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2019

State of Computer Science Education

Equity and Diversity



About the Code.org Advocacy Coalition



Bringing together more than 70 industry, non-profit, and advocacy organizations, the [Code.org Advocacy Coalition](#) is growing the movement to make computer science a fundamental part of K-12 education.

About the CSTA



The Computer Science Teachers Association ([CSTA](#)) is a membership organization that supports and promotes the teaching of computer science. CSTA provides opportunities for K-12 teachers and their students to better understand computer science and to more successfully prepare themselves to teach and learn.

About the Expanding Computing Education Pathways Alliance



The Expanding Computing Education Pathways ([ECEP](#)) Alliance is an NSF-funded Broadening Participation in Computing Alliance (NSF-CNS-1822011). ECEP seeks to increase the number and diversity of students in computing and computing-intensive degrees by promoting state-level computer science education reform. Working with the collective impact model, ECEP supports an alliance of 22 states and Puerto Rico to identify and develop effective educational interventions, and expand state-level infrastructure to drive educational policy change.



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Thank You for Helping to Build a Movement

The Code.org Advocacy Coalition, Computer Science Teachers Association, and the Expanding Computing Education Pathways Alliance wish to thank the hundreds of thousands of teachers, community members, researchers, local champions and stakeholders, nonprofits, universities, corporations, and government institutions who have supported the movement to expand access to K-12 computer science. This movement draws its strength from a broad base of support, and is grateful to each and every individual and organization who has contributed to the vision that every student in every school deserves the opportunity to learn computer science.



And to all the members of the Code.org Advocacy Coalition:

Afterschool Alliance
Alliance for California Computing Education for Students and Schools
American Association for University Women
Anita Borg Institute
Arizona Technology Council
Association for Computing Machinery
Battelle
BootUP
California STEM Network
CEASOM Regional Partnership
Charles County Public Schools
Chicago Suburban CSTA
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Common Sense Media
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Idaho STEM Action Center
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Rural Technology Fund
SAS
Science Foundation Arizona
Stand for Children
STEMx
Teach for America
TechNet
Technology Association of Louisville Kentucky
Technology Association of Oregon
The College Board
United Data Technologies
Utah STEM Action Center
Utah Tech Council
Washington STEM
West Virginia University Center for Excellence in STEM Education

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Executive Summary

The internet, smartphones, social media, apps, and online shopping are just a few of the modern innovations that have been developed through computer science. As our dependence on technology shapes our lives daily, it should come as no surprise that computing jobs are the number one source of new wages in the U.S.¹ and that 9 out of 10 parents want their children to learn computer science.²

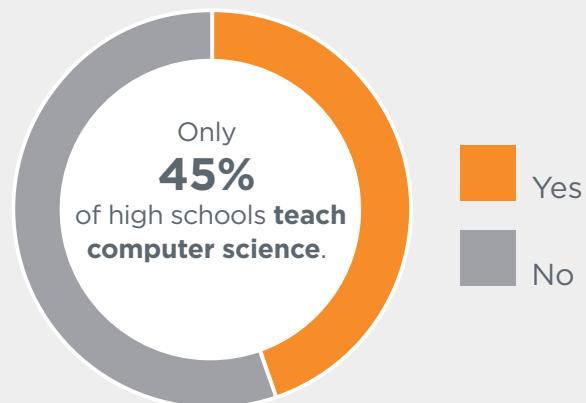
¹ Code.org. (2016). Computing occupations are now the #1 source of new wages. Retrieved from bit.ly/numberonewnewwages
² Google Inc. & Gallup Inc. (2016). Trends in the state of computer science in U.S. K-12 schools. Retrieved from goo.gl/J291E0

Only 45% of our nation's high schools teach computer science and courses still lack girls and underrepresented minority students. Furthermore, students receiving free and reduced lunch and students from rural areas are less likely to attend a school that provides opportunities to learn this critical subject.

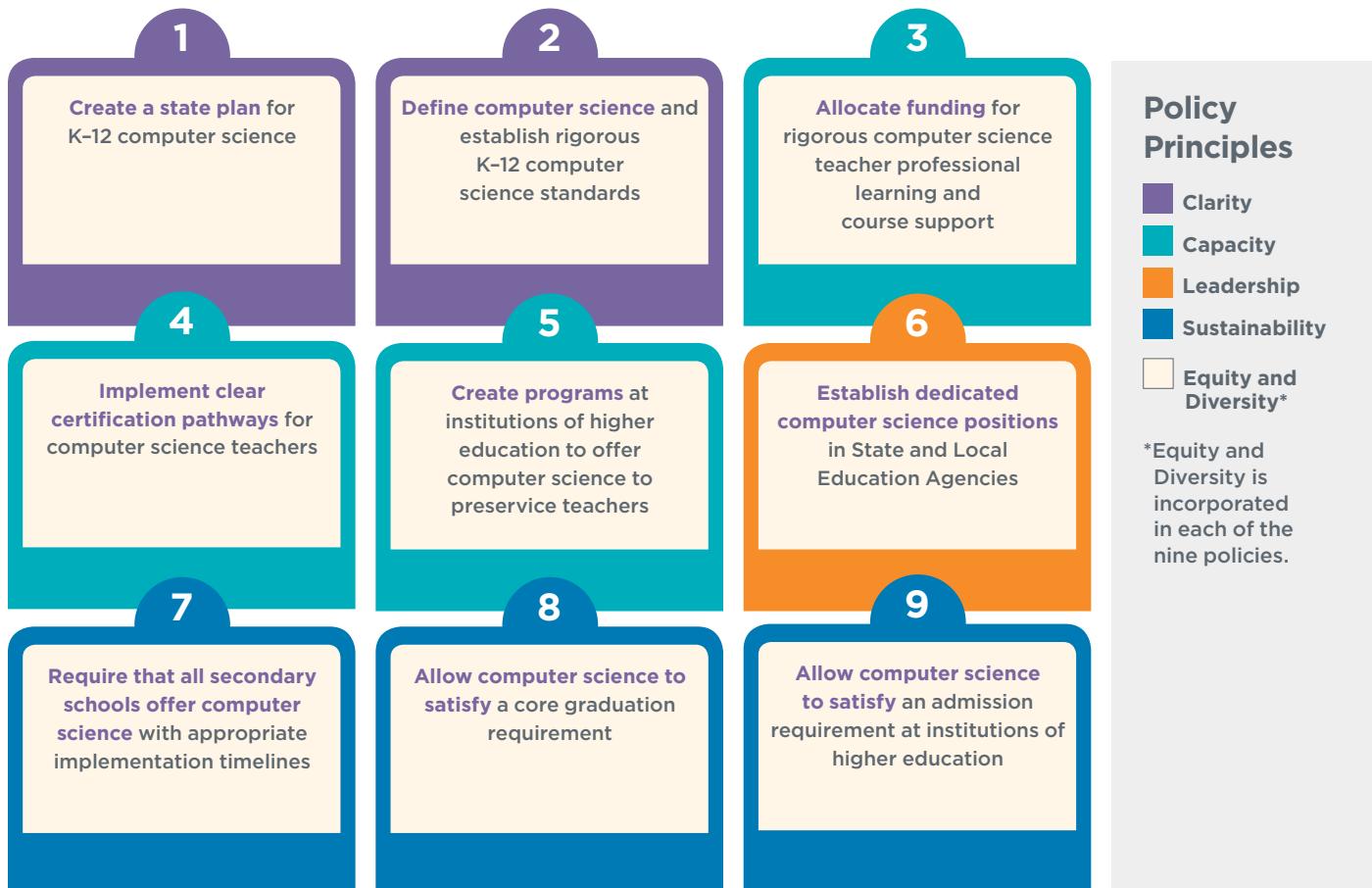
State education leaders have been working to make computer science a fundamental part of K-12 education for all students by adopting nine specific policy ideas. Since the *2018 State of Computer Science Education*³ report was published, 33 states passed 57 new laws and regulations promoting computer science. States that adopt more of the policies promoted by the Code.org Advocacy Coalition have higher rates of teaching computer science; policy adoption leads to more opportunities.

Percent of High Schools Teaching Computer Science

Across 39 states, 45% of high schools teach computer science.



Nine Policies to Make Computer Science Fundamental



³ 2018 State of Computer Science Education (2018) Retrieved from code.org/files/2018_state_of_cs.pdf. For 2017, see State of the States Landscape Report (2017). Retrieved from code.org/files/State_of_the_states.pdf

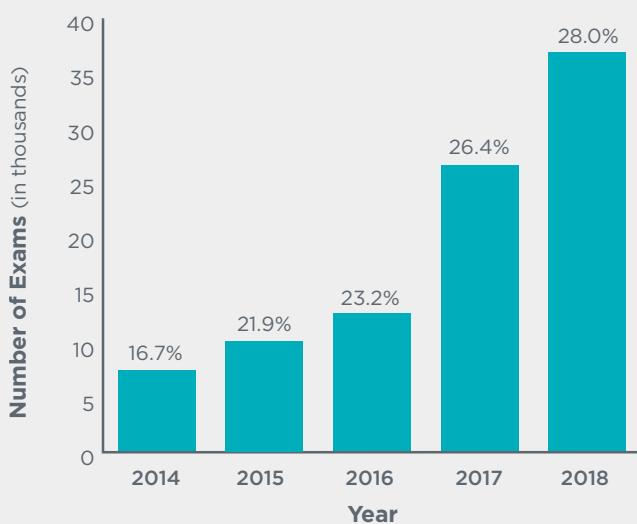
When the Code.org Advocacy Coalition began its work in 2013, just 14 states plus D.C. had at least one of these nine policies in place; last year there were 44 states. All 50 states have now adopted—or are in the process of adopting—one or more of the nine policies. The *2019 State of Computer Science Education* report describes these policy trends, summarizes the progress of each state in meeting the nine policies, provides data on computer science implementation rates, and includes a special focus on the relationship between policy and the participation rates of girls and underrepresented minority students.

At the heart of the national movement is the goal of increasing the participation of historically underrepresented groups. The principle of equity and diversity is an integral part of each of these nine policies; for example, some states prioritize funding for districts who make focused efforts to engage underrepresented groups, and other states call for annual report of student demographics in computer science courses that schools are required to offer.

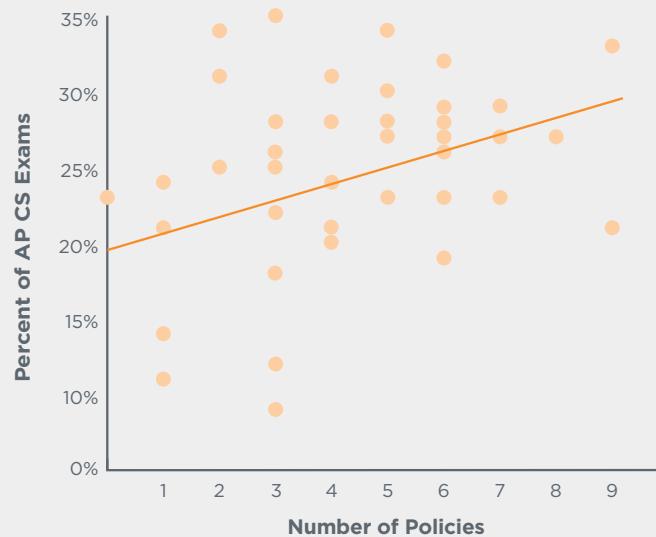
An analysis shows that as states adopt these policies, not only are more computer science courses taught across those states, there is also an increase in the representation of female students taking Advanced Placement® (AP) computer science exams.

Closing the participation gaps in computer science will take years, but there are clear signs that states are on the right path. Greater representation is already seen in states that have adopted policies that increase access to high school computer science courses, prepare more teachers to begin offering courses, and define standards for computer science. States can do even more by continuing to adopt policies that specifically focus on equity and diversity in computer science, such as increasing learning opportunities in elementary and middle schools. Research has shown that girls that have early exposure to computer science show the same level of interest, motivation, and confidence as boys⁴ and are more likely to take computer science courses in high school.⁵

Number and Percent of AP CS Exams Taken By Female Students Nationwide



Number of Policies and Female Students' AP CS Representation



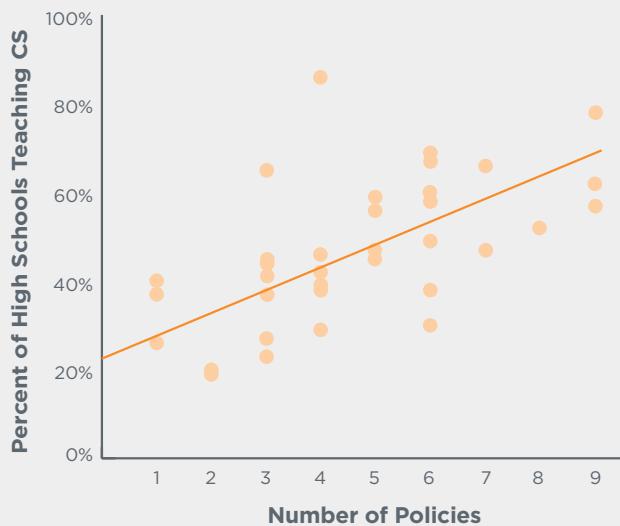
⁴ Master, A., Cheryan, S., Moscatelli, A., & Meltzoff, A. N. (2017). Programming experience promotes higher STEM motivation among first-grade girls. *Journal of Experimental Child Psychology*, 160, 92–106. <http://doi.org/10.1016/j.jecp.2017.03.013>

⁵ Google Inc. (2014). *Women who choose computer science—What really matters*. Retrieved from <https://edu.google.com/pdfs/women-who-choose-what-really.pdf>

Overall, there continues to be a strong connection between the adoption of the nine policies and the percentage of high schools teaching computer science in a state.

Trend in Policy Adoption and Access to Computer Science

States that have adopted more of the nine policies have a greater percentage of high schools teaching computer science.



Arkansas, Idaho, Indiana, Maryland, and Nevada have already adopted all nine policies, and several additional states are not far behind. These five states—and others—continue to refine already-adopted policies, such as expanding how students can apply computer science course credit towards high school graduation requirements, recognizing high-quality teaching with stipends and awards, and creating new pathways to teacher certification. Broadening participation in computer science is the ultimate goal and careful implementation of each policy is as important as the initial adoption of the policy. Computer science continues to be a significant opportunity to address equity, workforce, and education issues on a bipartisan basis. As we look forward to 2020, it is imperative to continue the bipartisan support and momentum we have seen for a subject that is critical to the success of all of our students.





Introduction

Published annually in September, this report updates each state's status toward adopting the nine policies recommended by the Code.org Advocacy Coalition. This year's report is co-authored by Code.org, the Computer Science Teachers Association (CSTA), and the Expanding Computing Education Pathways (ECEP) Alliance.

The 2019 *State of Computer Science Education* report describes the policy trends and national momentum over the past 12 months and contains:

- an analysis of national and state trends in AP computer science participation by gender and race, including the relationship with policies;
- a policy summary for each of the nine policies displaying a map of the states that have enacted the policy, including highlighted states and related resources;

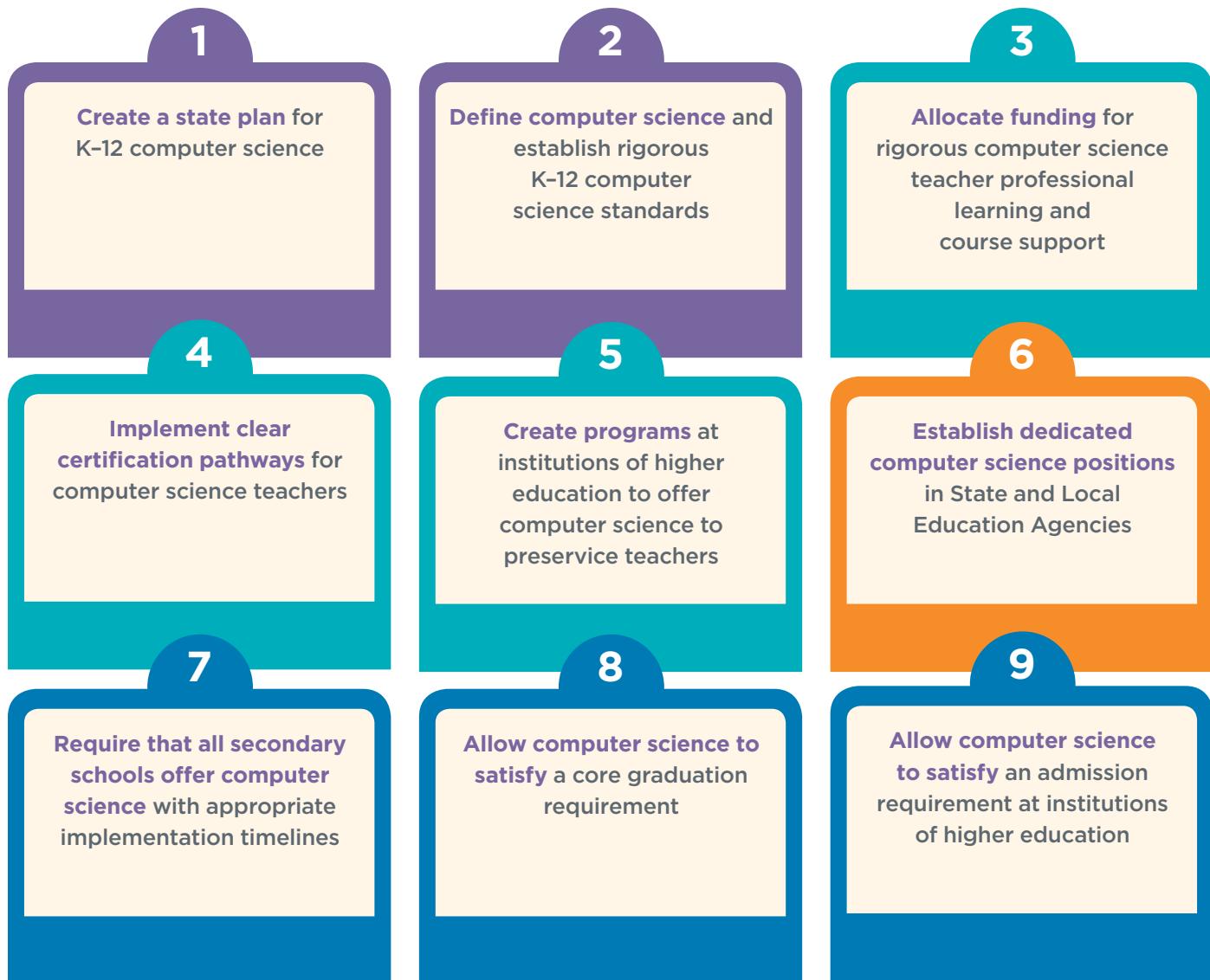
- state-specific summaries including updates on each state's progress toward meeting the nine policies and data on university graduates, school offerings, and participation; and
- updated data collected for the *K-12 Computer Science Access Report* about high schools that teach computer science from 39 states.



These nine recommendations are intended build and sustain a comprehensive state policy framework to broaden the teaching and learning of computer

science. They support a vision built on five principles: **Equity and Diversity, Clarity, Capacity, Leadership, and Sustainability.**

Nine Policies to Make Computer Science Fundamental



Policy Principles

Clarity Capacity Leadership Sustainability Equity and Diversity*

*Equity and Diversity is incorporated in each of the nine policies.

Equity and Diversity

All nine policies should promote access to and equity within rigorous and engaging computer science courses.

Prioritizing equity and diversity requires policymakers to focus attention on underserved populations and under-resourced schools. Data clearly shows that underrepresented minority students and rural students are less likely to have access to high-quality computer science content. If unaddressed, we will continue to exclude entire populations from this fast-growing field and miss out on the innovations and contributions that diversity promotes.

Clarity

A lack of clarity around what computer science is and how to achieve goals around expanding computer science education have hampered implementation and delayed policy adoption in states. Clarity of goals, including a state plan and an agreed-upon definition of computer science and learning expectations, are critical components of implementation.

State Plan for K-12 Computer Science Education

In most states, computer science is a new subject. In order to make computer science a fundamental part of the education system, states will need to create roadmaps to address a number of policy and implementation issues. The plan should articulate the goals for computer science, strategies for accomplishing the goals, and timelines for carrying out the strategies. Equitable access to K-12 computer science must be at the foundation of a state's plan.

K-12 Computer Science Standards

High-quality standards create foundational expectations for *all* students, rather than just those interested in advanced study, and prepare students for success in a variety of postsecondary, college, and career options. States should develop discrete standards for computer science education guided by the concepts, practices, and recommendations in the *K-12 Computer Science Framework*. The *CSTA K-12 Computer Science Standards* are an example of standards that have been informed by the *K-12 Computer Science Framework*.



Teacher Leadership in Advocacy Efforts

Over the past two years, the New Jersey CSTA chapters (CSTANJ.org), with support from Code.org and state universities, successfully advocated for computer science policy that has helped the state make huge leaps forward. During the 2018–2019 legislative session, two computer science bills that CSTANJ helped draft were signed into law: one requiring computer science to be taught in all high schools, and another creating a computer science teaching endorsement. Governor Murphy announced the state's CSforAll initiative which has included \$2 million for computer science education in each of the last two budgets and the creation of a Computer Science Advisory Board which is tasked with developing a State K-12 Computer Science Action Plan. The NJ Department of Education formed a committee to revise the current computer science standards. Additionally, a fourth CSTA chapter will soon join CSTANJ in supporting teachers across the state as they implement CSforAll.

