

17 (2) Proposals to improve elementary and sec-
18 ondary computer science education in such State
19 through the development and implementation of—

20 (A) challenging and grade-appropriate aca-
21 demic content standards for computer science
22 at elementary and secondary education levels;

23 (B) grade-appropriate assessments of com-
24 puter science learning;

1 (C) programs to increase access to com-
2 puter science courses for students at low-per-
3 forming schools and students underrepresented
4 in computing;

5 (D) improved computer science teacher
6 certification or licensure requirements and proc-
7 esses;

8 (E) professional development programs for
9 computer science teachers; and

10 (F) programs for ensuring that computer
11 science courses at the secondary level are con-
12 sidered an integral part of the curriculum stu-
13 dents need to be well prepared for higher edu-
14 cation and employment.

15 (d) CONSULTATION.—In developing a comprehensive
16 plan under this section, a State educational agency shall
17 collaborate with representatives of institutions of higher
18 education, with other interested parties, and, where they
19 exist in such State, with State P-16 or P-20 councils.

20 (e) DURATION OF GRANTS.—The Secretary shall
21 award each grant under subsection (a) for a period of 2
22 years.

23 (f) FUNDING STRUCTURE.—

24 (1) IN GENERAL.—The Secretary shall award
25 grants under subsection (a) proportionally among

1 the State educational agencies that apply for grant
2 funding under this section based on the number of
3 low-income children served by the State educational
4 agency compared to the total number of low-income
5 children served by all of the State educational agen-
6 cies that apply for grant funding under this section.

7 (2) COUNTING LOW-INCOME CHILDREN.—

8 (A) CATEGORIES OF CHILDREN.—The
9 number of low-income children to be counted
10 for purposes of this section is the aggregate
11 of—

12 (i) the number of children aged 5 to
13 17, inclusive, in the State from families
14 below the poverty level, as determined by
15 the Secretary on the basis of the most re-
16 cent satisfactory data;

17 (ii) the number of children (deter-
18 mined for either the preceding year or for
19 the second preceding year, as the Secretary
20 finds appropriate) aged 5 to 17, inclusive,
21 in the State in institutions for neglected
22 and delinquent children (other than such
23 institutions operated by the United
24 States); and

1 (iii) the number of children aged 5 to
2 17, inclusive, in the State from families
3 above the poverty level as determined
4 under paragraph (4)(A) of section 1124(c)
5 of the Elementary and Secondary Edu-
6 cation Act of 1965 (20 U.S.C. 6333(c)(4)).

7 (B) METHODOLOGY.—In making computa-
8 tions under subparagraph (A), the Secretary
9 shall use the methodology described in para-
10 graphs (3) through (5) of section 1124(c) of the
11 Elementary and Secondary Education Act of
12 1965 (20 U.S.C. 6333(c)).

13 (3) MINIMUM GRANT.—Notwithstanding para-
14 graph (1), each State educational agency approved
15 by the Secretary to receive a grant under this sec-
16 tion shall receive a minimum grant of \$250,000.

17 (g) AUTHORIZATION OF APPROPRIATIONS.—There is
18 authorized to be appropriated such sums as necessary,
19 subject to the availability of appropriations, to carry out
20 this section.

21 **SEC. 5. IMPLEMENTATION GRANTS.**

22 (a) PROGRAM AUTHORIZED.—The Secretary shall
23 award grants to State educational agencies in accordance
24 with this section to implement computer science education

1 improvements proposed in comprehensive plans that meet
2 the requirements of subsections (b) and (c) of section 4.

3 (b) BENCHMARKS.—Each State educational agency
4 applying for a grant under this section shall—

5 (1) develop quantifiable benchmarks for the ac-
6 tivities supported under such grant, which may in-
7 clude benchmarks for increasing—

8 (A) student knowledge and competency of
9 grade-appropriate computer science concepts;

10 (B) the number of students that take com-
11 puter science courses;

12 (C) the diversity of students who take com-
13 puter science courses;

14 (D) the number of students who plan to
15 pursue postsecondary computer science degrees;

16 (E) the diversity of students who plan to
17 pursue postsecondary computer science degrees;

18 and

19 (F) the number of teachers who are cer-
20 tified to teach computer science; and

21 (2) submit such quantifiable benchmarks to the
22 Secretary for approval.