These accomplishments were only possible because of the foundation laid by CSTANJ members over the past few years. The computer science advocacy movement in NJ began in 2012–2013 when the first two CSTA chapters were formed. From these chapters, we formed a CSTANJ steering committee which created a common vision that all students in NJ should have the opportunity to study computer science. We also developed four lofty goals to help achieve that vision. We communicated that vision with the CSTANJ members and any other stakeholders who would listen, including legislators, the NJ Department of Education, and Governor Murphy's team. It is hard for us to believe, but seven years later, the state has not just met, but exceeded the lofty goals established by CSTANJ members.

— Daryl Detrick

CSTANJ Advocacy Representative

Capacity

Schools' capacity for offering computer science courses is directly related to the availability of teachers prepared to teach the subject. Capacity for offering computer science in schools often constitutes having an adequate number of teachers prepared to teach computer science. Building capacity to offer computer science requires state funding, clear certification pathways, and preservice teacher preparation at institutions of higher education.

State-Level Funding for K-12 Computer Science Professional Learning

There is not enough school district funding for professional learning for teachers. States should provide resources to prepare inservice teachers

from diverse backgrounds to teach K-12 computer science. Funding priority should be given to districts that demonstrate an effort to engage underrepresented groups. This will increase school capacity to offer computer science by preparing inservice teachers to begin teaching the subject.

State Computer Science Teacher Certification

The expansion of K-12 computer science education offerings is hampered by the lack of certified computer science teachers, which disproportionately affects underrepresented minority students. Creating clear, navigable, and rewarding professional learning paths tied to computer science content knowledge can help to increase the number of computer science teachers and increase equitable access to the subject.



State-Approved Preservice Teacher Preparation at Institutions of Higher Education

The computer science teacher shortage should be addressed by exposing more preservice teachers to computer science during their required coursework and by creating specific pathways for computer science teachers. Preservice mathematics, science, or broader technology teachers could become computer science teachers in many states if they were exposed to relatively minimal computer science coursework within teacher preparation programs. To address equity, states should fund partnership opportunities between local school districts and schools of education to create direct pathways for teachers into high-need school districts.

Leadership

Implementation of policy reforms is bolstered by leadership at the state level to oversee statewide initiatives.

State-Level Computer Science Supervisor

In order to ensure rapid scaling of quality computer science, states must support and share best practices with school districts. Creating a statewide computer science leadership position within the state education agency signals to schools that computer science is an important core offering needed at all levels of education. This position would implement and monitor the process of increasing the diversity of students taking computer science through equitable access.

Sustainability

Making computer science a fundamental part of the K-12 education system requires sustainability of computer science initiatives. Key policies that promote and maintain momentum for computer science include requirements to offer computer science and allowing computer science to satisfy high school graduation and higher education admissions requirements.

A Requirement for All High Schools to Offer Computer Science

Most high schools do not offer computer science courses because states or local school districts have not prioritized this discipline. Underrepresented minority students are less likely to attend a school that offers computer science. Given the important role computer science plays in our economy and the world around us, ensuring that all students have access to computer science in K-12 is critical. This should start early by embedding computer science in the K-5 curriculum, which could inspire students to elect to take computer science courses in middle and high school. At the high school level, states should adopt policies that require schools to offer at least one computer science course that is based on rigorous standards and accessible to all students.

Computer Science Can Satisfy a Core High School Graduation Requirement

Currently, the majority of states have clear, publicly accessible policies allowing rigorous computer science courses to satisfy existing core high school graduation requirements. But a few states still do not include computer science as a core course for graduation. Computer science should be recognized as a distinct computer science credit that can satisfy a graduation requirement in a core subject such as mathematics or science or, increasingly, in computer science. States that count computer science towards a core graduation requirement see 19% more enrollment in their AP Computer

Science courses⁶ and increased participation from underrepresented minority students.⁷

Computer Science Can Satisfy a Core Admission Requirement at Institutions of Higher Education

Admission policies for most colleges and universities do not allow rigorous computer science courses to meet the mathematics or science entrance requirements, which discourages students from taking such courses in secondary education—even if they count towards a high school graduation requirement. Aligning these policies would incentivize students to explore computer science earlier, which is an important step to increasing diversity in the field.

Based on five key principles, these nine policy ideas are intended as a menu of choices for states to ensure that computer science is a central part of K-12 education. Not all states will be in a position to adopt every policy and many will require years of careful implementation. States should consider local context, including relevant k-12 data when deciding which policies to pursue and adopt. Some of these policy ideas may require resources such as funding or time. States should adopt the policies for which they are best positioned and work to ensure that computer science is at the core of their education systems. Read more about these policies at bit.ly/makecsfundamental.



⁶ <https://medium.com/@codeorg/does-making-cs-count-make-a-difference-7ab5ca6b8407>

⁷ <http://blog.code.org/post/121123281798/md>

Community Agreement on the Nine Policy Ideas

In spring 2019, SageFox Consulting (project evaluators) surveyed members of the Expanding Computing Education Pathways (ECEP) Alliance. State leaders were invited to reflect on the nine policy areas in an effort to understand the accuracy and value of the definitions to individual states and the ECEP Alliance as a whole. Overall, the 21 state teams that responded found the definitions to be accurate.

“The rubrics for the nine policy ideas have been very helpful because they force us to really think about and discuss what we’ve done (or not done) and not just check boxes!”

— Rosabel Deloge

New Hampshire ECEP Team

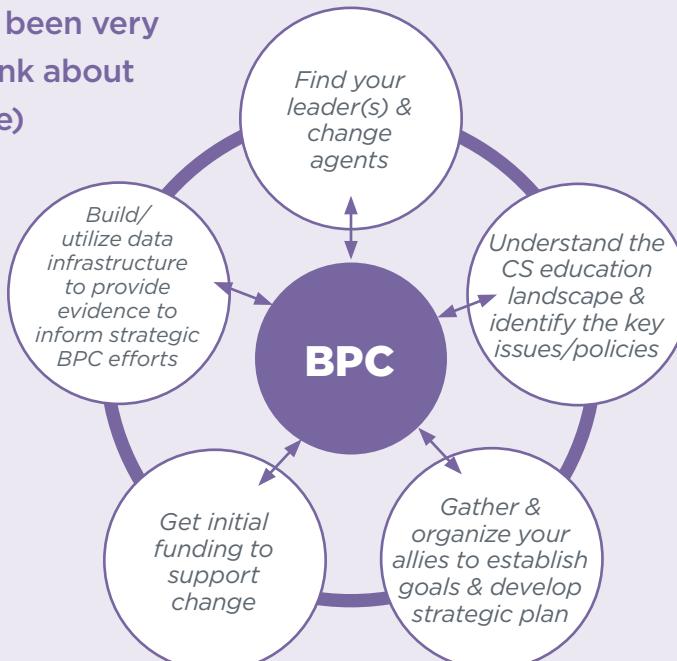
The agreement on policy areas may be a reflection of the national movement and investment in computer science education over the last decade. For example, the *K-12 Computer Science Framework* was developed collaboratively by stakeholders from states, districts, and the computer science education community and quickly gained political support across the nation. Many states adopted (or adapted) standards based on the framework, such as the CSTA Standards, and now 34 states have K-12 computer science standards, up from 6 in 2017.

Establishing policies is an important step in making computer science education fundamental to the K-12 education system. Policies must be designed and implemented with broadening participation in computing and equity at the forefront. ECEP works with state teams to use a five-stage model of change to help design and implement policy. Teams find leaders to champion the effort; understand the current landscape including the gaps and opportunities; organize stakeholders (ecepalliance.org/resources/stakeholders-involved-bpc) including those from other national organizations such as Code.org, CSTA, and the CSforALL Consortium; seek sustainable funding; and create state-level infrastructure with data to monitor change and ensure equitable implementation.

“I’ve always been reluctant to be involved in governmental policy work. The complexities of it seemed rather daunting. The ECEP team and their resources have made this more understandable, and this year I made a statement at a bill hearing in my state for the first time. Baby steps, but it’s at least something!”

— Lauren Bricker

Washington ECEP Team



**Broadening Participation in Computing (BPC)
Model of Change**



The Relationship Between Policy and Gender and Racial Diversity

The principle of equity and diversity is at the core of the nine policy ideas promoted by the Code.org Advocacy Coalition and states continue to find ways to weave these principles into their policies.

In the past year, several states have adopted policies that include a specific focus on equity. For example:

- Several states' standards include equity-related concepts from the *K-12 Computer Science Framework* and some states, like California, include equity guidance in the introduction to their standards.
- Arizona funds professional learning that prioritizes rural schools and schools with a majority of the student population eligible for free and reduced-price lunches. Grant applicants in Missouri must address how they will include and support students from historically underrepresented groups.
- Georgia requires all high schools to offer computer science and requires annual reporting on the number and demographics of students in computer science courses. Several states require all elementary, middle, and high schools to teach computer science, ensuring that all students have the opportunity to learn the subject—subsequently reducing the effect of negative stereotypes students develop about “who” belongs in computer science.⁸

This section reports on the participation of female and underrepresented minority (URM) students in Advanced Placement computer science (AP CS) over the past five years, nationally and by state. To explore the relationship between policy adoption and participation rates, we examine the nine policies together and we dive into three of the nine policies in greater detail: K-12 standards, funding professional learning, and requiring all high schools to teach computer science.

States that adopt more policies around computer science education see better representation of female students in AP computer science, yet there is more work to do to achieve parity.

Methodology

This section analyzes the College Board's AP computer science exam data over the last five years, up to 2018—the most recent year available. The exam numbers reported include both AP Computer Science A (2014 to 2018) and AP Computer Science Principles (2017 and 2018). Race/ethnicity categories from the College Board that we define as URM are Hispanic or Latino, American Indian or Alaska Native, Black or African American, and Native Hawaiian or Other Pacific Islander (the College Board updated these categories in 2016; for 2014 and 2015 data, Native Hawaiian or Other Pacific Islander demographic information is not available).

Because each state defines computer science differently, and many do not track demographic and enrollment data, AP exam data provides the most consistent measurement across states and allows for an accurate comparison over time. The long-term goal of the *K-12 Computer Science Access Report* is to collect demographic data from all computer science courses across every state (see this year's data in the *K-12 Computer Science Access Report* section of this report). To achieve this goal, it is important that states build internal capacity to track and disseminate data, specifically on course demographics and enrollment.

⁸ Master, A., & Meltzoff, A. N. (2017). Building bridges between psychological science and education: Cultural stereotypes, STEM, and equity. *Prospects-UNESCO*, 46, 215-234.

It is important to note that it takes many years for policies to influence participation rates in classrooms. Many policy changes around computer science education have taken place in the past three or four years, with full implementation of some policies still a few years away. Individual state participation data from the spring 2019 AP computer science exams will be available late fall 2019. This additional year of data will help to further examine the relationship between policy adoption and student participation rates.

Relationships and trends reported in this section are statistically significant correlations; none of the analyses attempt to infer causation.

See bit.ly/stateofcsapdata for all of the data used in this section.

Texas Data

Reporting and reviewing participation among underrepresented groups is key to improving diversity in computer science courses. According to the Texas Advanced Computing Center at The University of Texas at Austin:

- 57,826 students enrolled in high school computer science courses in the 2017-2018 school year, an 11% increase compared to the prior year.
- The following demographic groups increased participation in the 2017-2018 school year:
 - Economically disadvantaged students (+12%)
 - Female students (+9%)
 - Underrepresented minority students (+13%)
- Additionally, the number of certified computer science teachers increased 300% since the 2014-2015 school year.

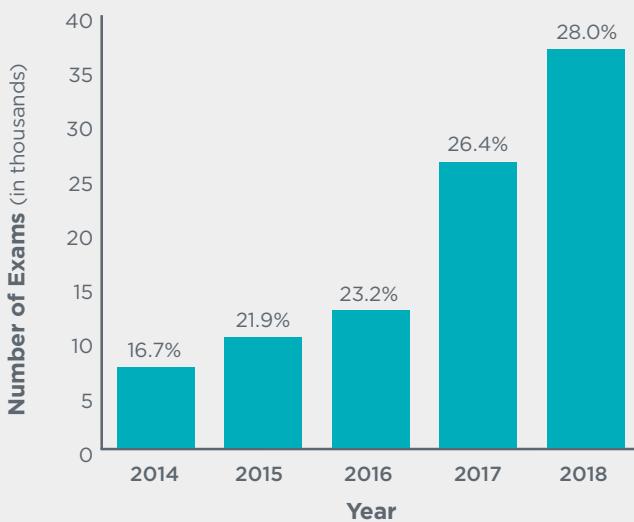


National and State Trends

Over the past several years, the number of students taking AP computer science exams has skyrocketed. In 2018, AP computer science was taught in 5,400 schools and U.S. students took 130,904 AP computer science exams, up from 4,440 schools and 99,868 students in 2017. The number of female students and URM students taking AP computer science exams has increased every year since 2014, with a significant increase in participation after the 2017 launch of AP Computer Science Principles.⁹

The percentage of female and underrepresented minority students who took an AP computer science exam also increased each year. Female students increased from 17% of exam takers in 2014 to 28% in 2018, and URM students increased from 13% of exam takers to 22%. The graphs below show the raw number and percent of exams taken by female and URM students nationwide.

Number and Percent of AP CS Exams Taken By Female Students Nationwide



Number and Percent of AP CS Exams Taken By URM Students Nationwide



Preliminary data from the 2019 AP computer science exams (which includes international students), shows that female students accounted for 29.3% of exams (up from 28.0% in 2018), and URM students for 21.9% (up from 21.1% in 2018). U.S.-only data for 2019 will be available in late 2019.

Furthermore, almost all states plus D.C. reflect the same positive trend in both female and URM student exam participation. Only three states show negative or neutral trends—Oklahoma, Vermont, and Wyoming. This is likely due to very few students taking AP computer science exams in those states overall. For example, no students in Wyoming took an AP Computer Science exam in 2015, only three students in 2016, six in 2017, and 38 in 2018.

Generally, over the last five years, there is increased participation and representation in AP computer science among female students and underrepresented minority students.

⁹ See a comprehensive analysis of AP CS data at <https://cs4all.home.blog/>

AP CS Exams Taken by Female Students By State



*No AP CS exams were taken in Wyoming in 2014.

█ 2014 █ 2018

AP CS Exams Taken by URM Students By State



*No AP CS exams were taken in Wyoming in 2014.

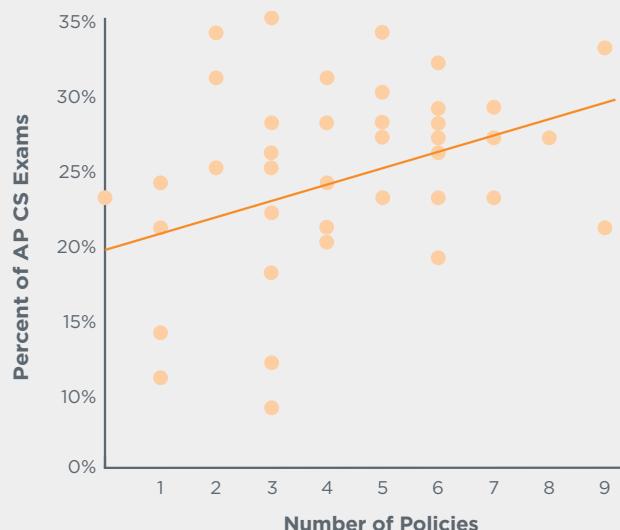
█ 2014 █ 2018

Relationship Between Policy and Student Representation

The nine policies promoted by the Code.org Advocacy Coalition were designed to complement one another and work together to change the education system to increase and broaden participation in computer science. The complexity of the K-12 education system and state policy in general means that it is impossible to isolate the effect of a single policy. However, when taken together, the nine policies correlate with a higher number and a greater percentage of female students taking AP computer science. Results from a multiple linear regression showed a significant positive relationship between the number of policies per state and the percentage of exams taken by female students ($p < 0.01$, $r^2 = 0.134$).

The percentage of exams taken by URM students was compared to the percentage of URM students in each corresponding state's school population. The number of policies a state has adopted shows no correlation, positive or negative, with the representation of URM students taking AP computer science exams relative to the state demographics.

Number of Policies and Female Students' AP CS Representation



Number of Policies and URM Students' AP CS Representation

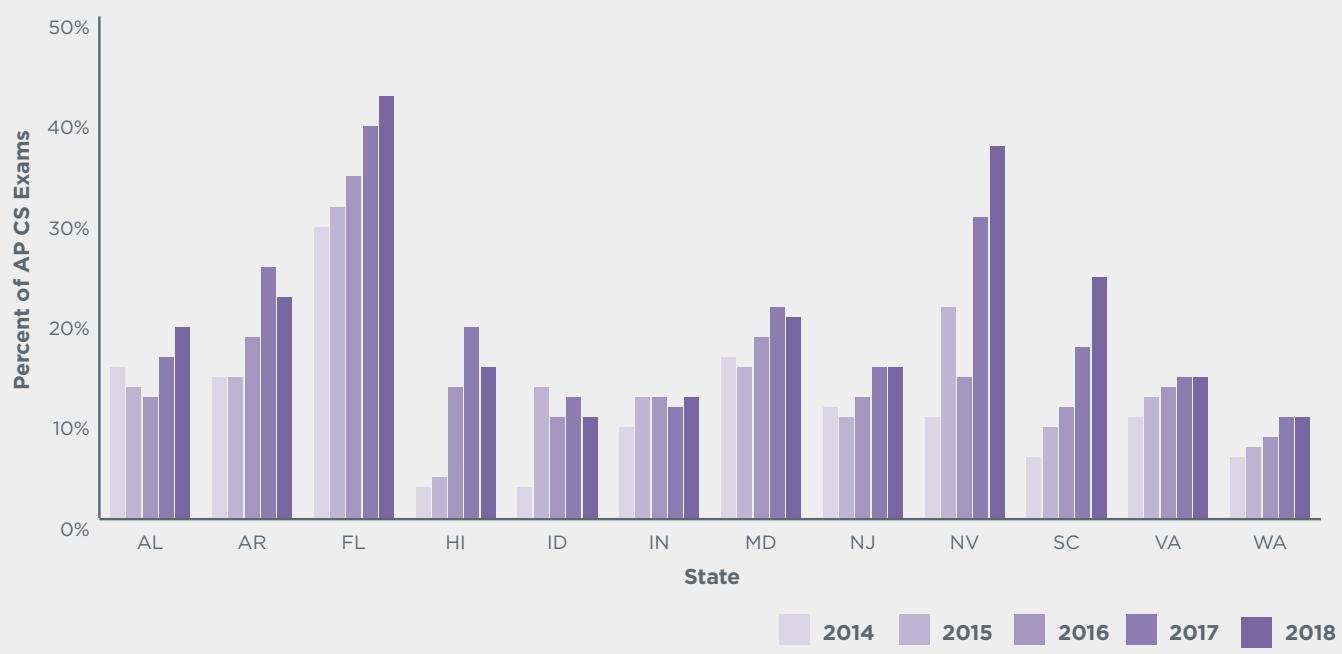


Not all policies are expected to have the same effect on student participation in computer science. The Code.org Advocacy Coalition has prioritized three policies: K-12 computer science standards, funding for professional learning, and requiring all high schools to teach computer science. The 12 states that have adopted all three of these policies are highlighted in the graphs below.

Female Student Participation in AP CS in States With Standards, Funding, and All HS Teach



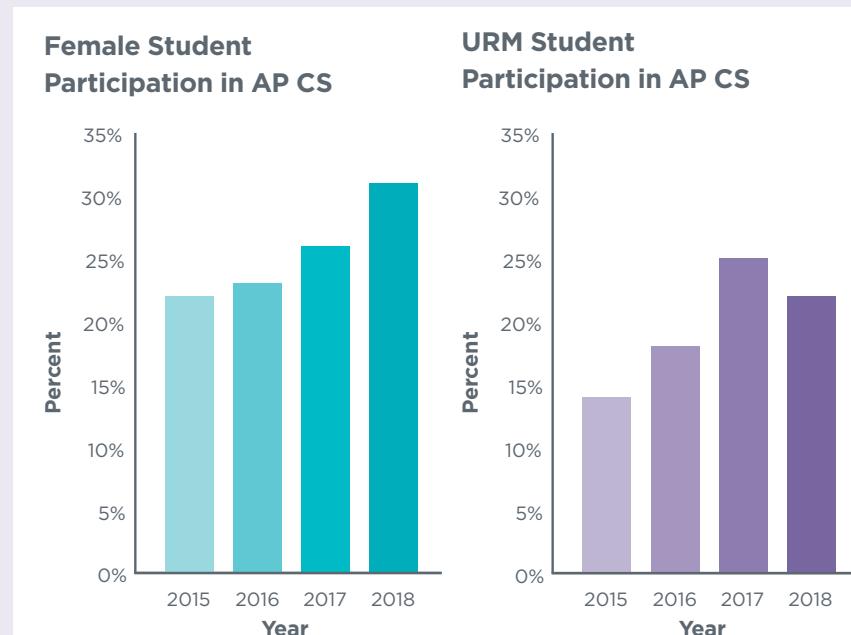
URM Student Participation in AP CS in States With Standards, Funding, and All HS Teach



AP CS Participation in Arkansas Before and After Policy Adoption

In one state, it is possible to compare the participation of students in AP computer science before and after all three policies were in place. Arkansas adopted standards, provided funding, and required all high schools to offer computer science prior to the 2016–2017 school year.

The graphs compare the representation of female students and URM students two years prior to the enactment of the policies in 2016 to subsequent years (although the other two policies were in place summer 2015, Arkansas did not adopt K-12 standards until 2016). Overall, in addition to increased numbers of students taking AP computer science, the representation of female and URM students also increased.



Conclusion and Recommendations

In order to increase diversity in computer science, every policy initiative should consider the implications for female and underrepresented minority students.

The growth of female and URM student participation and representation in AP computer science is promising. The policies advanced by state policymakers and advocates over the past few years are correlated with greater participation and better representation by female students. Yet even the states that have made the greatest strides are a long way from gender or racial parity. Advocates for computer science education must ensure that policy initiatives are centered on principles of equity and diversity and states must revisit policies often to ensure that they lead to equitable and diverse outcomes.

The following recommendations describe how to address equity within each of the nine policies.

State Plan for K-12 Computer Science Education

- The state plan should include specific goals related to measuring and improving participation rates of underrepresented groups.
- State planning committee members should represent diverse stakeholder communities, including underrepresented groups.
- The rollout of the state plan should prioritize high-need schools and schools with high populations of students from underrepresented groups.

K-12 Computer Science Standards

- Standards should provide examples of ways to broaden participation in computer science and include guidance on equity, inclusion, and diversity.

State-Level Funding for K-12 Computer Science Professional Learning

- Funding should prioritize schools and districts with large underrepresented student populations, and applications should include initiatives that serve these students.

State Computer Science Teacher Certification

- Certification pathways should include multiple clear pathways to support a diverse teacher population, such as micro-credentials, professional learning, subject matter exams, and academic coursework.

State-Approved Preservice Teacher Preparation at Institutions of Higher Education

- Preservice programs should incentivize recruitment of diverse candidates or require all preservice teachers to learn computer science concepts.

State-Level Computer Science Supervisor

- State supervisor responsibilities should include monitoring computer science efforts for equitable implementation.

A Requirement for All High Schools to Offer Computer Science

- The requirement should encourage schools to recruit underrepresented groups or close the access gap by requiring consistent reporting of enrollment data by specific demographics.
- The requirement should be extended to elementary and middle schools.

A Requirement for All High Schools to Offer Computer Science

- Computer science should satisfy core graduation credits in all high school diploma pathways.

Computer Science Can Satisfy a Core Admission Requirement at Institutions of Higher Education

- Admission requirements for higher education should align with high school graduation requirements in the state.



Policy Trends and National Momentum

Since the *2018 State of Computer Science Education* report, 33 states have adopted a total of 57 policies to support computer science education. This chapter discusses trends related to the nine state policies and describes momentum by state governors and the federal government. For more information about state legislation to promote computer science, refer to bit.ly/modelcslegislation.

Policy Trends

In the last 12 months, **33 states have adopted a total of 57 policies to support computer science education.**

Sweeping Changes Through Action on Multiple Policies

Fourteen states have enacted two or more policies since September 2018, including Alabama, Connecticut, Indiana, and Missouri.

- **Alabama.** HB 216 (2019) set a timeline by which every middle and high school would be required to offer at least one computer science course and elementary schools would offer instruction in the basics of computer science and computational thinking. The bill also established a task force to develop a state plan, called for the development of certification pathways for teachers, and explicitly aligned high school graduation and higher education admission requirements.
- **Connecticut.** SB 957 (2019) added computer science to the program of instruction in public schools (expanding upon the previous inclusion of computer programming), required all teacher

preparation programs to include instruction in computer science, called for the development of an alternate route to certification for computer science teachers, and required the development of a computer science endorsement.

The Connecticut ECEP Team

Building on years of coordinated efforts, 2019 brought a wave of policy movement for the state of Connecticut. The Department of Education solicited stakeholder involvement to develop a shared definition of computer science to drive future state conversations. A subsequent state landscape report highlighted the gaps and opportunities in K-12 computer science, and the CT CSTA chapter hosted a statewide computer science summit partially funded by an ECEP grant. These efforts were led by a core team of dedicated volunteers who, equipped with data from the landscape report, met with local and state government representatives and testified in support of SB 957, moving computer science forward in the state.

— Laura Stefon
Chief of Staff and Legislative Liaison
Connecticut State Department of Education



- **Indiana.** A concerted effort by state leaders led to the development of a state plan, changes in certification, the alignment of existing K-8 computer science standards to high school standards to create a comprehensive K-12 progression, and an appropriation of \$3 million per year for FY 2020 and FY 2021.

CSforIN

Indiana's momentum can be attributed to the hard work of a broad team, including leaders from the Indiana Department of Education, Indiana University Bloomington, Purdue University, Nextech, Project Lead the Way, Indiana's CSTA chapter, and the Code.org Advocacy Coalition. This large team collaborated together under the CSforIN movement with Governor Holcomb's office and key industry partners (e.g., Salesforce, Infosys) to strategically implement K-12 computer science education throughout the state of Indiana. Early initiatives of CSforIN have included 1) development of the IN computer science education landscape report, 2) organizing multiple summits of stakeholders, 3) holding a series of strategic meetings to launch and support CSforIN, 4) hiring a program manager for CSforIN to manage a website and communications, and 5) identifying areas in which to focus broadening participation efforts.

— Anne Leftwich and Maureen Biggers

ECEP State Leaders
Indiana University Bloomington

- **Missouri.** As part of a special legislative session called by the governor, Missouri passed HB 3 in October 2018 calling for the development of K-12 standards and a computer science teacher endorsement. The bill also allowed for computer science to count towards a mathematics, science, or practical arts graduation requirement and created a Computer Science Education Fund for the purpose of professional development. In 2019, HB 2 allocated \$450,000 to the fund.



State Plans Developed by a Variety of Stakeholders

Since the last report, the number of states with statewide plans has increased from 6 to 13.

Whether led by the state education agency such as in Georgia, a state education center such as the Idaho STEM Action Center, or a governor-appointed task force such as in Alabama (currently under development), these state plans involve multiple stakeholders and typically address the areas described in the *State Planning Toolkit*: diversity, professional learning, certification, standards, outreach, and funding. The toolkit includes resources, considerations and recommendations, and a table for listing goals and strategies. Learn more about the *State Planning Toolkit* at bit.ly/statetoolkit.

Developing K-12 Computer Science Standards Informed by Nationally Recognized Resources

Since the last report, the number of states that have K-12 computer science standards has increased from 22 to 34, with an additional 5 states actively developing standards. Like last year, standards development continues to see the largest growth of the nine policies.

Most states have developed their own state-specific K-12 computer science standards informed by the *K-12 Computer Science Framework* and the *CSTA K-12 Standards*. State-specific adaptations include emphasizing aspects of the standards to reflect the local economic priorities or implementation scenarios. Joining Maryland and Virginia's emphases on cybersecurity, North Dakota adopted the nation's first Computer Science and Cybersecurity Standards, embedding cybersecurity knowledge and skills across all grades and strands in the standards.

Of the 12 states that have adopted standards since the last report, the majority use a mix of grade-level standards and grade bands, such as K, 1, 2, 3, 4, 5 at the elementary school level and grade bands at the middle and high school levels. A few states,

primarily those that adopted the grade-banded *CSTA K-12 Standards*, use grade bands such as K-2, 3-5, 6-8, and 9-12.

Equitably Funding K-12 Computer Science Professional Learning

Since the last report, the number of states funding K-12 computer science professional learning has increased from 19 to 26.

Between fiscal years 2016 to 2021, states have allocated a total of over \$123M towards computer science professional development. One trend for FY 2020, as demonstrated by Florida's investment of \$10M and Mississippi's investment of \$300K, is an emphasis on funding professional development not only to build teachers' capacity to teach courses, but also for the purpose of earning a formal computer science teacher certification.

Rather than a one-time investment, most states fund computer science over multiple years. For example, Pennsylvania recently followed up their initial investment in PAsmart with an expansion of the program in FY 2020. Alabama, Indiana, and Utah have significantly increased their funding from FY 2019 to FY 2020.





As in previous years, states continue to prioritize the equitable distribution of funding. For example, Arizona amended their computer science professional development program to prioritize rural schools and schools with at least 60% of the students eligible for free and reduced-price lunches. Entities interested in receiving a grant from Missouri's Computer Science Education fund must address how they will "reach and support historically underrepresented students in computer science" (HB 3, special session 2018).

States are also using funding to incentivize and reward teachers. A portion of Florida's state funding will be used to provide annual bonuses for teachers certified in computer science. In Alabama, computer science may be added to the list of eligible areas identified in the state's Math and Science Teacher Education Loan Repayment Program, subject to appropriations from the legislature. Arkansas gives stipends to teachers who add the computer science endorsement onto their license, enroll at least ten students in a computer science course (for high school teachers), and/or attend professional development and become a K-8 Computer Science

Lead Teacher at their school (for K-8 teachers). An enrollment contest in the 2018-2019 school year provided monetary awards and recognition to Arkansas schools with the largest computer science course enrollment. The state also announced a new Computer Science Educator of the Year Award in 2019, recognizing and providing stipends to five finalists and one awardee.

Increasing the Number of Pathways to Certification

Since the last report, the number of states with a teacher certification in computer science has increased from 33 (plus D.C.) to 37 (plus D.C.).

Although this change only reflects four states that did not previously have a computer science teacher certification, several states with existing certifications have made modifications or increased the number of pathways to certification. Rhode Island, Arizona, and Virginia have amended state certification rules to allow micro-credentials (job-embedded and competency-based assessments of teachers' knowledge and skills) to count towards certification requirements as an



alternative to subject-matter exams or academic coursework. Arizona also allows coursework or training from accredited institutions and other programs approved by the local education agency to count towards certification requirements.

These trends are consistent with Code.org's recommendations for teacher pathways. Learn more at bit.ly/csteacherpathway. Learn more about micro-credentials at advocacy.code.org/micro-credentials.pdf.

Requiring All Preservice Teachers to Learn Computer Science

Since the last report, the number of states supporting preservice teacher preparation in computer science has increased from 13 to 19.

States can support preservice teacher preparation in several different ways. Many of the 19 states approve programs that prepare undergraduates to teach computer science and list the programs on the state department website. For example, Pennsylvania recently published guidelines for the approval of

preservice education programs in computer science. A few states have taken a different approach, adding computer science to the knowledge and skills that all preservice teachers must learn, regardless of certification or area of concentration: Nevada requires all teacher candidates in the Nevada System of Higher Education to receive appropriate education and training in computer science, and Connecticut requires all teacher preparation programs to include instruction in computer science that is grade-level and subject-area appropriate. Arkansas added computer science knowledge and skills to the standards of teaching for all elementary school teachers, providing further support for the state's initiative to integrate computer science into elementary education.

Preservice computer science education has a long way to go. In 2017, only 100 computer science teachers graduated from preservice teacher preparation programs; by comparison, 10,639 teachers were prepared in mathematics and 11,661 teachers were prepared in science the same year.¹⁰

¹⁰ Title II National Teacher Preparation Data for academic year 2016–2017, retrieved from title2.ed.gov

“Nevada has adopted all nine model state policies for expanding computer science education, which means the real work has just begun. Our state, through government, industry and education partnerships, is positioned to broaden computer science education to all of our communities. Implementation of these policies is the critical component to ensuring that all of our students are college, career, and community ready for this digital age.”



—Jhone Ebert
Nevada Superintendent of Public Instruction

Dedicating Multiple State-Level Computer Science Positions

Since the last report, the number of states with computer science supervisors has increased from 14 to 21.

The creation of positions dedicated to computer science continues to reflect states' commitments to implementing policy initiatives. For example, the Oklahoma State Department of Education previously employed a Mathematics and Computer Science Coordinator. This position has now been split into a dedicated Computer Science position and a Mathematics position which will continue to support the integration of computer science into mathematics. In addition, states are now creating multiple positions focused on different areas of computer science education. Maryland has state-level positions that include an Executive Director and Director of Research at the Maryland Center for Computing Education, and a Career Programs Specialist and a K-12 Computer

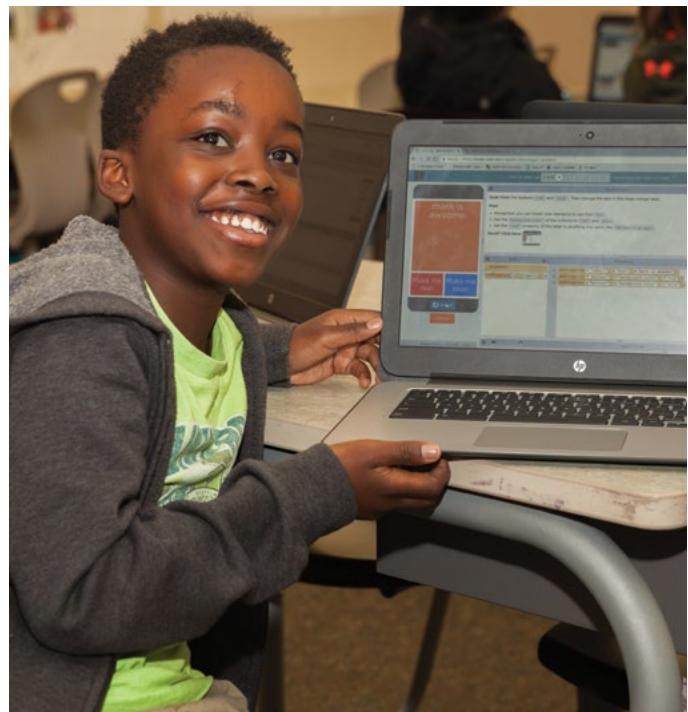
Science Education Specialist at the Maryland State Department of Education. The latter position is responsible for improving coordination across the institutions working on computer science initiatives.

The number of local or regional positions dedicated to computer science continues to increase, following a trend established last year with the development of local computer science education supervisors across a state. For example, Arkansas has expanded the number of computer science specialists at Education Service Cooperatives.

State computer science supervisors do not yet have a national association or formal gatherings like other subject supervisors. However, these supervisors followed up on their first gathering in 2018 by meeting for a second national workshop in June 2019.

Requiring All Schools to Teach Computer Science, Including Elementary, Middle, and High Schools

Since the last report, the number of states requiring all high schools to offer computer science has increased from 15 to 19.



Following last year's trend, states continue to require elementary and middle schools, in addition to all high schools, to offer computer science. This year, Connecticut joined New Hampshire and Wyoming in adding computer science to the state's list of subjects required to be taught by all public schools. Similarly, all schools in Virginia are required to teach computer science by virtue of the addition of computer science to the state's Standards of Learning.

This year, more states are taking an incremental approach to requiring all high schools to offer computer science. For example, Georgia is phasing in the requirement over a period of six years with three benchmarks: at least one high school per district must teach it in the 2022–2023 school year, 50 percent of high schools in each district in 2023–2024, and finally all high schools in 2024–2025. All

elementary and middle schools in Georgia must offer instruction in exploratory computer science beginning in the 2022–2023 school year.

The target school year for full implementation is coming up for many states that were early adopters of this policy. An appropriate timeline, funding, and coordinated teacher professional learning are all necessary to support schools and districts as they implement these requirements. District planning workshops, such as the CSforALL SCRIPT workshops (csforall.org/script), have been held across the nation to support school districts in visioning, self-assessment, and goal-setting to implement K-12 computer science. Data on the percentage of high schools teaching computer science in each state can be found in the *K-12 Computer Science Access* section of this report.



Expanding How Computer Science Can Satisfy Existing Graduation Requirements and Implementing Graduation Requirements in Computer Science

Since the last report, the number of states allowing computer science to satisfy a core high school graduation requirement has increased from 38 (plus D.C.) to 47 (plus D.C.).

In addition to new states adopting this policy, many states with existing policies have reduced restrictions. For example, Washington passed legislation in 2018 (SB 6136) removing the restrictions on when computer science could be counted as a mathematics credit. Previously, a student had to be concurrently enrolled in or have successfully completed Algebra II, effectively limiting the policy to students who took Algebra I in middle school. Similarly, Florida had previously restricted the policy to students who earned an industry certification. After the passage of HB 7101 in 2019, students in Florida only have to pass a computer science course for that course to count towards a mathematics or science credit.

This policy change is bolstered by the evidence of a corresponding increase in diversity and enrollment in computer science courses. The year following a policy change to allow computer science to satisfy a core graduation requirement, the average number of AP computer science exams per school increases by 10%, exams taken by female students increases by 24%, and exams taken by underrepresented minority students increases by 26%. And computer science participation is 19% higher in states that allow it to count, 48% higher among female students, and 64% higher among underrepresented minority students.¹¹

The 2018 report noted that Nevada and South Carolina were the only two states to have computer science graduation requirements; both states had revised existing graduation requirements in technology to focus on computer science. Nevada and South Carolina continue to fund and coordinate statewide professional learning to retrain general technology or computer literacy teachers in computer science. The first year of full implementation in South Carolina is the 2019–2020 school year; schools will no longer be able to receive waivers from the state and each graduating student must have taken an approved computer science course. In the 2018–2019 school year, 69% of high schools in South Carolina taught computer science, up from 43% in the 2017–2018 school year. The 26% increase was the largest improvement of any state.

Aligning High School Graduation and Higher Education Admission Policies

Since the last report, the number of states allowing computer science to count as a core admission requirement for higher education, rather than an elective, has increased from 17 to 18.

Alabama is the latest state to enact this policy by aligning high school graduation requirements with higher education admissions requirements. In many states, computer science may count towards a core high school graduation requirement such as mathematics or science, but not towards higher education admission for the same subject. This misalignment detracts from the purpose of allowing computer science to count as a core high school graduation credit because many student schedules are directed by higher education admission requirements.

¹¹ <https://medium.com/@codeorg/does-making-cs-count-make-a-difference-7ab5ca6b8407>

Only the Beginning: Idaho Adopts All Nine Policies

Idaho has been a national leader in expanding computer science education and in 2018 became the second state to adopt all nine policies thanks to a partnership of key stakeholders, including the Idaho STEM Action Center, Former Governor Otter, and Idaho Digital Learning Academy. In addition to this strong start, Idaho continues to expand access to high-quality computer science courses in every school; securing ongoing funding to support educators and students will be their next challenge.

National Momentum

Governors' Partnership for K-12 Computer Science

The Governors' Partnership for K-12 Computer Science is a group of bipartisan state leaders committed to advancing policy and funding to expand access to, and increase equity in, K-12 computer science education. As part of the partnership, governors commit to working towards ensuring all high schools offer computer science, funding professional learning opportunities for teachers, and developing a set of high-quality academic K-12 computer science standards.

“Providing all Rhode Island students with computer science education is essential for our economic development and ensures that our students have the skills necessary to compete for high wage, high demand careers.”

— Governor Gina Raimondo (D-RI)
Member of the Governors' Partnership for K-12 Computer Science



The Governors' Partnership for K-12 Computer Science has 17 members, including 9 Republicans and 8 Democrats. Since the last report, Governor Murphy (D-NJ), Governor Parson (R-MO), and Governor Herbert (R-UT) have joined the partnership. Governors who are members of the partnership are noted in their respective state's summary in this report. More information about the partnership can be found at governorsforcs.org.

Federal Policy

There has been significant policy movement at the federal level in the past year, at both the U.S. Department of Education and Congress.

The U.S. Department of Education (ED) has made meaningful moves to support funding for K-12 computer science, building on years of work and momentum by the computer science community, goals set by the Obama Administration for focused K-12 computer science funding, and the Trump Administration's pledge for \$200 million for STEM and computer science.

In 2018, ED offered competitive grants to help the education community fund their work, and these opportunities gave an advantage to applicants who addressed computer science in their proposals. In 2019, changes to the Carl D. Perkins Career and Technical Education Act expanded opportunities as well; the Perkins Innovation and Modernization Grant Program offered funds to improve and modernize career and technical education programs (including computer science) to better prepare high school students for success in the workforce.

In February 2019, ED made a major move to support expanding access to computer science when they called for the Education Innovation and Research program to exclusively prioritize funding for computer science. This marked the first time computer science had an exclusive funding priority in any major grant program at ED. These grants can

jumpstart opportunities for schools to expand computer science offerings and level the playing field for students across the country.

“Computer science literacy is important for individuals to thrive in this digital age. Providing our young people with opportunities to develop these skills will better prepare them for 21st century jobs.”

—Congressman Chuck Fleischmann (R-TN)



On top of the support at ED over the last year, members of Congress continued to advocate for computer science education. From the Computer Science for All Act to the bipartisan Building Blocks of STEM Act and Preparing Teachers for K-12 Computer Science Education Act, the House and Senate introduced many bills in the 116th Congress that would expand opportunities to teach, learn, and invest in computer science education. There was also an effort to win investments in computer science from the Department of Defense via the JROTC Cyber Training Act, which would enhance the preparation of the approximately 500,000 students in the Junior Reserve Officers' Training Corps for careers in computer science and cyber-security. Although these ideas—and others—may be difficult to pass due to competing priorities

in Congress, the Computer Science Education Coalition continues to press lawmakers for \$250 million in targeted funding for computer science education.

Despite this progress, the work is far from over. The computer science education community will continue to pursue changes to federal policies to increase access for all students. At the top of the community's priorities is addressing diversity in STEM fields and subjects, changes to education laws that would support the growth of the computer science teaching workforce, and support for research on the teaching, learning, and assessment of computer science education.

“When it comes to being prepared for the 21st-century economy, our young people, especially girls and young people of color, need Congress to invest in their futures. We must invest in our young people NOW, before it’s too late. I am proud to lead my colleagues in introducing the Computer Science for All Act to help ensure that all students learn the computer science skills necessary for the tech jobs of today and tomorrow.”

—Congresswoman Barbara Lee (D-CA)







The State of Computer Science Policy

This section presents the most reliable data currently available on the nine model state policies developed by the Code.org Advocacy Coalition (advocacy.code.org) for expanding computer science education. For more information regarding the policies, please refer to *Nine Policy Ideas to Make Computer Science Fundamental to K-12 Education* (bit.ly/makecsfundamental).