23 (c) ACTIVITIES.—Grant funds received under this
24 section shall be used by each State educational agency for
25 the development and implementation of—

1 (1) challenging and grade-appropriate academic
2 content standards for computer science;

3 (2) grade-appropriate assessments of computer
4 science learning;

5 (3) programs to increase access to computer
6 science courses for students at low-performing
7 schools and students underrepresented in computing;

8 (4) improved computer science teacher certifi-
9 cation requirements and processes;

10 (5) professional development programs for com-
11 puter science teachers;

12 (6) programs for ensuring that computer
13 science courses at the secondary level are considered
14 an integral part of the curriculum students need to
15 be well prepared for higher education and employ-
16 ment;

17 (7) effective computer science curricula;

18 (8) computer science distance learning pro-
19 grams; and

20 (9) such other activities that strengthen com-
21 puter science education and that such State edu-
22 cational agency considers appropriate.

23 (d) ADMINISTRATIVE EXPENSES.—A State edu-
24 cational agency may use not more than five percent of a

1 grant received under this section for administrative ex-
2 penses.

3 (e) PARTNERSHIPS.—In performing the activities re-
4 quired under subsection (c), each State educational agency
5 shall partner with institutions of higher education and
6 local educational agencies, and may partner with nonprofit
7 organizations, businesses, and other State educational
8 agencies.

9 (f) NON-FEDERAL SHARE.—

10 (1) IN GENERAL.—Each State educational
11 agency receiving a grant under this section shall
12 provide a non-Federal share, in cash or in-kind, of
13 the funding for the activities described in subsection
14 (c) of not less than 20 percent of the total cost of
15 such activities in any fiscal year.

16 (2) FINANCIAL HARDSHIP WAIVER.—The Sec-
17 retary may reduce or waive the requirement to pro-
18 vide a non-Federal share under paragraph (1) for a
19 State educational agency if such State educational
20 agency demonstrates a need for such waiver or re-
21 duction due to extreme financial hardship.

22 (g) DURATION OF GRANTS.—The Secretary shall
23 award each grant under subsection (a) for a period of five
24 years.

1 (h) SUBSEQUENT GRANTS.—At the end of the 5-year
2 period for a grant, the grant recipient may apply for an
3 additional grant under this section by submitting an up-
4 dated comprehensive plan that meets the requirements of
5 subsections (b) and (c) of section 4. In considering an ap-
6 plication for a subsequent grant under this section, the
7 Secretary shall take into consideration the reports filed
8 under subsection (l).

9 (i) COMPETITIVE BASIS; PRIORITY.—The Secretary
10 shall—

11 (1) award grants for a fiscal year on a competi-
12 tive basis among State educational agencies that
13 meet the requirements for funding under this sec-
14 tion; and

15 (2) give priority to State educational agency
16 proposals that include an emphasis on serving low-
17 performing schools and on increasing participation
18 in computer science by students underrepresented in
19 computing.

20 (j) FUNDING PRIORITY.—In allocating grant funds
21 received under this section, a State educational agency
22 shall give priority to proposals that include an emphasis
23 on serving low-performing schools and on increasing par-
24 ticipation in computer science by students underrep-
25 resented in computing.

1 (k) SUPPLEMENT, NOT SUPPLANT.—Funds made
2 available to carry out this section shall be used to supple-
3 ment, and not supplant, other Federal and State funds
4 available to carry out the activities described in this sec-
5 tion.