Each policy summary includes:

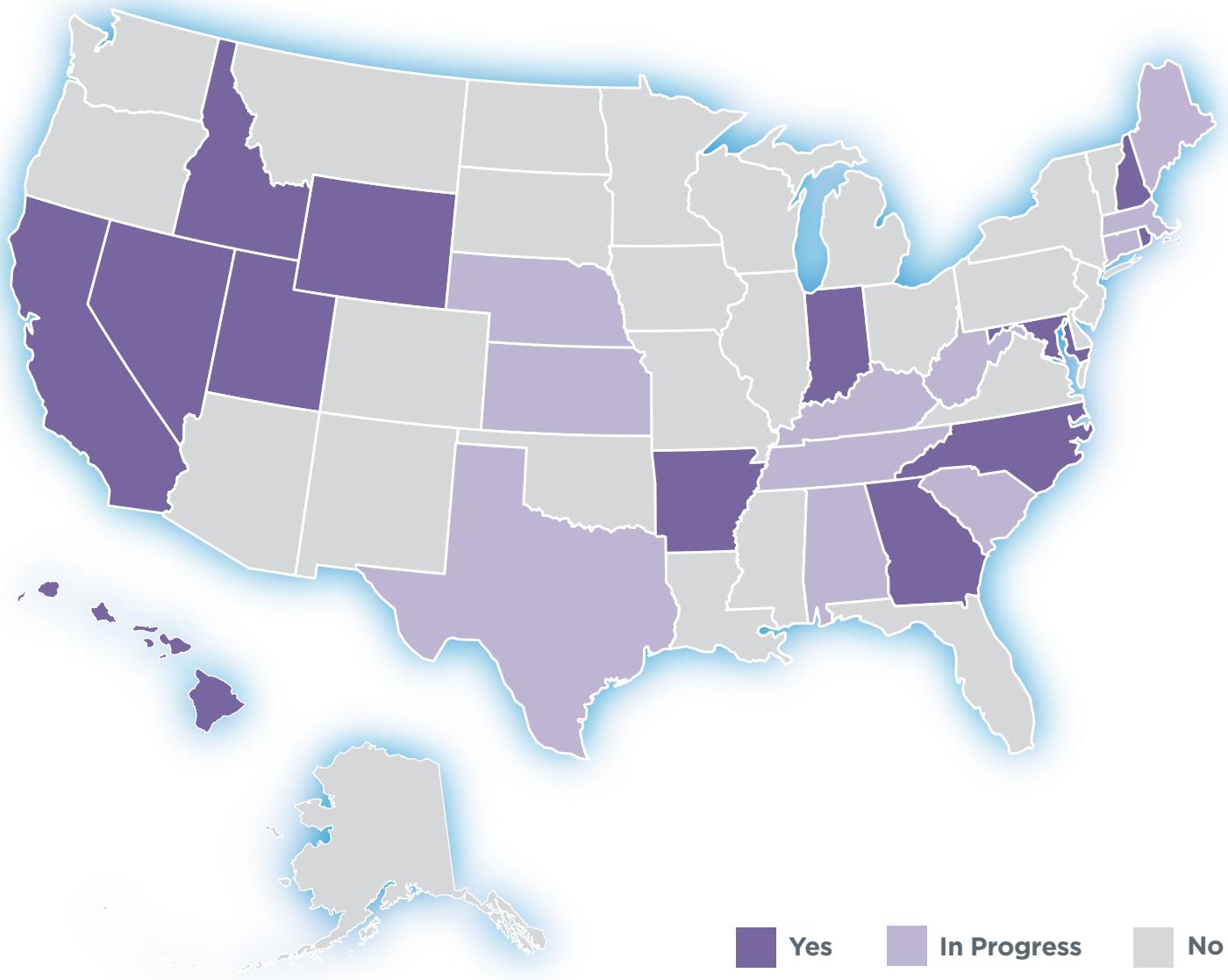
- a list of states that have met the policy and the total number of states,
- a map designating the status of states in enacting a policy,
- a rubric describing the criteria necessary to meet the policy,
- a highlight describing one or more state actions related to the policy, and
- one or two related resources to assist a state in developing the policy.

Although a “No” indicates that a state has not met all of the criteria in a rubric, in some cases, a state may have met some of the criteria. Where possible, states that are in progress of meeting a policy are noted as such.

For the most up-to-date policy status and additional information, please refer to advocacy.code.org and bit.ly/9policies.

1

State Plan for K-12 Computer Science Education



2
States

2017

6
States

2018

13
States

2019

Rubric

A state is considered to have a plan for K-12 computer science education if the plan meets all four of the following criteria:

- developed by a state education agency,
- specific to computer science education,
- includes a timeline, goals, and strategies for achieving the goals, and
- the plan is publicly accessible.

States

The following states have state plans (states in bold have adopted the policy since the 2018 report):

- Arkansas
- **California**
- **Georgia**
- Hawaii
- **Idaho**
- **Indiana**
- Maryland
- **Nevada**
- New Hampshire
- North Carolina
- Rhode Island
- **Utah**
- Wyoming

Highlights

The California Computer Science Strategic Implementation Plan was adopted in May 2019 by the California State Board of Education. The stated goal is for all schools to offer rigorous and relevant computer science education equitably and sustainably throughout grades K-12 and that all teachers are adequately prepared to teach computer science aligned with the state's standards. The plan's sections are: Equity and Access, Supporting Educators to Teach Computer Science, and Expanding Computer Science Course Offerings. Each section includes a description of activities, immediate actions and those pending funding, and guidance for schools, districts, county offices of education, community and business partners, and other entities to consider as they work to improve computer science education. Following the recommendations in the plan, California appropriated \$1 million over four years for a state computer science coordinator and \$37.1 million to the Educator Workforce Investment Grant Program, which includes, among other priorities, grants for computer science professional learning.

Related Resources

State Computer Science Planning Toolkit

This toolkit helps state and local education agencies establish plans to address the key policy and implementation issues reflected in this report.

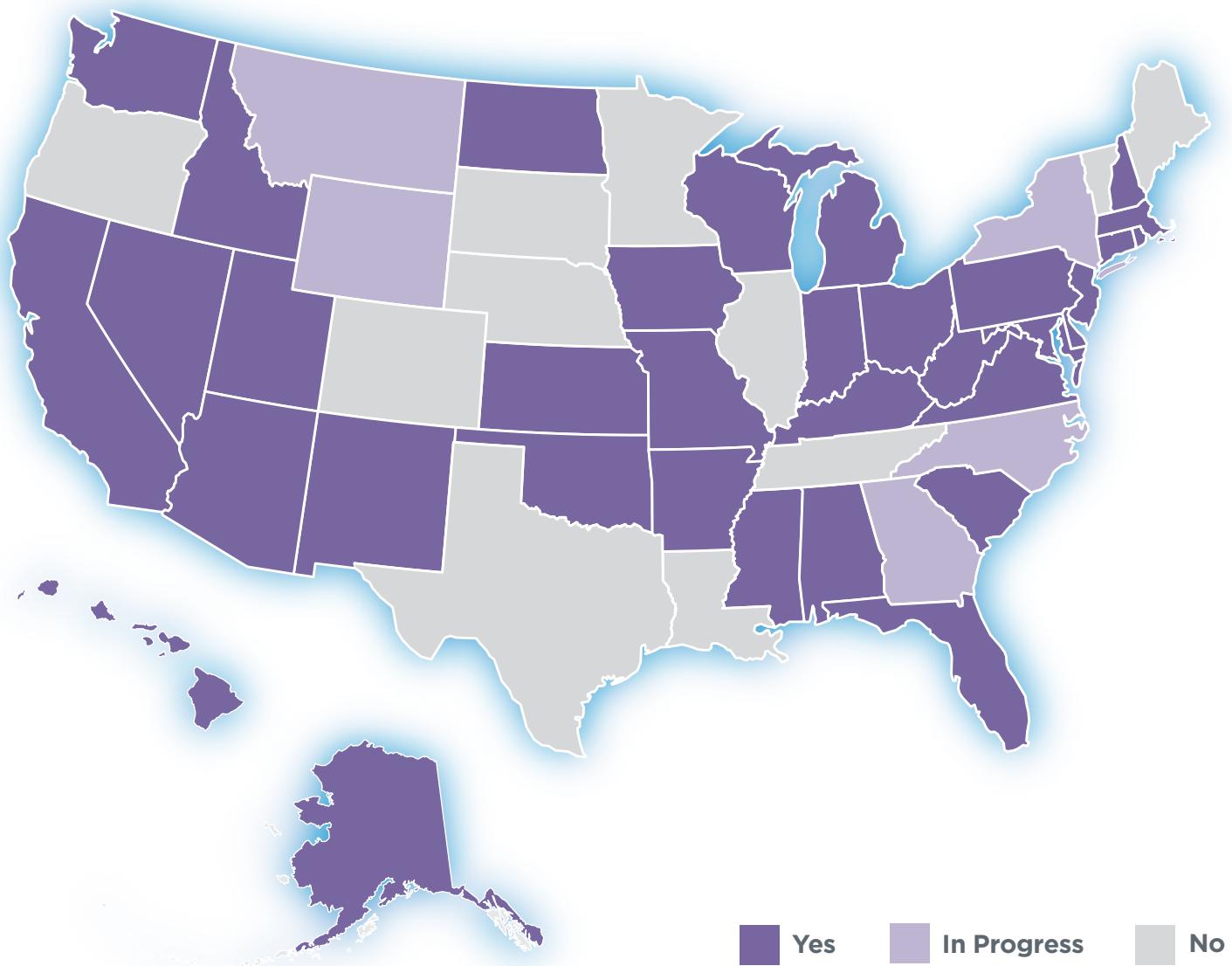
bit.ly/statetoolkit

State Summit Toolkit

This toolkit, created through a partnership by the Expanding Computing Education Pathways (ECEP) Alliance and the National Center for Women & Information Technology (NCWIT), helps organizers of state advocacy efforts plan state computer science summits, meetings, and strategic planning sessions.

ncwit.org/organize

K-12 Computer Science Standards



6
States

2017

22
States

2018

34
States

2019

Rubric

A state is considered to have K-12 computer science standards if the standards meet both of the following criteria:

- form a coherent progression that aligns elementary, middle, and high school expectations, and
- are publicly accessible on the state's website.

States

The following states have K-12 computer science standards (states in bold have adopted the policy since the 2018 report):

- Alabama
- Alaska
- **Arizona**
- Arkansas
- California
- Connecticut
- Delaware
- Florida
- Hawaii
- Idaho
- **Indiana**
- Iowa
- Kansas
- Kentucky
- Maryland
- Massachusetts
- **Michigan**
- Mississippi
- **Missouri**
- Nevada
- New Hampshire
- New Jersey
- **New Mexico**
- North Dakota
- **Ohio**
- Oklahoma
- Pennsylvania
- Rhode Island
- South Carolina
- Utah
- Virginia
- Washington
- West Virginia
- Wisconsin

Highlights

In December 2018, the Ohio State Board of Education approved K-12 computer science standards based on the *K-12 Computer Science Framework* and *2017 CSTA K-12 Standards*. The Ohio standards consist of expectations for individual grades K, 1, 2, 3, 4, 5, 6, 7, 8, and for the 9-12 grade band. The 9-12 standards include foundational and advanced level expectations. Ohio's *Computer Science Model Curriculum* provides in-depth guidance for implementing the state standards. It describes learning progressions and elaborates on the key concepts and practices associated with each standard. The model curriculum is not a complete curriculum nor is it mandatory; it is intended to help educators in planning and developing their local curricula. The Department of Education is now working with teams of Ohio computer science educators to develop instructional examples, tools, and resources that align to the state standards. Once released, the supports will be regularly reviewed and updated.

Related Resources

K-12 Computer Science Framework

The Framework provides high-level guidance describing the essential computer science concepts and practices for all students.

k12cs.org

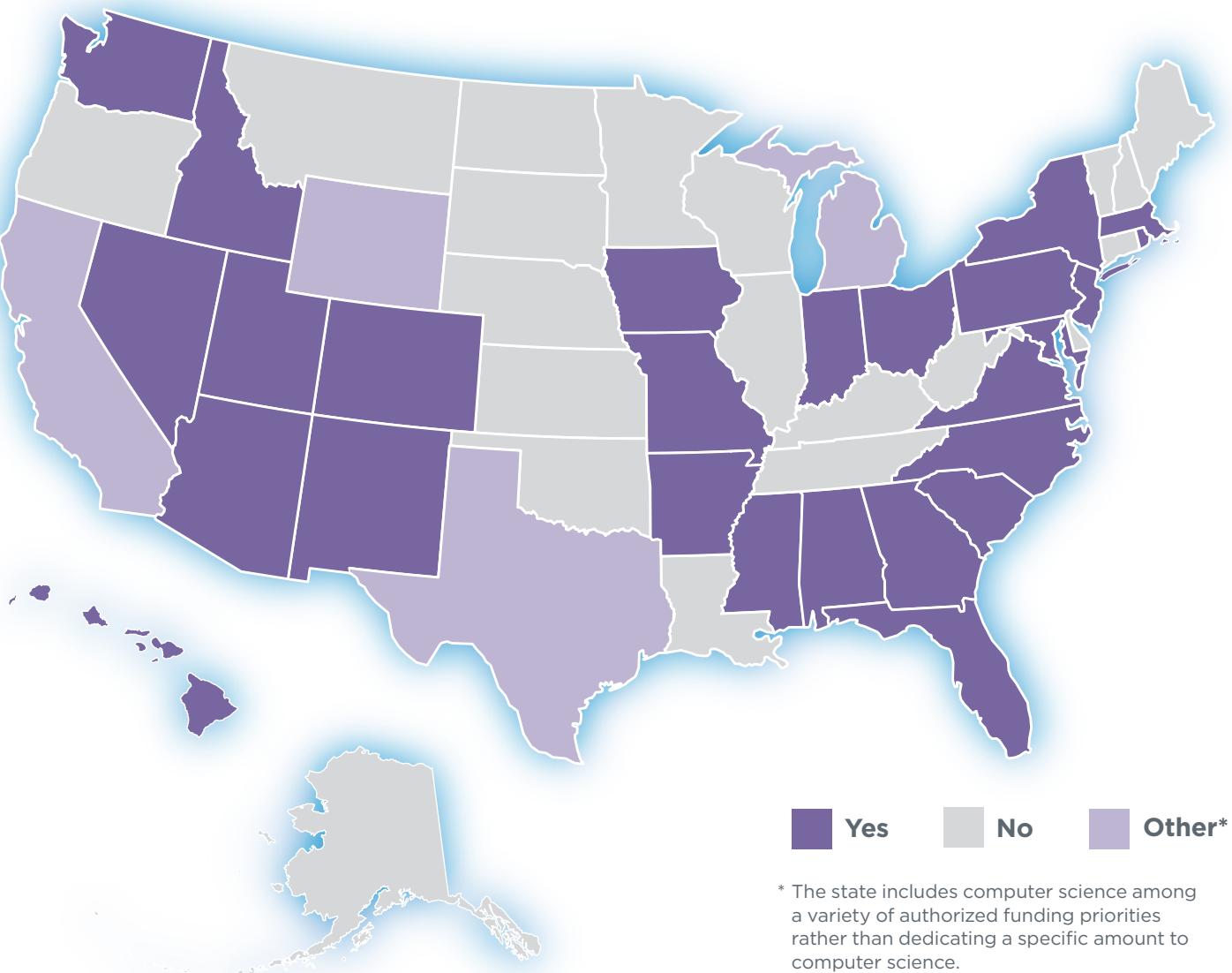
2017 CSTA K-12 Computer Science Standards

The CSTA Standards delineate a core set of learning objectives designed to provide the foundation for a complete computer science curriculum. The *K-12 Computer Science Framework* was a primary input for the CSTA Standards.

csteachers.org/standards

3

State-Level Funding for K-12 Computer Science Professional Learning



9
States

2017

19
States

2018

26
States

2019

Rubric

A state is considered to have dedicated state-level funding to K-12 computer science professional learning if the funding meets all three of the following criteria:

- the funds are allocated via the approved state budget or state legislation,
- a description of the funds is publicly accessible, and

States

The following states have dedicated funding to K-12 computer science professional learning (states in bold have adopted the policy since the 2018 report):

- Alabama
- Arizona
- Arkansas
- Colorado
- **Florida**
- Georgia
- Hawaii
- Idaho
- **Indiana**
- Iowa
- Maryland
- Massachusetts
- **Mississippi**
- **Missouri**
- Nevada
- New Jersey
- **New Mexico**
- New York
- North Carolina
- **Ohio**
- Pennsylvania
- Rhode Island
- **South Carolina**
- Utah
- Virginia
- Washington

Highlights

Florida allocated \$10 million for FY 2020 to train, recruit, and retain computer science teachers. In addition to funding professional development, it will be used to prepare teachers for computer science certification and to provide bonuses for teachers certified in computer science. Pennsylvania allocated \$20M for STEM and computer science education in FY 2019. The department created two programs: Advancing Grants for the expansion of existing large-scale programs, and Targeted Grants for schools or districts with little to no computer science. The Targeted Grant applications were designed to be easily completed, making them accessible to schools without a grant writer, and recipients received targeted support. Arkansas has continued to allocate \$2.5 million for computer science initiatives every year since FY 2016. Together, these are some of the largest single and multi-year investments in computer science in the country.

Revisiting the priorities for grant programs ensures the equitable distribution of funding. HB 2303 (2019) in Arizona amended the computer science professional development program to prioritize rural schools and schools with at least 60% of the students eligible for free and reduced-price lunches. SB 313 (2019) in Nevada includes a funding provision targeting counties with less than 100,000 residents to provide incentives for teachers earning a degree or other credential in computer science.

Related Resources

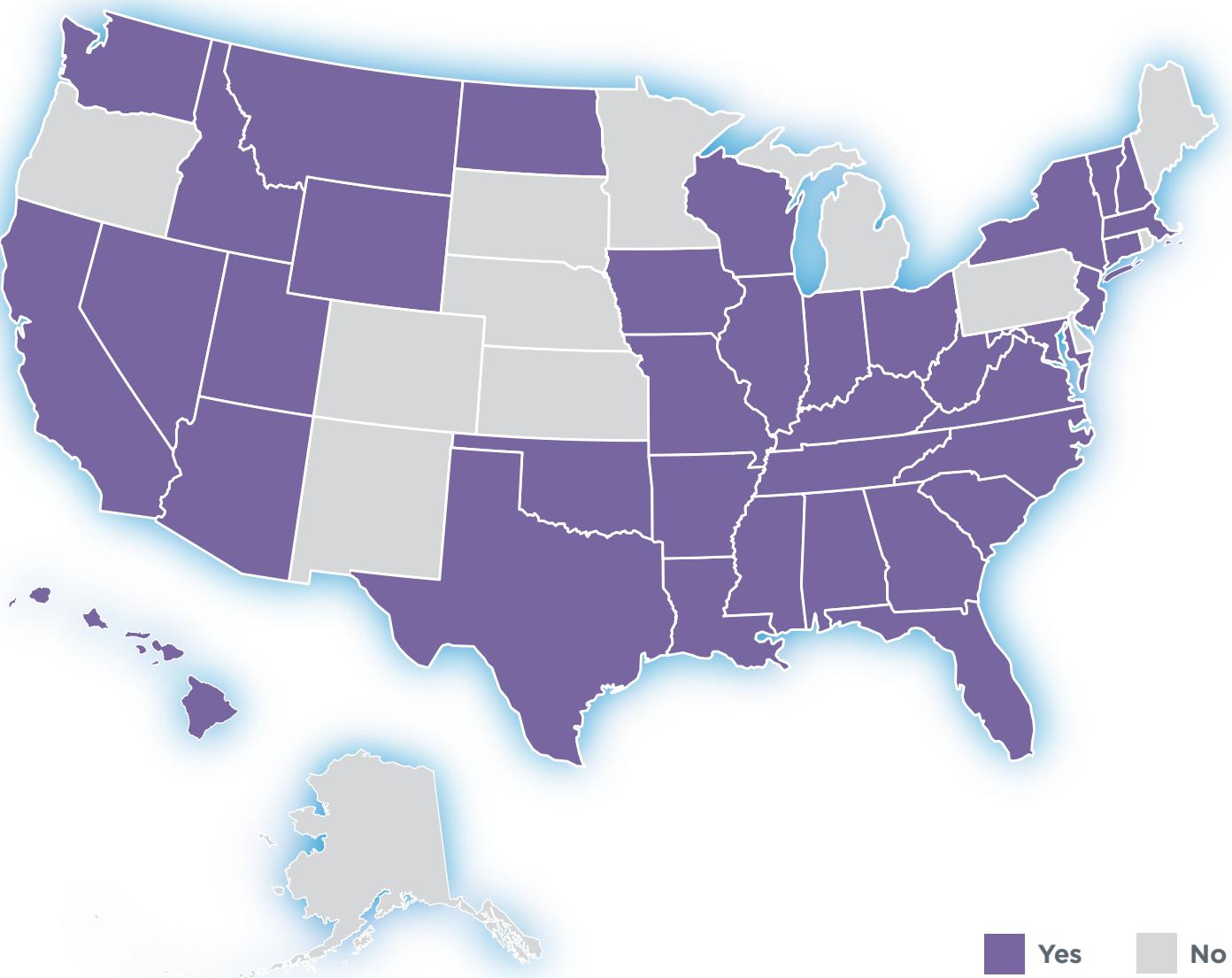
Models for Funding Professional Learning

This document describes key elements of legislative initiatives to fund computer science and provides detailed guidance for state authorities implementing grant programs.

bit.ly/modelsforfundings

4

State Computer Science Teacher Certification



27
States

2017

33
States

2018

38
States

2019

Rubric

A state is considered to have computer science teacher certification if the certification (or endorsement, licensure, or authorization) meets both of the following criteria:

- explicitly names “computer science” or has a related name (e.g., computer programming), and
- enables a teacher to teach computer science courses.

States

The following states have computer science certification (states in bold have adopted the policy since the 2018 report):

- **Alabama**
- Arizona
- Arkansas
- California
- **Connecticut**
- District of Columbia
- Florida
- Georgia
- **Hawaii**
- Idaho
- Illinois
- **Indiana**
- Iowa
- Kentucky
- Louisiana
- Maryland
- Massachusetts
- Mississippi
- **Missouri**
- Montana
- Nevada
- New Hampshire
- New Jersey
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- South Carolina
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

Since 2018, Michigan phased out the computer science endorsement requirements and now authorizes all teachers to teach computer science.

Highlights

In May 2019, the Arizona State Board of Education approved new preK-8 and 6-12 endorsements that require nine and twelve semester hours respectively, and cover topics such as inclusive pedagogy.

The previous endorsement spanned preK to grade 12 and required 30 semester hours in computer science, proving a burden to many teachers. The requirements can be met through an accredited institution or now through a program approved by the local education agency. The new endorsements allow fifteen clock hours of professional learning, or an analogous micro-credential, to substitute for one semester hour of college coursework.

Arkansas has a unique approach to certification. Any teacher with a grade-appropriate license can obtain an approval code to teach computer science through a variety of qualifications, including a combination of years teaching computer science and completion of approved professional development. The approval code is a temporary measure that helps schools meet short-term needs by providing teachers with options for demonstrating their competency, as well as monitoring teachers in order to help them meet traditional certification requirements later.

Related Resources

Teacher Pathways Recommendations

This document provides recommendations and examples for computer science teacher preparation and certification.

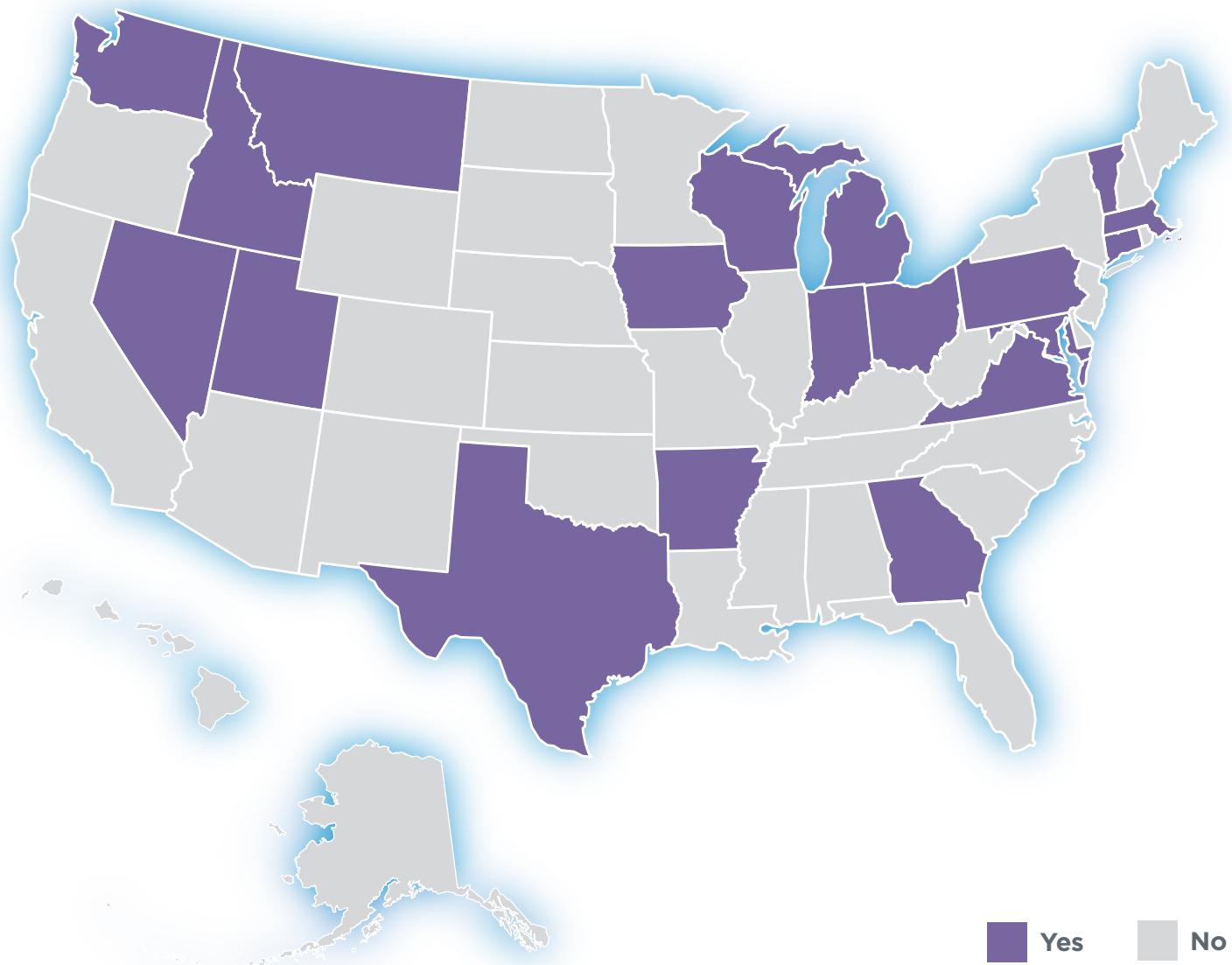
bit.ly/csteacherpathway

Micro-credentials in Computer Science

This paper describes micro-credentials, illustrates a model for how they might be used for certification, gives examples of state initiatives, and provides recommendations.

advocacy.code.org/micro-credentials.pdf

State-Approved Preservice Teacher Preparation at Institutions of Higher Education



12
States

2017

13
States

2018

19
States

2019

Rubric

A state is considered to have approved preservice teacher preparation in computer science at institutions of higher education if any of the following criteria are met:

- the state requires all preservice teachers (from any subject) be exposed to computer science content and/or pedagogy within a teacher's preparation program,
- the state provides scholarships for preservice teachers to take computer science,
- the state provides funds to teacher preparation institutions to establish preservice computer science education programs, and/or
- the state approves programs at institutions of higher education that prepare preservice teachers to teach computer science and lists those programs publicly.

Note that each of the above criteria involves a state-led effort; individual programs led by universities are not sufficient to meet this state policy.

States

The following states have state-approved preservice teacher preparation at institutions of higher education (states in bold have adopted the policy since the 2018 report):

- Arkansas
- **Connecticut**
- **Georgia**
- Idaho
- Indiana
- **Iowa**
- Maryland
- **Massachusetts**
- Michigan
- Montana
- **Nevada**
- Ohio
- **Pennsylvania**
- Texas
- Utah
- Vermont
- Virginia
- Washington
- Wisconsin

Highlights

With the passage of SB 313 (2019), Nevada now requires all teacher candidates in the Nevada System of Higher Education to receive appropriate education and training in computer science. The bill also allows the Board of Regents to apply for funds from the Account for Computer Education and Technology to develop the curriculum and standards for computer science teaching. Similarly, SB 957 (2019) in Connecticut requires all teacher preparation programs to include instruction in computer science that is grade-level and subject-area appropriate.

By requiring that preservice teachers across all subject areas and grade levels receive exposure to computer science, states like Nevada and Connecticut ensure that teachers have the knowledge and skills to integrate computer science into their classroom practice.

Related Resources

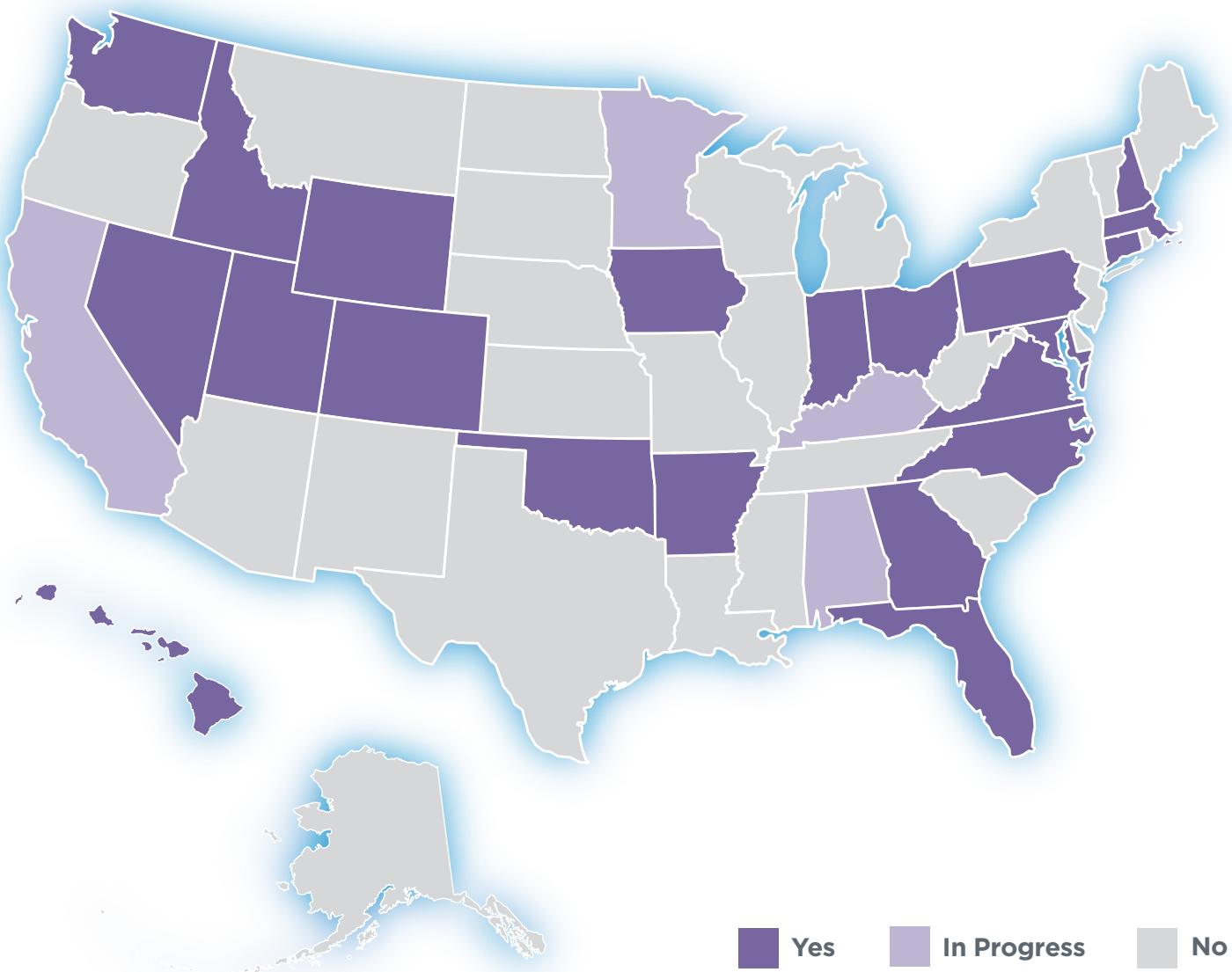
Priming the Computer Science Teacher Pump

This report offers a set of recommendations that schools of education, together with other departments and school districts, can take to develop computer science education within their teacher education programs.

computingteacher.org

6

State-Level Computer Science Supervisor



8
States

2017

14
States

2018

21
States

2019

Rubric

A state is considered to have a state-level computer science supervisor if the position meets all three of the following criteria:

- located in a state agency,
- with a title reflecting a focus on K-12 computer science, and
- is clearly able to develop state policy and/or regulations and create programs around computer science.

States

The following states have a state-level computer science supervisor (states in bold have adopted the policy since the 2018 report):

- Arkansas
- Colorado
- Connecticut
- Florida
- Georgia
- Hawaii
- Idaho
- Indiana
- **Iowa**
- Maryland
- Massachusetts
- Nevada
- New Hampshire
- **North Carolina**
- **Ohio**
- **Oklahoma**
- **Pennsylvania**
- **Utah**
- Virginia
- Washington
- **Wyoming**

Highlights

Maryland has multiple state-level positions dedicated to computer science. The Maryland Center for Computing Education (MCCE) based at the University System of Maryland employs an executive director and director of research. The responsibilities of the MCCE include implementation of the state plan, management of state grant funds, and development of preservice programs. The Maryland State Department of Education employs two computer science specialists: a career programs specialist with oversight of STEM and computer science pathways, and a specialist responsible for computer science resources and courses for students not participating in career and technical education pathways. The latter position collaborates with the MCCE, provides technical assistance to educators, collects data on computer science programs, pursues funding opportunities, and collaborates with other content specialists to integrate computer science across other content areas.

Multiple state-level positions dedicated to computer science allow for a focused and coordinated effort across state entities that are responsible for different aspects of a state's computer science initiative.

Related Resources

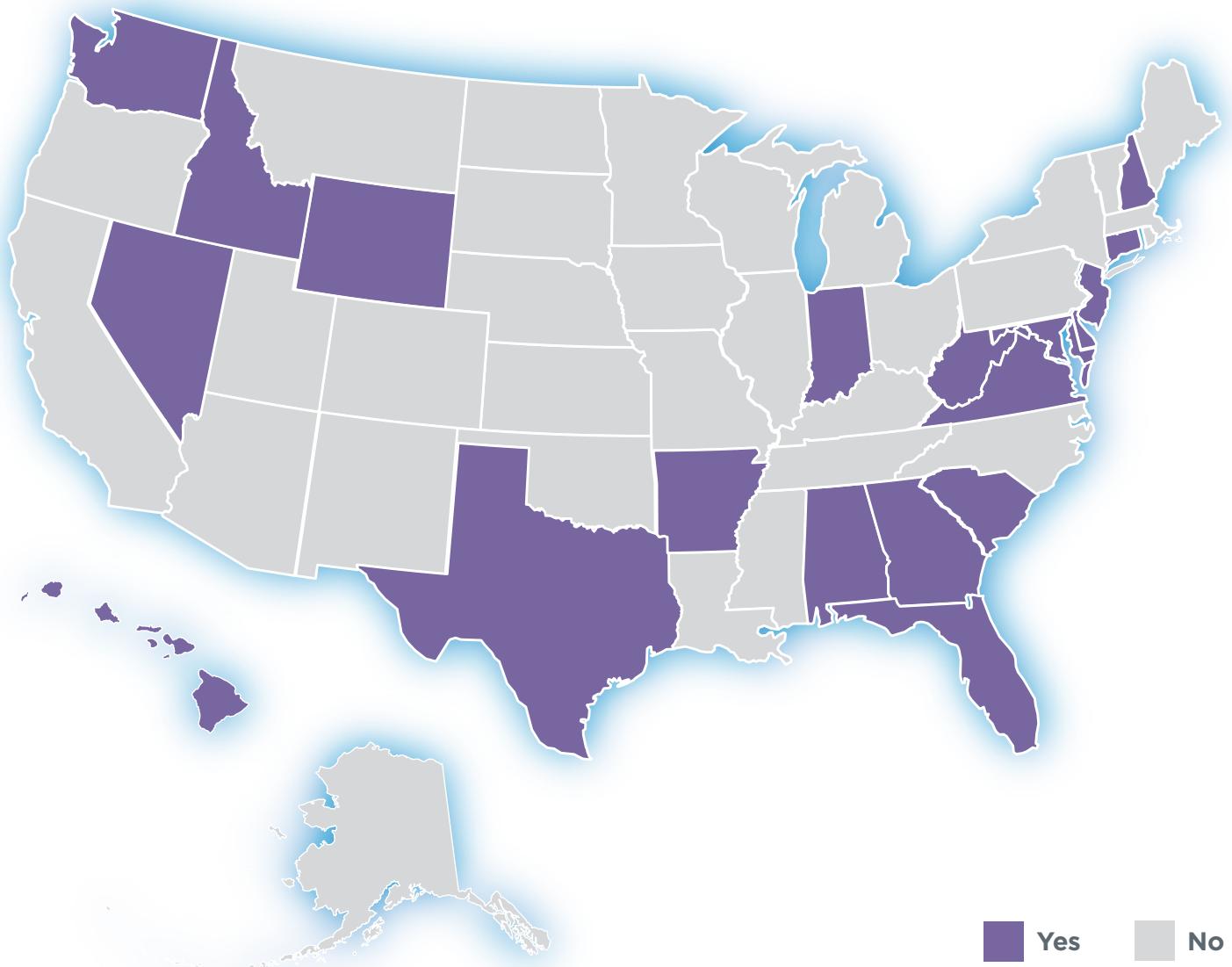
Model Computer Science State Supervisor Job Description

This resource provides a sample job description with responsibilities and qualifications based on existing state positions.

bit.ly/csjobdescription

7

A Requirement for All High Schools to Offer Computer Science



4
States

2017

15
States

2018

19
States

2019

Rubric

A state is considered to require all high schools to offer computer science if the policy meets both of the following criteria:

- requires all public high schools in the state to offer one or more computer science courses, and
- a description of the requirement is publicly accessible.

States

The following states require all high schools to offer computer science (states in bold have adopted the policy since the 2018 report):

- **Alabama**
- Arkansas
- **Connecticut**
- Delaware
- Florida
- **Georgia**
- Hawaii
- Idaho
- Indiana
- Maryland
- Nevada
- New Hampshire
- New Jersey
- South Carolina
- Texas
- Virginia
- **Washington**
- West Virginia
- Wyoming

Highlights

In May 2019, Georgia passed SB 108 phasing in a requirement that all middle and high schools offer computer science. Beginning in the 2022–2023 school year, each local school system must have at least one high school offering a course in computer science and all middle schools must offer instruction in exploratory computer science. By the 2023–2024 school year, at least 50 percent of the high schools in each local school system must offer a course in computer science, and by the 2024–2025 school year, all high schools must offer a course. The same bill requires annual reporting of the number of teachers trained, the number of schools offering training, and the number and demographics of students served.

This approach lays out an appropriate timeline, includes milestones, and couples the requirement with annual reporting for transparency and accountability.

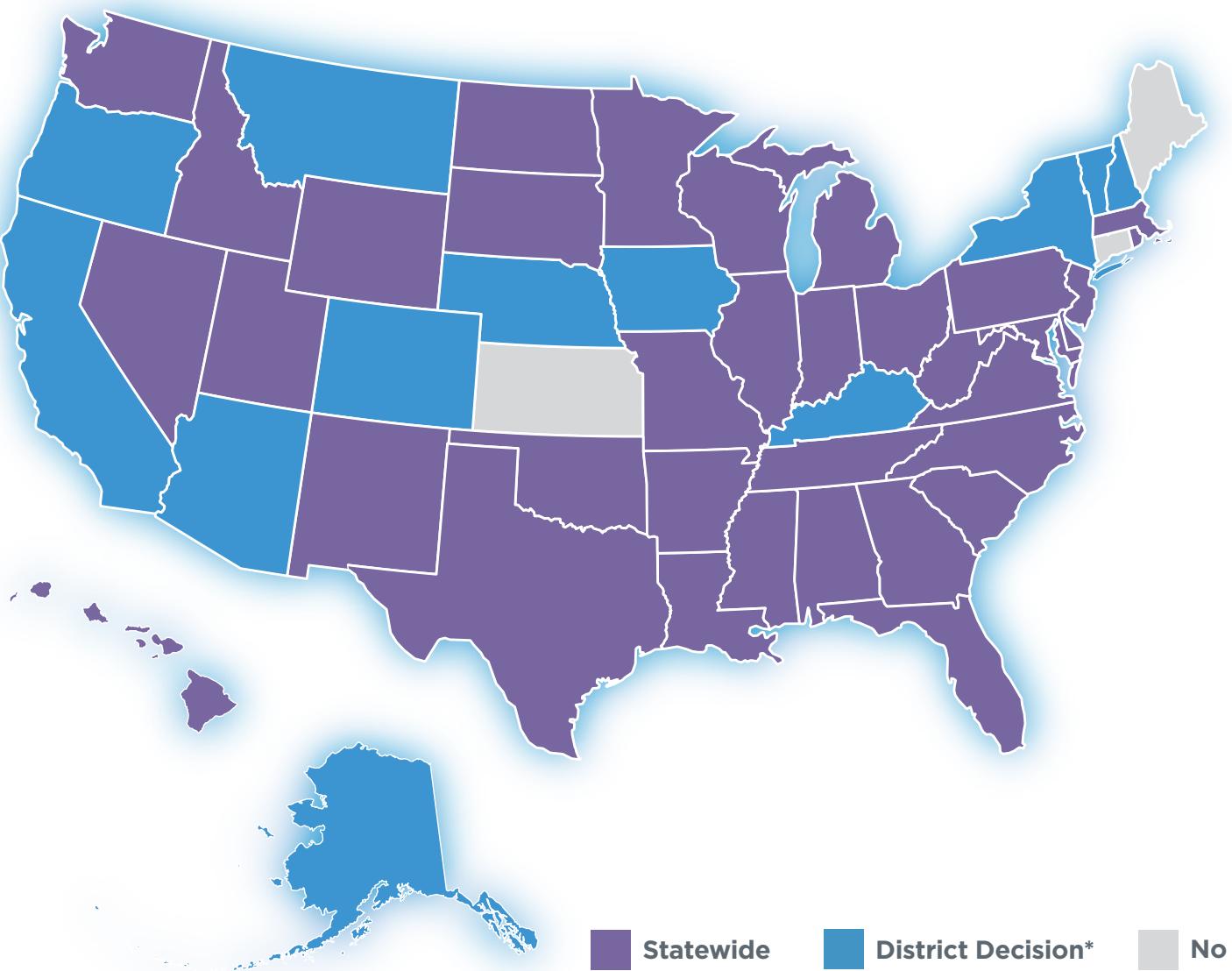
Related Resources

All High Schools Offer Computer Science — State Examples

This resource provides examples of states that have set a public goal, passed a legislative mandate, or used other policy levers to ensure that all high schools offer computer science. The resource also includes best practices for implementing this policy.

bit.ly/allhsofferexamples

Computer Science Can Satisfy a Core High School Graduation Requirement



28
States

2017

39
States

2018

47
States

2019

Rubric

A state is considered to allow computer science to count towards a core graduation requirement if the policy meets both criteria:

- allows computer science to satisfy a core graduation requirement (not an elective) for a subject such as mathematics, science, technology, or language other than English, and
- a description of the policy is publicly accessible.