6 (l) REPORTS.—Each State educational agency receiv-
7 ing a grant under this section shall—

8 (1) measure the progress of such State edu-
9 cational agency in achieving the benchmarks devel-
10 oped under subsection (b)(1);

11 (2) collect data relating to student-related
12 benchmarks developed under subsection (b)(1) in a
13 form that is disaggregated by student race, eth-
14 nicity, gender, disability status, migrant status,
15 English proficiency status, and low-income status,
16 except that such disaggregation shall not be required
17 when the number of students in a category is insuf-
18 ficient to yield statistically reliable results or the re-
19 sults would reveal personally identifiable information
20 about an individual student;

21 (3) collect such other performance information
22 as the Secretary may reasonably require for the na-
23 tional evaluation conducted under section 6;

24 (4) submit a report to the Secretary addressing
25 each item in paragraphs (1) through (3) not later

1 than four years after the date on which the State
2 educational agency receives an initial grant under
3 this section; and

4 (5) not later than two years after the date of
5 the submission of the report required under para-
6 graph (4), and biennially thereafter until the State
7 educational agency no longer receives grant funding
8 under this section, submit to the Secretary an up-
9 date of such report.

10 (m) GUIDANCE.—The Secretary shall provide guid-
11 ance to State educational agencies regarding acceptable
12 data sources and methodologies for—

13 (1) establishing performance benchmarks; and

14 (2) measuring progress by State educational
15 agencies receiving grants under this section.

16 **SEC. 6. NATIONAL EVALUATION.**

17 (a) IN GENERAL.—Not earlier than 4 years after the
18 date of the enactment of this Act, the Secretary shall con-
19 tract with an independent organization for a comprehen-
20 sive, scientifically valid, and quantitative evaluation of the
21 performance and effectiveness of the activities funded by
22 grants received under this Act in improving the availability
23 and quality of computer science education, the overall par-
24 ticipation rate of students in computer science courses,

1 and the participation rate of students underrepresented in
 2 computing in computer science courses.

3 (b) REPORTING REQUIREMENTS.—

4 (1) INITIAL REPORT.—Not later than 5 years
 5 after the date of the enactment of this Act, the Sec-
 6 retary shall submit to Congress a report on the re-
 7 sults of the evaluation described in subsection (a).

8 (2) REPORT UPDATES.—Not later than 2 years
 9 after the date on which the Secretary submits the
 10 report required under paragraph (1), and biennially
 11 thereafter, the Secretary shall submit to Congress
 12 an update of such report.

13 **SEC. 7. EXPANDING TEACHER PREPARATION PROGRAMS**
 14 **FOR COMPUTER SCIENCE TEACHERS.**

15 (a) COMPUTER SCIENCE MODEL TEACHER PREPA-
 16 RATION PROGRAM.—Part B of title II of the Elementary
 17 and Secondary Education Act of 1965 (20 U.S.C. 6661
 18 et seq.) is amended by adding at the end the following:

19 **“SEC. 2204. COMPUTER SCIENCE MODEL TEACHER PREPA-**
 20 **RATION PROGRAM.**

21 **“(a) ESTABLISHMENT.—**The Secretary is authorized
 22 to award grants to institutions of higher education to im-
 23 prove training for elementary school and secondary school
 24 computer science teachers.

1 “(b) ELIGIBILITY.—The Secretary shall award a
2 grant under this section to an institution of higher edu-
3 cation that—

4 “(1) has, at minimum—

5 “(A) a program in teacher education; and

6 “(B) a program in computer science or
7 informatics; and

8 “(2) submits an application at such time, in
9 such form, and containing such information and as-
10 surances as the Secretary may require.

11 “(c) USE OF FUNDS.—An institution of higher edu-
12 cation that receives a grant under the section shall use
13 the grant funds to carry out not less than one of the fol-
14 lowing activities:

15 “(1) Develop courses for undergraduate stu-
16 dents that—

17 “(A) prepare such students to teach com-
18 puter science in elementary schools and sec-
19 ondary schools;

20 “(B) address content and pedagogy in
21 informatics or computer science education; and

22 “(C) engage the teacher education depart-
23 ment and other relevant departments at the in-
24 stitution of higher education.

1 “(2) Develop and fund teacher mentoring pro-
2 grams to support elementary school and secondary
3 school computer science teachers who are new to the
4 profession.

5 “(d) DURATION OF GRANTS.—Each grant awarded
6 by the Secretary under this section shall be for a period
7 of 5 years.