States

The following states allow computer science to satisfy a core graduation requirement (states in bold have adopted the policy since the 2018 report):

- Alabama
- **Alaska***
- Arizona*
- Arkansas
- California*
- Colorado*
- Delaware
- District of Columbia
- Florida
- Georgia
- **Hawaii**
- Idaho
- Illinois
- Indiana
- **Iowa***
- Kentucky*
- Louisiana
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- **Missouri**
- **Montana***
- **Nebraska***
- Nevada
- New Hampshire*
- New Jersey
- New Mexico
- New York*
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon*
- Pennsylvania
- Rhode Island
- South Carolina
- **South Dakota**
- Tennessee
- Texas
- Utah
- Vermont*
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

* The state has passed policy that is permissive and encouraging, but it is not a requirement for schools to allow computer science to satisfy a core graduation requirement.

Highlights

Missouri passed legislation (HB 3, special session 2018) allowing students to fulfill one unit of any mathematics, science, or practical arts unit required for graduation with a district-approved computer science course. The state developed the policy alongside new K-12 computer science standards and teacher certification requirements, and posted a guidance document that defines computer science, explains course code reporting, and outlines teaching qualifications for the course to count.

Washington and Florida are examples of states that have reduced restrictions within existing policies. Washington removed a restriction that required certain courses to be taken before computer science could be counted as a mathematics credit. Florida no longer requires students to earn an industry certification in order for a course to count towards a mathematics or science credit.

Related Resources

Outcomes of K-12 Computer Science Policy in States

This resource presents outcomes associated with policy adoption, with a focus on allowing computer science to count towards core graduation requirements.

bit.ly/cspolicyoutcomes

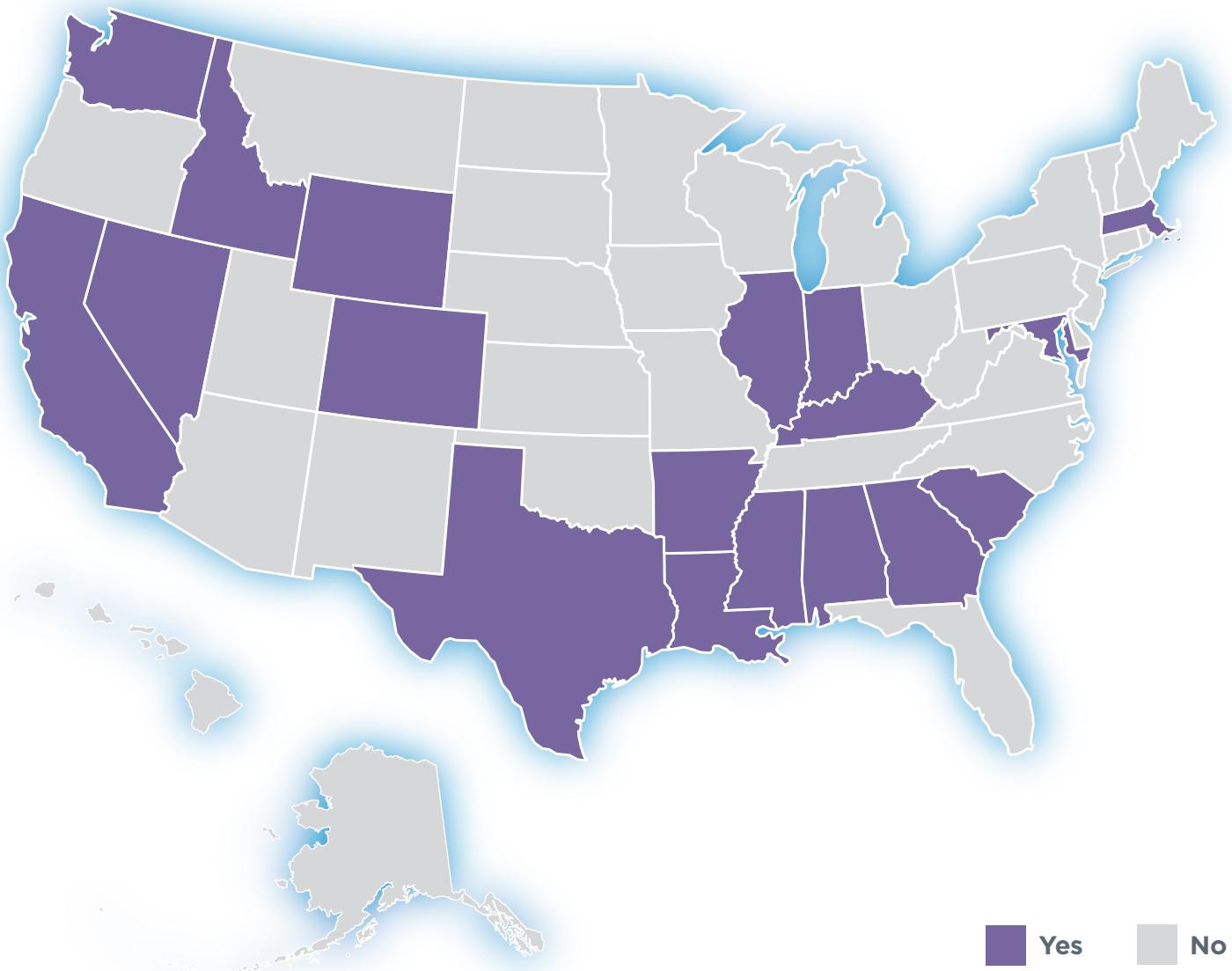
Computer Science Flex Credit

This issue brief describes how computer science should be considered a credit on transcripts and allowed to “flex” to satisfy a core graduation requirement.

bit.ly/csflexcredit

9

Computer Science Can Satisfy a Core Admission Requirement at Institutions of Higher Education



13
States

2017

17
States

2018

18
States

2019

Rubric

A state is considered to allow computer science to count towards a core admission requirement if the policy meets both criteria:

- allows computer science to satisfy one of the core credits for entry (not an elective), and
- a description of the policy is publicly accessible.

States

The following states allow computer science to satisfy a core admission requirement at institutions of higher education (states in bold have adopted the policy since the 2018 report):

- **Alabama**
- Arkansas
- California
- Colorado
- Georgia
- Idaho
- Illinois
- Indiana
- Kentucky
- Louisiana
- Maryland
- Massachusetts
- Mississippi
- Nevada
- South Carolina
- Texas
- Washington
- Wyoming

Highlights

Beginning in fall 2022, students applying to Mississippi State Institutions of Higher Learning must have one credit in computer science or technology. This higher education requirement is aligned to the state's computer science or technology requirement for high school graduation. In many states, computer science may count towards a specific core graduation requirement (e.g., math or science), but not count towards the same subject requirement when applying for admission to an institution of higher education. This misalignment leads to a situation in which students may take computer science to graduate from state high schools, but may not use the same credit when applying to state institutions of higher education. By aligning high school graduation requirements and higher education admission requirements, states ensure clear articulation of computer science credits.

Related Resources

University of California Data Confirms Computer Science is Foundational

Computer science can satisfy a core university graduation requirement in 95% of B.S. degrees across the UC system, confirming that computer science is a foundational subject for all students. Universities that allow computer science to count towards their own degree requirements should also allow it to count towards admission requirements, as these policies influence high school graduation requirements and course-taking patterns.

bit.ly/ucdataconfirmscs



State Summaries

This section provides information for each state in the nation, including:

- **the state's status toward meeting each of the nine policies (bolded policies are changes since the 2018 report),**
- **policy updates in the state, and**
- **data on university graduates, school offerings, and participation.**

Each state summary also notes membership in the Expanding Computing Education Pathways (ECEP) Alliance, a National Science Foundation-funded broadening participation in computing alliance. Refer to ecepalliance.org for more information about connecting with a state team and to learn more about how your state can increase the number and diversity of K-16 students in computing and computing-related degrees.

Data Sources

The data included in the state summaries represents the most current information that is publicly accessible. New data from the AP program and university graduates is expected in fall 2019. Refer to advocacy.code.org for up-to-date state policy information and data.

The number of bachelor's degrees in computer science earned in a given state and the percentage female comes from the National Center for Education Statistics (NCES) IPEDS Completions Survey. The data includes only bachelor's degrees from public or nonprofit private institutions.

The percentage of schools in the state teaching at least one computer science course is included for those states with complete data sets in the Access Report. See the *K-12 Computer Science Access Report* section of this report for full methodology.

The data about AP computer science exam participation by female and underrepresented minority students (Black, Hispanic/Latino, Native American/Alaska Native, and Native Hawaiian/Other Pacific Islander students) comes from the College Board National and State Summary Reports (research.collegeboard.org/programs/ap/data). The number of high schools offering the exam comes from data provided to Code.org directly from the College Board. AP data is included because it provides a national, standardized data set on participation and diversity in computer science courses. AP numbers reported here aggregate both AP Computer Science A and AP Computer Science Principles courses.

Active Computer Science Teachers Association (CSTA) chapters are listed below. These CSTA chapters develop local computer science teacher communities for professional learning. Refer to csteachers.org/chapters to join or start a new chapter.

Active CSTA Chapters by State

Alabama

- CSTA Alabama

Alaska

- CSTA Top of the World

Arkansas

- CSTA Arkansas

Arizona

- CSTA Arizona

California

- CSTA California Central Valley
- CSTA Golden Gate
- CSTA Inland Empire
- CSTA Orange County
- CSTA Sacramento
- CSTA San Diego
- CSTA San Mateo County
- CSTA Silicon Valley
- CSTA Southern California

Colorado

- CSTA Colorado

Connecticut

- CSTA Connecticut

Delaware

- CSTA Delaware

Florida

- CSTA Florida
- CSTA Miami

Georgia

- CSTA Georgia

Hawaii

- CSTA Hawaii

Idaho

- CSTA Idaho

Illinois

- CSTA Chicago
- CSTA Chicago Suburban

Iowa

- CSTA Iowa

Indiana

- CSTA Hoosier Heartland
- CSTA Hoosier Heritage

Kentucky

- CSTA Kentuckiana
- CSTA Northern Kentucky

Louisiana

- CSTA Louisiana

Maine

- CSTA Maine

Maryland

- CSTA Maryland

Massachusetts

- CSTA Greater Boston
- CSTA Western Mass

Michigan

- CSTA Michigan

Minnesota

- CSTA Minnesota

Mississippi

- CSTA Central Mississippi

Missouri

- CSTA Southwest Missouri
- CSTA St. Louis

Nebraska

- CSTA Metro Omaha
- CSTA Nebraska Huskers

Nevada

- CSTA Nevada Silver State

New Hampshire

- CSTA New Hampshire

New Jersey

- CSTA Central NJ
- CSTA Northern NJ
- CSTA Southern NJ

New Mexico

- CSTA New Mexico

New York

- CSTA Hudson Valley
- CSTA Long Island
- CSTA Lower Hudson Valley
- CSTA New York Capital District
- CSTA NYC
- CSTA Staten Island
- CSTA Western New York

North Carolina

- CSTA Triangle East

Ohio

- CSTA Ohio

Oklahoma

- CSTA Oklahoma

Oregon

- CSTA Oregon

Pennsylvania

- CSTA Philly
- CSTA Pittsburgh

Rhode Island

- CSTA Rhode Island

South Carolina

- CSTA South Carolina

Texas

- CSTA Alamo
- CSTA Central Texas
- CSTA Dallas Fort Worth
- CSTA Greater Houston
- CSTA Paso Del Norte

Utah

- CSTA Utah

Virginia

- CSTA Central Virginia
- CSTA Northern Virginia

Washington

- CSTA Central Washington
- CSTA Puget Sound
- CSTA Spokane

West Virginia

- CSTA West Virginia

Wisconsin

- CSTA Wisconsin Dairyland

Wyoming

- CSTA WY



Alabama

1 State Plan	2 Standards	3 Funding
In Progress	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	In Progress
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The recommendations made by the Governor's Advisory Council for Computer Science Education will serve as the basis for the state plan required by Act 389 (2019).
- For FY 2020 (SB 199), the state appropriated \$2.771M: \$614K for middle school computer science, \$300K for computer science educator training, \$1M for CS4AL, and \$857K to train K-12 teachers in computer science.
- Act 389 updated certification pathways including a course-specific permit earned through professional learning; created a state Computer Science Specialist position; and required all schools to offer computer science by the 2020–2021 school year. The bill also allowed computer science to satisfy high school mathematics or science graduation requirements and admission requirements at institutions of higher education.
- Governor Kay Ivey is a member of the Governors' Partnership for K-12 Computer Science.
- Alabama is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 38% of high schools taught at least one computer science course.
- 104 schools (30% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 18 more schools than the previous year.
- 642 female students (32%) took an AP CS exam in 2018, compared to 463 (30%) in 2017.
- 383 underrepresented minority students (19%) took an AP CS exam in 2018, compared to 243 (16%) in 2017.
- 614 bachelor's degrees in computer science were earned in 2017; 20% were female.



Alaska

1 State Plan	2 Standards	3 Funding
No	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 computer science standards in June 2019.
- The state passed a permissive and encouraging policy to allow computer science to count as a mathematics, science, or local CTE/technology credit for graduation, but it is a district decision.

Data

- In the 2018–2019 school year, 19% of high schools taught at least one computer science course.
- 8 schools (9% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 2 more schools than the previous year.
- 29 female students (25%) took an AP CS exam in 2018, compared to 17 (25%) in 2017.
- 18 underrepresented minority students (16%) took an AP CS exam in 2018, compared to 5 (7%) in 2017.
- 33 bachelor's degrees in computer science were earned in 2017; none were female.



Arizona

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 computer science standards in October 2018.
- HB 2303 (2019) amended the computer science professional development program to prioritize rural schools and schools with at least 60% of the students eligible for free and reduced-price lunches. The FY 2020 budget included \$1M in continued funding for the program.
- HB 2303 (2019) strongly encouraged the State Board of Education, Arizona Board of Regents, and universities to develop guidelines on computer science courses to meet high school graduation and university admission requirements.
- Governor Doug Ducey is a member of the Governors' Partnership for K-12 Computer Science.

Data

- 65 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 13 more schools than the previous year.
- 267 female students (24%) took an AP CS exam in 2018, compared to 163 (22%) in 2017.
- 284 underrepresented minority students (26%) took an AP CS exam in 2018, compared to 153 (21%) in 2017.
- 814 bachelor's degrees in computer science were earned in 2017; 16% were female.



Arkansas

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- Arkansas appropriated \$2.5 million for the Computer Science Initiative for FY 2020 (SB 136).
- All preservice elementary educators receive instruction in computer science education.
- Governor Asa Hutchinson is the co-chair of the Governors' Partnership for K-12 Computer Science.
- Arkansas is a member of the ECEP Alliance.

Data

- In the 2018–2019 school year, 78% of high schools taught at least one computer science course, compared to 64% in 2017–2018.
- 59 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 9 more schools than the previous year.
- 390 female students (31%) took an AP CS exam in 2018, compared to 230 (26%) in 2017.
- 277 underrepresented minority students (22%) took an AP CS exam in 2018, compared to 221 (25%) in 2017.
- 350 bachelor's degrees in computer science were earned in 2017; 15% were female.



California

1 State Plan	2 Standards	3 Funding
Yes	Yes	Other
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	In Progress
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The State Board of Education adopted the Computer Science Strategic Implementation Plan in May 2019.
- Although the state has not created a dedicated funding source for computer science, SB 75 (2019) appropriated \$22.1M to the Educator Workforce Investment Grant Program to support professional learning in several areas including computer science.
- SB 75 (2019) created the Computer Science Coordinator position.
- California is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 47% of high schools taught at least one computer science course, compared to 45% in 2016–2017.
- 685 schools (28% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 105 more schools than the previous year.
- 7,437 female students (30%) took an AP CS exam in 2018, compared to 5,464 (29%) in 2017.
- 6,542 underrepresented minority students (27%) took an AP CS exam in 2018, compared to 4,565 (24%) in 2017.
- 6,236 bachelor's degrees in computer science were earned in 2017; 18% were female.



Colorado

1 State Plan	2 Standards	3 Funding
No	No	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- SB 207 (2019) allocated \$1,048,600 for Computer Science Education Grants for Teachers (FY 2020), and HB 19-1277 dedicated \$250K per year for FY 2021, 2022, and 2023 to the Computer Science Education Grant Program.

Data

- 129 schools (35% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 33 more schools than the previous year.
- 466 female students (24%) took an AP CS exam in 2018, compared to 273 (19%) in 2017.
- 359 underrepresented minority students (19%) took an AP CS exam in 2018, compared to 259 (18%) in 2017.
- 1,021 bachelor's degrees in computer science were earned in 2017; 17% were female.



Connecticut

1 State Plan	2 Standards	3 Funding
In Progress	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	No	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- SB 957 (2019) required the State Department of Education to develop an alternate route to certification for computer science teachers and the State Board to create an endorsement and approve an assessment for certification.
- SB 957 required teacher preparation programs to include, as part of the curriculum for all preservice candidates, instruction in computer science that is grade-level and subject-area appropriate.
- SB 957 added computer science (including computer programming) to the list of subjects that public schools must teach.
- Connecticut is a member of the ECEP Alliance.

Data

- 116 schools (43% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 20 more schools than the previous year.
- 672 female students (28%) took an AP CS exam in 2018, compared to 504 (27%) in 2017.
- 361 underrepresented minority students (15%) took an AP CS exam in 2018, compared to 232 (12%) in 2017.
- 533 bachelor's degrees in computer science were earned in 2017; 18% were female.



Delaware

1 State Plan	2 Standards	3 Funding
No	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Data

- In the 2018–2019 school year, 65% of high schools taught at least one computer science course.
- 23 schools (35% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 9 more schools than the previous year.
- 87 female students (22%) took an AP CS exam in 2018, compared to 66 (23%) in 2017.
- 64 underrepresented minority students (16%) took an AP CS exam in 2018, compared to 30 (10%) in 2017.
- 194 bachelor's degrees in computer science were earned in 2017; 22% were female.



District of Columbia

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Data

- In the 2018–2019 school year, 20% of high schools taught at least one computer science course.
- 17 schools (30% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 2 more schools than the previous year.
- 124 female students (34%) took an AP CS exam in 2018, compared to 73 (31%) in 2017.
- 189 underrepresented minority students (52%) took an AP CS exam in 2018, compared to 96 (41%) in 2017.
- 202 bachelor's degrees in computer science were earned in 2017; 28% were female.



Florida

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS, MS	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- SB 2500 (2019) allocated \$10M for computer science teacher certification and professional development and SB 7070 (2019) established recruitment awards for newly hired teachers who are content experts in specified subjects including computer science.
- HB 7071 (2019) amended the existing graduation policy to allow computer science to satisfy a math or science graduation requirement without requiring an industry certification.

Data

- In the 2018–2019 school year, 30% of high schools taught at least one computer science course, compared to 23% in 2017–2018.
- 315 schools (28% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 74 more schools than the previous year.
- 2,974 female students (28%) took an AP CS exam in 2018, compared to 1,817 (25%) in 2017.
- 4,424 underrepresented minority students (42%) took an AP CS exam in 2018, compared to 2,823 (39%) in 2017.
- 2,986 bachelor's degrees in computer science were earned in 2017; 18% were female.



Georgia

1 State Plan	2 Standards	3 Funding
Yes	In Progress	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Department of Education developed a state plan for expanding computer science.
- The state adopted K-8 computer science standards in March 2019.
- SB 108 (2019) established a computer science professional development grant program which received \$750K in the FY 2020 budget.
- The state approves programs at institutions of higher education that prepare preservice teachers to teach computer science and lists those programs publicly.
- SB 108 also required all high schools to offer computer science beginning in the 2024-2025 school year.
- Georgia is a member of the ECEP Alliance.

Data

- In the 2018-2019 school year, 52% of high schools taught at least one computer science course, compared to 50% in 2017-2018.
- 177 schools (28% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 23 more schools than the previous year.
- 1,316 female students (27%) took an AP CS exam in 2018, compared to 923 (24%) in 2017.
- 1,015 underrepresented minority students (20%) took an AP CS exam in 2018, compared to 710 (18%) in 2017.
- 2,279 bachelor's degrees in computer science were earned in 2017; 19% were female.



Hawaii

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- In 2019, the state budget increased the weighted per-pupil funding to schools by \$3M, directing that schools use the funds to implement, among other subjects, computer science curriculum.
- The state developed certification pathways for K-6, 6-12, and K-12 in computer science in 2018.
- Act 51 (2018) required all high schools to offer at least one computer science course by the 2021-2022 school year.
- AP computer science can count as the fourth mathematics credit required for the Honors or STEM diploma.
- Governor David Ige is a member of the Governors' Partnership for K-12 Computer Science.
- Hawaii is a member of the ECEP Alliance.

Data

- In the 2017-2018 school year, 47% of high schools taught at least one computer science course.
- 24 schools (29% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 8 more schools than the previous year.
- 132 female students (29%) took an AP CS exam in 2018, compared to 92 (32%) in 2017.
- 67 underrepresented minority students (15%) took an AP CS exam in 2018, compared to 56 (19%) in 2017.
- 134 bachelor's degrees in computer science were earned in 2017; 13% were female.



Idaho

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Idaho STEM Action Center, Idaho Digital Learning Academy, and stakeholders across the state created the Idaho Computing Technology K-12 Computer Science State Plan for computer science education implementation.
- HB215 (2019) allocated \$1M for FY 2020 for the expansion of computer science throughout the state.

Data

- 15 schools (13% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 4 fewer than the previous year.
- 59 female students (21%) took an AP CS exam in 2018, compared to 92 (29%) in 2017.
- 28 underrepresented minority students (10%) took an AP CS exam in 2018, compared to 39 (12%) in 2017.
- 435 bachelor's degrees in computer science were earned in 2017; 16% were female.



Illinois

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	Yes

Refer to advocacy.code.org for additional up-to-date information.

Data

- In the 2018-2019 school year, 37% of high schools taught at least one computer science course.
- 187 schools (27% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 30 more schools than the previous year.
- 1,580 female students (25%) took an AP CS exam in 2018, compared to 1,115 (23%) in 2017.
- 1,126 underrepresented minority students (18%) took an AP CS exam in 2018, compared to 848 (17%) in 2017.
- 2,232 bachelor's degrees in computer science were earned in 2017; 16% were female.



Indiana

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Department of Education and a group of stakeholders created a state plan for computer science education.
- The state published a comprehensive set of K-12 computer science standards in fall 2018.
- In 2018, the Department of Education contracted with a provider to offer computer science professional development in FY 2019 as required by SB 172. HB 1001 (2019) allocated \$3M per year for computer science professional development for FY 2020 and 2021.
- The state added computer science to the list of courses that can satisfy a science requirement for graduation.
- Governor Eric Holcomb is a member of the Governors' Partnership for K-12 Computer Science.
- Indiana is a member of the ECEP Alliance.

Data

- In the 2018-2019 school year, 62% of high schools taught at least one computer science course, compared to 51% in 2017-2018.
- 93 schools (21% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 16 more schools than the previous year.
- 384 female students (22%) took an AP CS exam in 2018, compared to 268 (20%) in 2017.
- 201 underrepresented minority students (12%) took an AP CS exam in 2018, compared to 152 (11%) in 2017.
- 1,886 bachelor's degrees in computer science were earned in 2017; 21% were female.



Iowa

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state approves programs at institutions of higher education that prepare preservice teachers to teach computer science and lists those programs publicly.
- The Department of Education created a position for a Computer Science Education Program Consultant.
- The state passed a permissive and encouraging policy to allow computer science to count as a mathematics credit for graduation, but it is a district decision.
- Governor Kim Reynolds is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018-2019 school year, 58% of high schools taught at least one computer science course, compared to 49% in 2017-2018.
- 41 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 10 more schools than the previous year.
- 76 female students (19%) took an AP CS exam in 2018, compared to 58 (17%) in 2017.
- 41 underrepresented minority students (10%) took an AP CS exam in 2018, compared to 30 (9%) in 2017.
- 459 bachelor's degrees in computer science were earned in 2017; 14% were female.



Kansas

1 State Plan	2 Standards	3 Funding
In Progress	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	No	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Department of Education convened a Computer Science Task Force to develop a state plan and make recommendations to the State Board of Education in 2019.
- The state adopted preK-12 computer science standards in April 2019.

Data

- In the 2017–2018 school year, 26% of high schools taught at least one computer science course.
- 24 schools (17% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 11 more schools than the previous year.
- 16 female students (11%) took an AP CS exam in 2018, compared to 9 (16%) in 2017.
- 13 underrepresented minority students (9%) took an AP CS exam in 2018, compared to 2 (3%) in 2017.
- 435 bachelor's degrees in computer science were earned in 2017; 10% were female.



Kentucky

1 State Plan	2 Standards	3 Funding
In Progress	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	In Progress
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The development of a state plan for computer science is in progress.
- The state is in the process of developing a state leadership position for computer science.
- The state adopted K-12 computer science standards in February 2019.

Data

- In the 2017–2018 school year, 39% of high schools taught at least one computer science course.
- 98 schools (37% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 37 more schools than the previous year.
- 375 female students (28%) took an AP CS exam in 2018, compared to 260 (28%) in 2017.
- 98 underrepresented minority students (7%) took an AP CS exam in 2018, compared to 82 (9%) in 2017.
- 524 bachelor's degrees in computer science were earned in 2017; 19% were female.



Louisiana

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	Yes

Refer to advocacy.code.org for additional up-to-date information.

Data

- In the 2018–2019 school year, 23% of high schools taught at least one computer science course, compared to 15% in 2017–2018.
- 43 schools (15% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 6 more schools than the previous year.
- 151 female students (28%) took an AP CS exam in 2018, compared to 118 (31%) in 2017.
- 143 underrepresented minority students (27%) took an AP CS exam in 2018, compared to 126 (33%) in 2017.
- 455 bachelor's degrees in computer science were earned in 2017; 24% were female.



Maine

1 State Plan	2 Standards	3 Funding
In Progress	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	No	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state department of education has two full-time positions who provide support, technical assistance, and guidance for computer science initiatives.
- In 2019, the legislature passed a resolution (LD 1382) that directed the Department of Education to study and develop a state plan for computer science instruction; that plan is now under development.

Data

- 30 schools (22% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 7 more schools than the previous year.
- 79 female students (23%) took an AP CS exam in 2018, compared to 49 (20%) in 2017.
- 12 underrepresented minority students (3%) took an AP CS exam in 2018, compared to 13 (5%) in 2017.
- 119 bachelor's degrees in computer science were earned in 2017; 16% were female.



Maryland

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math & Technology	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Maryland Center for Computing Education published a state implementation plan for computer science in August 2019.
- The State Board approved K-12 computer science standards in September 2018.
- The state allocated \$1M for the computer science education initiative for FY 2020.
- Governor Larry Hogan is a member of the Governors' Partnership for K-12 Computer Science.
- Maryland is a member of the ECEP Alliance.

Data

- In the 2018-2019 school year, 62% of high schools taught at least one computer science course.
- 170 schools (47% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 20 more schools than the previous year.
- 1,833 female students (33%) took an AP CS exam in 2018, compared to 1,356 (31%) in 2017.
- 1,134 underrepresented minority students (20%) took an AP CS exam in 2018, compared to 926 (21%) in 2017.
- 3,422 bachelor's degrees in computer science were earned in 2017; 22% were female.



Massachusetts

1 State Plan	2 Standards	3 Funding
In Progress	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state is currently developing a plan for computer science education.
- The state approves programs at institutions of higher education that prepare preservice teachers to teach computer science and lists those programs publicly.
- The state allocated \$1M in the FY 2020 budget for the implementation of a state plan to establish and promote digital literacy and computer science education.
- Massachusetts is a member of the ECEP Alliance.

Data

- In the 2017-2018 school year, 67% of high schools taught at least one computer science course, compared to 58% in 2016-2017.
- 196 schools (43% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 28 more schools than the previous year.
- 1,119 female students (27%) took an AP CS exam in 2018, compared to 822 (24%) in 2017.
- 603 underrepresented minority students (14%) took an AP CS exam in 2018, compared to 552 (16%) in 2017.
- 2,641 bachelor's degrees in computer science were earned in 2017; 25% were female.



Michigan

1 State Plan	2 Standards	3 Funding
No	Yes	Other
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	Yes	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 computer science standards in May 2019.

Data

- 153 schools (23% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 68 more schools than the previous year.
- 762 female students (26%) took an AP CS exam in 2018, compared to 401 (24%) in 2017.
- 192 underrepresented minority students (7%) took an AP CS exam in 2018, compared to 87 (5%) in 2017.
- 2,103 bachelor's degrees in computer science were earned in 2017; 17% were female.



Minnesota

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	In Progress
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- Minnesota is a member of the ECEP Alliance.

Data

- 65 schools (21% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 6 more schools than the previous year.
- 304 female students (21%) took an AP CS exam in 2018, compared to 242 (20%) in 2017.
- 128 underrepresented minority students (9%) took an AP CS exam in 2018, compared to 87 (7%) in 2017.
- 1,236 bachelor's degrees in computer science were earned in 2017; 17% were female.



Mississippi

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Computer Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- HB 1643 (2019) allocated \$300K for the development of computer science courses and professional development.
- Mississippi is a member of the ECEP Alliance.

Data

- In the 2018–2019 school year, 47% of high schools taught at least one computer science course, compared to 28% in 2017–2018.
- 20 schools (10% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 7 more schools than the previous year.
- 65 female students (34%) took an AP CS exam in 2018, compared to 24 (23%) in 2017.
- 40 underrepresented minority students (21%) took an AP CS exam in 2018, compared to 23 (22%) in 2017.
- 207 bachelor's degrees in computer science were earned in 2017; 16% were female.



Missouri

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math, Science, & Practical Arts	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 computer science standards in May 2019.
- HB 3 (2018 special session) created a Computer Science Education Fund, and HB 2 (2019) allocated \$450K to the fund for FY 2020.
- The Department of Elementary and Secondary Education created a certification in computer science and developed guidance on teaching qualifications, allowing teachers who complete approved professional development to teach computer science.
- A computer science course can count towards a mathematics, science, or practical arts graduation credit.
- Governor Michael Parson is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018–2019 school year, 38% of high schools taught at least one computer science course, compared to 32% in 2017–2018.
- 80 schools (25% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 11 more schools than the previous year.
- 171 female students (21%) took an AP CS exam in 2018, compared to 129 (20%) in 2017.
- 73 underrepresented minority students (9%) took an AP CS exam in 2018, compared to 64 (10%) in 2017.
- 1,378 bachelor's degrees in computer science were earned in 2017; 18% were female.



Montana

1 State Plan	2 Standards	3 Funding
No	In Progress	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state began development of K-12 computer science standards in July 2018.
- The state passed a permissive and encouraging policy to allow computer science to count as a science, mathematics, elective, or CTE graduation requirement. Alternatively, a district may increase the local requirements in math, science, or career and technical education and allow a computer science course to fulfill one of the required credits, or require all students to complete a computer science credit.
- Governor Steve Bullock is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018–2019 school year, 45% of high schools taught at least one computer science course, compared to 40% in 2017–2018.
- 6 schools (6% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 4 more schools than the previous year.
- 7 female students (18%) took an AP CS exam in 2018, compared to 2 (15%) in 2017.
- 1 underrepresented minority student (3%) took an AP CS exam in 2018, compared to 2 (15%) in 2017.
- 99 bachelor's degrees in computer science were earned in 2017; 11% were female.



Nebraska

1 State Plan	2 Standards	3 Funding
In Progress	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state plan under development by the Department of Education is slated for adoption in Fall 2019.
- In 2018, Nebraska created a pathway for middle and high school computer science teachers under a Business, Marketing, and Information Technology Endorsement and an Information Technology Supplemental Endorsement.
- The Commissioner of Education sent a letter to school district superintendents in December 2018 clarifying that computer science can count towards the 80 core curriculum hours required for graduation (under CTE).

Data

- In the 2017–2018 school year, 40% of high schools taught at least one computer science course.
- 29 schools (32% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 10 more schools than the previous year.
- 33 female students (14%) took an AP CS exam in 2018, compared to 15 (10%) in 2017.
- 23 underrepresented minority students (10%) took an AP CS exam in 2018, compared to 12 (8%) in 2017.
- 539 bachelor's degrees in computer science were earned in 2017; 17% were female.



Nevada

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, HS	Math, Science, & Computer Ed and Tech	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Department of Education created the Computer Science Strategic Plan.
- SB 313 (2019) allocated \$933K and \$700K for computer science education in FY 2020 and 2021, respectively.
- The state created two endorsement pathways in 2018 and SB 313 (2019) authorized teachers receiving one of the endorsements to request reimbursement.
- SB 313 (2019) required all preservice educators to be trained in computer science and computer literacy. The bill also allowed the Board of Regents to apply for a grant to develop curriculum and standards for preservice educators.
- Nevada is a member of the ECEP Alliance.

Data

- In the 2018–2019 school year, 57% of high schools taught at least one computer science course.
- 31 schools (25% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 4 more schools than the previous year.
- 292 female students (33%) took an AP CS exam in 2018, compared to 126 (26%) in 2017.
- 325 underrepresented minority students (37%) took an AP CS exam in 2018, compared to 147 (30%) in 2017.
- 163 bachelor's degrees in computer science were earned in 2017; 25% were female.



New Hampshire

1 State Plan	2 Standards	3 Funding
Yes	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state updated certification pathways and computer science educator standards, providing teachers with five pathways to certification. One of the pathways requires teachers to pass a national exam; another allows teachers with a computer science teaching assignment prior to June 30, 2019 to apply for the certification; and a third allows teachers to submit to the department evidence of skills, knowledge, and competencies, such as coursework, professional experience, letters of recommendation, professional development, or other artifacts.
- New Hampshire is a member of the ECEP Alliance.

Data

- In the 2018–2019 school year, 49% of high schools taught at least one computer science course.
- 28 schools (24% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 8 more schools than the previous year.
- 111 female students (27%) took an AP CS exam in 2018, compared to 42 (18%) in 2017.
- 12 underrepresented minority students (3%) took an AP CS exam in 2018, compared to 8 (3%) in 2017.
- 586 bachelor's degrees in computer science were earned in 2017; 19% were female.



New Jersey

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Secondary School Computer Science Education Initiative was renewed with \$2M appropriated for FY 2020 (SB 2500).
- Governor Phil Murphy is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018-2019 school year, 59% of high schools taught at least one computer science course.
- 253 schools (44% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 34 more schools than the previous year.
- 1,856 female students (28%) took an AP CS exam in 2018, compared to 1,374 (26%) in 2017.
- 1,000 underrepresented minority students (15%) took an AP CS exam in 2018, compared to 766 (15%) in 2017.
- 1,642 bachelor's degrees in computer science were earned in 2017; 17% were female.



New Mexico

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 Computer Science Standards in December 2018.
- The legislature allocated \$200K per year for FY 2019 and 2020 (HB 548) to develop and implement teacher professional development.

Data

- In the 2018-2019 school year, 23% of high schools taught at least one computer science course.
- 21 schools (16% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 3 more schools than the previous year.
- 44 female students (22%) took an AP CS exam in 2018, compared to 49 (29%) in 2017.
- 97 underrepresented minority students (48%) took an AP CS exam in 2018, compared to 69 (41%) in 2017.
- 169 bachelor's degrees in computer science were earned in 2017; 19% were female.



New York

1 State Plan	2 Standards	3 Funding
No	In Progress	Yes

4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No

7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state is developing K-12 computer science standards as required by A 9506 (2018).
- The legislature allocated \$6M in FY 2020 for the Smart Start program to expand computer science education

Data

- In the 2017–2018 school year, 44% of high schools taught at least one computer science course, compared to 38% in 2016–2017.
- 407 schools (35% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 68 more schools than the previous year.
- 3,601 female students (35%) took an AP CS exam in 2018, compared to 2,578 (32%) in 2017.
- 2,664 underrepresented minority students (26%) took an AP CS exam in 2018, compared to 1,846 (23%) in 2017.
- 5,232 bachelor's degrees in computer science were earned in 2017; 21% were female.



North Carolina

1 State Plan	2 Standards	3 Funding
Yes	In Progress	Yes

4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes

7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state is developing K-12 computer science standards as required by HB 155 (2017).
- The Department of Public Instruction created a Computer Science Director position.
- Governor Roy Cooper is a member of the Governors' Partnership for K-12 Computer Science.
- North Carolina is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 45% of high schools taught at least one computer science course.
- 117 schools (18% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 22 more schools than the previous year.
- 882 female students (27%) took an AP CS exam in 2018, compared to 587 (24%) in 2017.
- 471 underrepresented minority students (15%) took an AP CS exam in 2018, compared to 349 (14%) in 2017.
- 1,561 bachelor's degrees in computer science were earned in 2017; 20% were female.



North Dakota

1 State Plan	2 Standards	3 Funding
No	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state adopted K-12 computer science and cybersecurity standards in February 2019, becoming the first state to create K-12 cybersecurity standards.
- SB 2171 (2019) gave the Department of Public Instruction the ability to credential computer and cyber science teachers.
- Governor Doug Burgum is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018–2019 school year, 41% of high schools taught at least one computer science course, compared to 23% in 2017–2018.
- 12 schools (22% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 2 more schools than the previous year.
- 6 female students (9%) took an AP CS exam in 2018, compared to 11 (11%) in 2017.
- 4 underrepresented minority students (6%) took an AP CS exam in 2018, compared to 6 (6%) in 2017.
- 162 bachelor's degrees in computer science were earned in 2017; 10% were female.



Ohio

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math, Science, & Foreign Language	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The State Board of Education adopted K-12 computer science standards and a model curriculum in December 2018.
- HB 166 (2019) appropriated \$1.5M for FY 2020 for teachers to take coursework and content exams to become credentialed to teach computer science.
- The state temporarily revised teacher certification requirements, allowing licensed 7-12 teachers who completed approved professional development to teach computer science until 2021.
- The Department of Education created a Computer Science Education Program Specialist position.
- The state added computer science to the list of courses students can count towards the foreign language or elective credits required for graduation.
- Ohio is a member of the ECEP Alliance.

Data

- 141 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 10 more schools than the previous year.
- 621 female students (23%) took an AP CS exam in 2018, compared to 521 (24%) in 2017.
- 308 underrepresented minority students (11%) took an AP CS exam in 2018, compared to 171 (8%) in 2017.
- 1,462 bachelor's degrees in computer science were earned in 2017; 15% were female.



Oklahoma

1 State Plan	2 Standards	3 Funding
No	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Tech/ World Lang.	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- Although the state does not require all schools to offer computer science, SB 593 (2019) directed the State Department of Education to develop a rubric for computer science programs in elementary, middle, and high schools to serve as a guide to schools for implementing quality computer science programs. The bill also authorized the department to create a grant program for computer science professional learning and recommended \$1M subject to authorization, although no funds were appropriated for the program.
- The Department of Education created a Director of Education Technology and Computer Science Education position.

Data

- In the 2017–2018 school year, 29% of high schools taught at least one computer science course.
- 56 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 27 more schools than the previous year.
- 109 female students (21%) took an AP CS exam in 2018, compared to 80 (22%) in 2017.
- 99 underrepresented minority students (19%) took an AP CS exam in 2018, compared to 64 (18%) in 2017.
- 510 bachelor's degrees in computer science were earned in 2017; 15% were female.



Oregon

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- Oregon is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 37% of high schools taught at least one computer science course, compared to 31% in 2016–2017.
- 32 schools (14% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 7 more schools than the previous year.
- 184 female students (24%) took an AP CS exam in 2018, compared to 86 (20%) in 2017.
- 66 underrepresented minority students (9%) took an AP CS exam in 2018, compared to 34 (8%) in 2017.
- 834 bachelor's degrees in computer science were earned in 2017; 19% were female.



Pennsylvania

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state funded PAsmart for a second year in FY 2020 with dedicated funding for expanding STEM and computer science education, including teacher professional development.
- The Department of Education developed specific program guidelines for state approval of professional educator programs in computer science.
- The Department of Education has a position focused on computer science.
- Governor Tom Wolf is a member of the Governors' Partnership for K-12 Computer Science.

Data

- In the 2018–2019 school year, 56% of high schools taught at least one computer science course.
- 240 schools (30% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 34 more schools than the previous year.
- 925 female students (23%) took an AP CS exam in 2018, compared to 666 (22%) in 2017.
- 309 underrepresented minority students (8%) took an AP CS exam in 2018, compared to 232 (8%) in 2017.
- 3,769 bachelor's degrees in computer science were earned in 2017; 22% were female.



Rhode Island

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The FY 2020 budget allocated \$210K for computer science professional development.
- Governor Gina Raimondo is a member of the Governors' Partnership for K-12 Computer Science.
- Rhode Island is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 86% of high schools taught at least one computer science course, compared to 85% in 2016–2017.
- 32 schools (44% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 3 more schools than the previous year.
- 147 female students (28%) took an AP CS exam in 2018, compared to 77 (23%) in 2017.
- 80 underrepresented minority students (15%) took an AP CS exam in 2018, compared to 32 (9%) in 2017.
- 442 bachelor's degrees in computer science were earned in 2017; 25% were female.



South Carolina

1 State Plan	2 Standards	3 Funding
In Progress	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Computer Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Department of Education has a state plan for high school computer science and is expanding the plan to span K-12.
- The FY 2020 budget allocated \$500K to teacher professional development.
- South Carolina is a member of the ECEP Alliance.

Data

- In the 2018–2019 school year, 69% of high schools taught at least one computer science course, compared to 43% in 2017–2018.
- 55 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 7 more schools than the previous year.
- 301 female students (29%) took an AP CS exam in 2018, compared to 214 (28%) in 2017.
- 250 underrepresented minority students (24%) took an AP CS exam in 2018, compared to 130 (17%) in 2017.
- 689 bachelor's degrees in computer science were earned in 2017; 18% were female.



South Dakota

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
No	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The State Board of Education approved changes to the diploma requirements in 2018, allowing students who earn a regular diploma to substitute a state-approved advanced computer science course for a science requirement.