8 “(e) REPORT.—Not later than 180 days after the
9 conclusion of the grant period described under subsection
10 (d), an institution of higher education that receives a
11 grant under this section shall submit to the Secretary and
12 Congress a report that—

13 “(1) identifies the number of teachers served
14 under the grant;

15 “(2) identifies the number of teachers described
16 in paragraph (1) who obtain a teaching position in
17 a computer science classroom; and

18 “(3) evaluates the activities carried out under
19 this section.”.

20 “(b) TECHNICAL AMENDMENT.—The table of contents
21 for such Act is amended by inserting before the item relat-
22 ing to part C of title II the following:

“Sec. 2204. Computer science model teacher preparation program.”.

1 **SEC. 8. COMPUTER SCIENCE IN THE ROBERT NOYCE**
2 **TEACHER SCHOLARSHIP PROGRAM.**

3 Section 10 of the National Science Foundation Au-
4 thorization Act of 2002 (42 U.S.C. 1862n–1) is amend-
5 ed—

6 (1) by striking “and mathematics” and insert-
7 ing “mathematics, informatics, and computer
8 science” in each place it appears;

9 (2) in subsection (a)(3)(B), by striking “or
10 mathematics” and inserting “mathematics,
11 informatics, and computer science”;

12 (3) in subsections (b)(1)(D)(i), (c)(1)(A),
13 (d)(1), and (i)(7) by striking “or mathematics” in
14 each place it appears and inserting “mathematics,
15 informatics, or computer science”; and

16 (4) in subsection (i)(5), by striking “or mathe-
17 matics” and inserting “mathematics, or computer
18 science”.

19 **SEC. 9. DEFINITIONS.**

20 In this Act:

21 (1) **COMPUTER SCIENCE.**—The term “computer
22 science” means the study of computers and algo-
23 rithmic processes and includes the study of com-
24 puting principles, computer hardware and software
25 design, computer applications, and the impact of
26 computers on society.

1 (2) COMPUTER SCIENCE EDUCATION.—The
2 term “computer science education” includes com-
3 puting education in any of the following:

4 (A) Software design.

5 (B) Hardware design.

6 (C) Creation of digital artifacts.

7 (D) Abstraction.

8 (E) Logic.

9 (F) Algorithm development and implemen-
10 tation.

11 (G) Programming paradigms and lan-
12 guages.

13 (H) Theoretical foundations.

14 (I) Networks.

15 (J) Graphics.

16 (K) Databases and information retrieval.

17 (L) Information security and privacy.

18 (M) Artificial intelligence.

19 (N) The relationship between computing
20 and mathematics.

21 (O) The limits of computation.

22 (P) Applications in information technology
23 and information systems.

24 (Q) The social impacts of computing.

1 (3) INSTITUTION OF HIGHER EDUCATION.—The
2 term “institution of higher education” has the
3 meaning given that term in section 101(a) of the
4 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

5 (4) LOCAL EDUCATIONAL AGENCY.—The term
6 “local educational agency”—

7 (A) subject to subparagraph (B), has the
8 meaning given that term in section 8101 of the
9 Elementary and Secondary Education Act of
10 1965 (20 U.S.C. 7801); and

11 (B) includes any charter school (as defined
12 in section 4310 of the Elementary and Sec-
13 ondary Education Act of 1965 (20 U.S.C.
14 7221i)) that constitutes a local educational
15 agency under State law.

16 (5) SECRETARY.—The term “Secretary” means
17 the Secretary of Education.

18 (6) STATE EDUCATIONAL AGENCY.—The term
19 “State educational agency” has the meaning given
20 that term in section 8101 of the Elementary and
21 Secondary Education Act of 1965 (20 U.S.C. 7801).

22 (7) STUDENTS UNDERREPRESENTED IN COM-
23 PUTING.—The term “students underrepresented in
24 computing”—

- 1 (A) means populations historically under-
2 represented in computer science disciplines; and
3 (B) includes females, racial minorities, and
4 low-income students.