Data

- 2 schools (3% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 2 fewer than the previous year.
- 4 female students (21%) took an AP CS exam in 2018, compared to 3 (9%) in 2017.
- 3 underrepresented minority students (16%) took an AP CS exam in 2018, compared to 1 (3%) in 2017.
- 213 bachelor's degrees in computer science were earned in 2017; 15% were female.



Tennessee

1 State Plan	2 Standards	3 Funding
In Progress	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- HB 1339/SB 1151 (2019) required the development of a state plan by May 2020.

Data

- 63 schools (16% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 13 more schools than the previous year.
- 389 female students (31%) took an AP CS exam in 2018, compared to 274 (29%) in 2017.
- 271 underrepresented minority students (21%) took an AP CS exam in 2018, compared to 188 (20%) in 2017.
- 734 bachelor's degrees in computer science were earned in 2017; 17% were female.



Texas

1 State Plan	2 Standards	3 Funding
In Progress	No	Other
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math, Science, & Foreign Language	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- HB 2984 (2019) required the development of a strategic advisory committee to present a report by September 2020 and directed the State Board to review and modify the K–8 Technology Applications TEKS (Texas Essential Knowledge and Skills) to include coding and computational thinking by the end of 2020.
- Although funding is not directly allocated to computer science professional learning, HB 3 and HB 963 (2019) consolidated all computer science (or Technology Applications) courses into Career and Technical Education and allowed schools to receive weighted funding for students enrolled in computer science courses.
- Texas is a member of the ECEP Alliance.

Data

- 462 schools (25% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 63 more schools than the previous year.
- 3,044 female students (27%) took an AP CS exam in 2018, compared to 2,378 (27%) in 2017.
- 3,532 underrepresented minority students (31%) took an AP CS exam in 2018, compared to 2,722 (30%) in 2017.
- 3,563 bachelor's degrees in computer science were earned in 2017; 19% were female.



Utah

1 State Plan	2 Standards	3 Funding
Yes	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The Utah Computer Science Education Master Plan was adopted in July 2019.
- The State Board of Education adopted a framework for K-12 computer science standards in 2018 and is slated to approve K-5 grade-level standards in October 2019. The State Board of Education will begin development of 6-12 grade-level standards in September 2019.
- HB 227 (2019) allocated \$3.15M for the Computer Science for Utah Grant Program per year for FY 2020 and 2021. This funding established a full-time Computer Science State Specialist.
- The Community Foundation of Utah and the Silicon Slopes community created a fund to invest in initiatives outlined in the state plan.
- Governor Gary Herbert is a member of the Governors' Partnership for K-12 Computer Science.
- Utah is a member of the ECEP Alliance.

Data

- In the 2018-2019 school year, 66% of high schools taught at least one computer science course, compared to 58% in 2017-2018.
- 32 schools (16% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is one fewer than the previous year.
- 87 female students (23%) took an AP CS exam in 2018, compared to 68 (17%) in 2017.
- 70 underrepresented minority students (19%) took an AP CS exam in 2018, compared to 36 (9%) in 2017.
- 1080 bachelor's degrees in computer science were earned in 2017; 13% were female.



Vermont

1 State Plan	2 Standards	3 Funding
No	No	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	District Decision	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state passed a permissive and encouraging policy to allow computer science to count towards a core graduation requirement, but it is a district decision.

Data

- In the 2018-2019 school year, 27% of high schools taught at least one computer science course.
- 11 schools (16% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is one fewer than the previous year.
- 16 female students (12%) took an AP CS exam in 2018, compared to 25 (20%) in 2017.
- 4 underrepresented minority students (3%) took an AP CS exam in 2018, compared to 4 (3%) in 2017.
- 266 bachelor's degrees in computer science were earned in 2017; 16% were female.



Virginia

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math, Science, & CTE	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state allocated \$550K per year for FY 2019 and 2020 for K-12 computer science professional development.
- HB 2217/SB 1419 (2019) established a micro-credential program in science, technology, engineering, and mathematics (STEM) endorsement areas, including computer science.
- Governor Ralph Northam is a member of the Governors' Partnership for K-12 Computer Science.
- Virginia is a member of the ECEP Alliance.

Data

- In the 2017–2018 school year, 66% of high schools taught at least one computer science course, compared to 63% in 2016–2017.
- 158 schools (34% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 24 more schools than the previous year.
- 1,341 female students (27%) took an AP CS exam in 2018, compared to 1,121 (26%) in 2017.
- 720 underrepresented minority students (14%) took an AP CS exam in 2018, compared to 600 (14%) in 2017.
- 1,865 bachelor's degrees in computer science were earned in 2017; 19% were female.



Washington

1 State Plan	2 Standards	3 Funding
No	Yes	Yes
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The 2019–2021 budget (HB 1109) appropriated \$1M per year over the biennium for the computer science education grant program. The program required a one-to-one private match.
- SB 5088 (2019) required that each school district that operates a high school must provide access to an elective computer science course by the 2022–2023 school year.
- HB 1577 (2019) required each school district to report the number of computer science course offerings and demographics of the students who are enrolled in the courses, starting in June 2020.
- Governor Jay Inslee is the co-chair of the Governors' Partnership for K-12 Computer Science.
- Washington is a member of the ECEP Alliance.

Data

- 155 schools (36% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 20 more schools than the previous year.
- 817 female students (27%) took an AP CS exam in 2018, compared to 749 (28%) in 2017.
- 313 underrepresented minority students (10%) took an AP CS exam in 2018, compared to 259 (10%) in 2017.
- 1,700 bachelor's degrees in computer science were earned in 2017; 24% were female.



West Virginia

1 State Plan	2 Standards	3 Funding
In Progress	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math & Science	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- SB 267 (2019) required the State Board to adopt a policy detailing the appropriate level of computer science instruction that shall be available to students at each programmatic level prior to the 2020–2021 school year. The bill also required the Department of Education to develop and offer professional development opportunities for teachers. The Department of Education is developing a state plan to meet these requirements.
- The state developed course-specific teacher certifications in 2019, each of which requires a minimum of 60 hours of professional development: the Permanent Authorization for Introduction to Computer Science and the Permanent Authorization for Computer Science Discoveries.

Data

- In the 2018–2019 school year, 46% of high schools taught at least one computer science course.
- 25 schools (20% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 10 more schools than the previous year.
- 78 female students (31%) took an AP CS exam in 2018, compared to 88 (36%) in 2017.
- 9 underrepresented minority students (4%) took an AP CS exam in 2018, compared to 10 (4%) in 2017.
- 202 bachelor's degrees in computer science were earned in 2017; 15% were female.



Wisconsin

1 State Plan	2 Standards	3 Funding
No	Yes	No
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	Yes	No
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
No	Math	No

Refer to advocacy.code.org for additional up-to-date information.

Updates

- State statute requires each school board to provide an instructional program designed to give students knowledge in computer science, including problem solving, computer applications, and the social impact of computers.

Data

- In the 2018–2019 school year, 42% of high schools taught at least one computer science course, compared to 34% in 2017–2018.
- 87 schools (17% of schools with AP programs) offered an audited AP computer science course in 2017–2018, which is 19 more schools than the previous year.
- 294 female students (20%) took an AP CS exam in 2018, compared to 172 (17%) in 2017.
- 107 underrepresented minority students (7%) took an AP CS exam in 2018, compared to 55 (5%) in 2017.
- 1,190 bachelor's degrees in computer science were earned in 2017; 7% were female.



Wyoming

1 State Plan	2 Standards	3 Funding
Yes	In Progress	Other
4 Certification	5 Preservice Teacher Prep	6 State Supervisor
Yes	No	Yes
7 Require HS to Offer	8 Core Grad Credit	9 Higher Ed Admission
ES, MS, HS	Math & Science	Yes

Refer to advocacy.code.org for additional up-to-date information.

Updates

- The state began development of K-12 computer science standards in July 2018 and is slated to adopt them later in 2019.
- The Department of Education hired a Math and Computer Science Consultant to lead the computer science efforts.
- SF 29 (2018) required each school to include computer science and computational thinking by the 2022-2023 school year.

Data

- In the 2018-2019 school year, 60% of high schools taught at least one computer science course.
- 8 schools (19% of schools with AP programs) offered an audited AP computer science course in 2017-2018, which is 3 more schools than the previous year.
- 10 female students (26%) took an AP CS exam in 2018, compared to 5 (24%) in 2017.
- 3 underrepresented minority students (8%) took an AP CS exam in 2018, compared to 0 in 2017.
- 42 bachelor's degrees in computer science were earned in 2017; 7% were female.



K-12 Computer Science Access Report

The *K-12 Computer Science Access Report*, launched in September 2017, is a collaborative partnership between the Computer Science Teachers Association and Code.org to identify, on a school-by-school basis, where computer science courses are taught. This report provides a point-in-time view of computer science implementation in the U.S. So far, the initiative has collected data on 55% of all public K-12 schools and 83% of all public high schools. This is an increase of 13% across K-12 schools and 16% of public high schools reported last year. Based on this limited data, at least 33,376 public schools in the U.S. teach computer science (there are 100,729 public schools in the nation). Refer to code.org/yourschool for an interactive map of the most up-to-date data.

The current data set includes elementary, middle, and high schools from every state with the most data coming from public high schools (including public charter schools and any schools that offer at least one high school grade). In order to provide an accurate portrayal of implementation, this chapter only reflects public high schools and only states where data has been collected from all public high schools. Last year, the report included data from 24 states; this year, it includes 39 states. These 39 states represent 65% of the total number of public high schools in the nation.

Based on complete data sets from 18,091 public high schools in these 39 states, 45% of public high schools teach computer science. From the 13 states with complete data sets for both the 2017–2018 and 2018–2019 school years, the percentage of public high schools teaching computer science has increased from 37% to 46%, or from 2,224 public high schools to 2,789 public high schools.

The first part of this chapter describes the methodology for data collection, including data sources, and the methodology for determining which courses are computer science courses. The second part is composed of graphs showing the percentage of high schools in a state teaching computer science, the types of communities in which computer science is offered, student diversity and access, and income levels and access. The next part of this chapter describes the relationship between policy and implementation. The last part highlights five states that have successfully made gains in computer science access.

There are 39 states included in this report. New states added to the report this year are highlighted.

Alabama*	Indiana	Nebraska	Pennsylvania
Alaska	Iowa	Nevada	Rhode Island
Arkansas	Kansas*	New Hampshire	South Carolina
California	Kentucky*	New Jersey	Utah
Delaware	Louisiana	New Mexico	Vermont
District of Columbia	Maryland	New York	Virginia
Florida	Massachusetts	North Carolina*	West Virginia
Georgia	Mississippi	North Dakota	Wisconsin
Hawaii	Missouri	Oklahoma*	Wyoming
Illinois	Montana	Oregon	

*States without new data; previous years' data set is reported

Data Sources

Data Source	Description
National Center for Education Statistics (NCES)	Database of schools in the country with demographic information including enrollment in Free and Reduced Lunch programs, student demographics, and grades offered. The most recently available 2017-2018 NCES list of schools is used for the overall number of schools.
School Courses for the Exchange of Data (SCED)	SCED is a common classification system for middle and high school courses. Some states use SCED for a course classification system.
State departments of education	School names, school IDs, course codes, course enrollment, and course descriptions
National organizations (e.g., the College Board, the International Baccalaureate)	School names, school IDs, course names, and course descriptions
District/school course catalogs	Direct contact with school employees and school course catalogs for course names and descriptions
Survey responses	Completed surveys about course offerings on Code.org and Hourofcode.com from teachers, administrators, and parents

Data from state education agencies was collected through direct collaboration or via requests submitted through an online portal. State data included school codes, course codes, course descriptions, and course enrollment. Data was collected throughout the school year, starting in fall 2018. States with complete data sets are defined as those where all public high schools report their course offerings to the state department of education, or where data was collected for every public high school via another method (see table above for more detail).

School codes were cross-referenced with data from the National Center for Education Statistics (NCES) to determine each school's community type, underrepresented minority (URM) enrollment, and the percentage of students receiving free and reduced lunch (FRL). The NCES uses four main categories for community type (City, Suburban, Town, Rural) which can be reduced to two categories based on the U.S. Census Bureau urban-rural classification: Urban (City, Suburban, and Town) and Rural. Race/ethnicity categories from the NCES that we define as URM are Hispanic, American Indian/Alaska Native, Black or African American, and Native Hawaiian or Other Pacific Islander. State departments of education and organizations interested in providing statewide implementation data should contact accessreport@code.org.

Defining a Computer Science Course

The following definition of computer science was developed by the Computer Science Teachers Association (Tucker, 2003) and later reaffirmed in the *K-12 Computer Science Framework*:

Computer science is the study of computers and algorithms, including their principles, their hardware and software designs, their implementation, and their impact on society.

Learning computer science means learning how to create new technologies, rather than simply using them. Although many schools offer their students some exposure to computer science in a limited capacity such as an Hour of Code, this report focuses on **schools that teach a foundational computer science course**.

These are schools where students learn computer science during the school day (not in after school clubs) and spend a minimum amount of time per semester applying learned concepts through programming (at least 20 hours of programming for grades 9–12 high schools and at least 10 hours of programming for K–8 elementary and middle schools). Although computer science is broader than programming, some direct programming experience is integral to learning the fundamental concepts and is used as a defining characteristic to differentiate foundational computer science courses from non-computer science courses.

Changes for this Year's Report

In last year's report, the list of schools used in the denominator of all calculations was the set of all schools available in either one or both of the NCES annual school databases published for the 2013–2014 and 2014–2015 school years. This resulted in a slightly inflated number for the total number of schools in a state. This year's report includes only the most current list of schools published by the NCES, which is based on the 2017–2018 school year. This resulted in a decrease of 4% in the total number of schools for the 2017–2018 school year, which results in slightly different numbers from those reported in last year's report.

This year, the SCED and state-level course catalogs were reexamined, and courses were added (or deleted) based on course description. This resulted in the addition of three SCED courses and over 200 courses across the states. These 200 courses were either new courses in the state catalog, new state course descriptions that fit our definition, or courses aligned with the three additional SCED course codes.



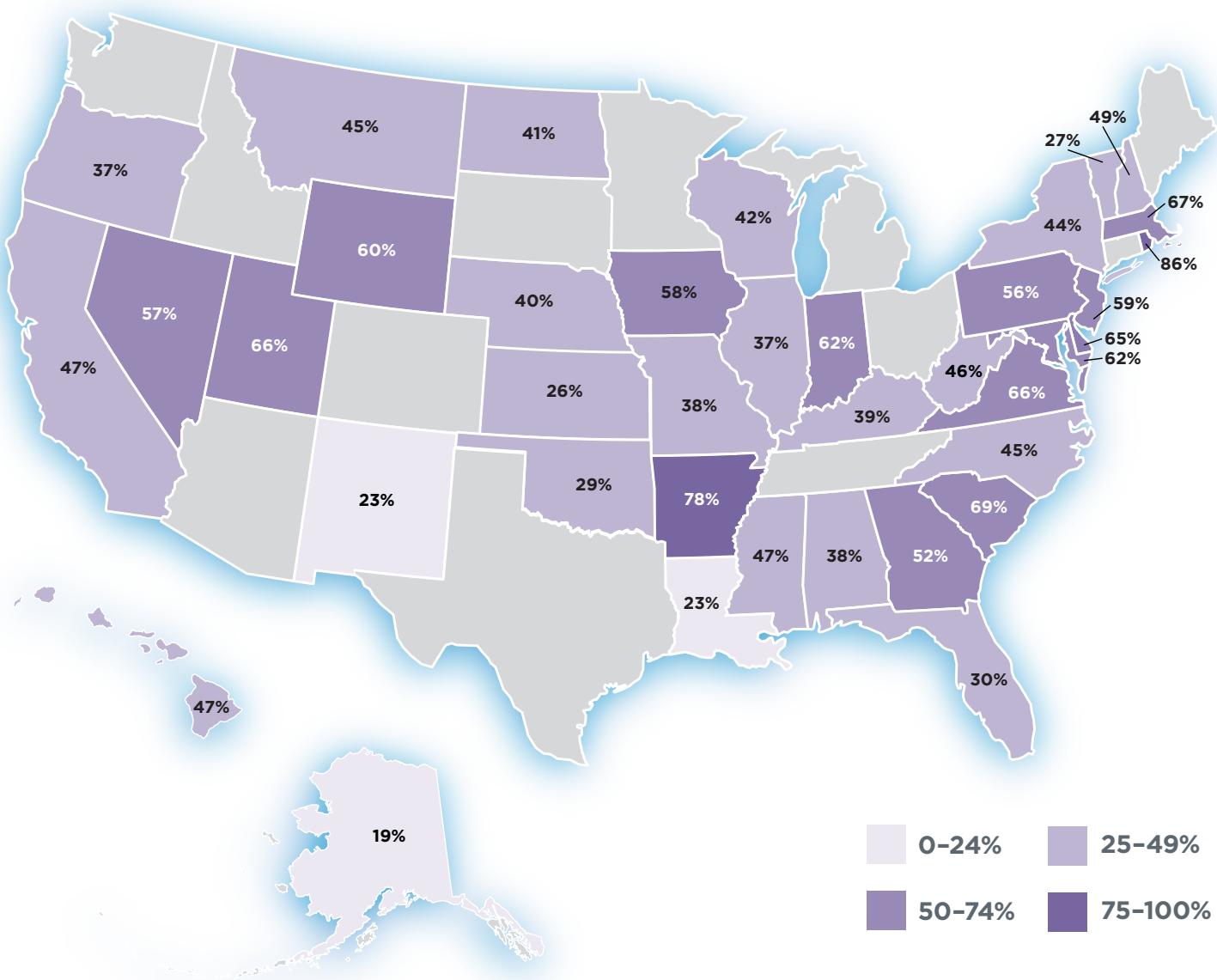
Inferring Between Years

Each year, unless new data is provided, it is inferred that if a school taught computer science in the previous year, the school is still teaching computer science. This ensures any data obtained from a school course catalog or survey (and not reported from the state department of education or a national organization) is carried forward to the new year.

State-by-State Data

Percent of Public High Schools Teaching Computer Science

A state is included in this map if data has been collected from all of the state's public high schools.



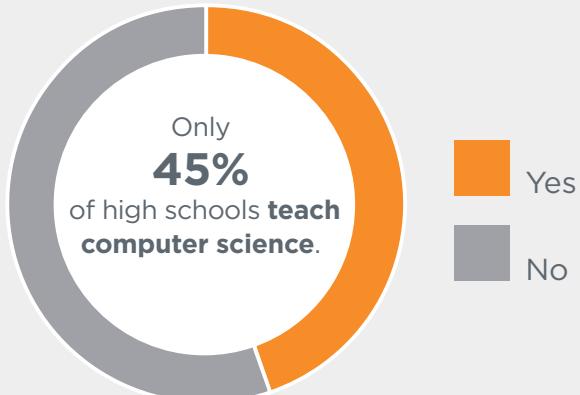
Public High Schools Teaching Computer Science (CS): Overall, By Community, By Underrepresented Minority, By Free and Reduced Lunch

A state is included in this table if data has been collected from almost all of the state's public high schools.

	Overall Implementation	Last Reported Year	By Community Type		By Percent Underrepresented Minorities		By Percent Free and Reduced Lunch	
State	% teaching CS	Year	Urban	Rural	Under 50% URM	Over 50% URM	Under 50% FRL	Over 50% FRL
Alaska	19%	2018	26%	18%	27%	13%	23%	15%
Alabama	38%	2017	43%	36%	49%	45%	63%	40%
Arkansas	78%	2018	72%	81%	88%	70%	89%	82%
California	47%	2017	48%	27%	53%	40%	58%	39%
District of Columbia	20%	2018	21%	N/A	0%	20%	20%	21%
Delaware	65%	2018	63%	79%	68%	72%	74%	0%
Florida	30%	2018	35%	22%	36%	33%	32%	40%
Georgia	52%	2018	64%	43%	60%	48%	81%	45%
Hawaii	47%	2017	56%	40%	56%	39%	54%	44%
Iowa	58%	2018	72%	55%	58%	78%	61%	48%
Illinois	37%	2018	54%	23%	38%	49%	46%	37%
Indiana	62%	2018	68%	59%	67%	65%	70%	59%
Kansas	26%	2017	48%	21%	26%	36%	30%	21%
Kentucky	39%	2017	44%	39%	42%	37%	55%	36%
Louisiana	23%	2018	33%	18%	25%	24%	38%	19%
Massachusetts	67%	2017	69%	66%	76%	48%	81%	49%
Maryland	62%	2018	60%	75%	76%	51%	74%	44%
Missouri	38%	2018	48%	34%	41%	46%	51%	34%
Mississippi	47%	2018	58%	45%	58%	33%	55%	45%
Montana	45%	2018	70%	44%	48%	26%	50%	34%
North Carolina	45%	2017	48%	46%	50%	41%	58%	36%
North Dakota	41%	2018	53%	40%	43%	38%	45%	25%
Nebraska	40%	2017	64%	37%	44%	50%	44%	43%
New Hampshire	49%	2018	38%	60%	49%	N/A	50%	40%
New Jersey	59%	2018	61%	60%	72%	44%	68%	47%
New Mexico	23%	2018	27%	20%	30%	22%	31%	20%
Nevada	57%	2018	63%	52%	60%	57%	57%	69%
New York	44%	2017	43%	47%	57%	30%	57%	33%
Oklahoma	29%	2017	52%	26%	30%	33%	34%	28%
Oregon	37%	2017	51%	27%	37%	35%	48%	33%
Pennsylvania	56%	2018	59%	52%	67%	39%	69%	46%
Rhode Island	86%	2017	87%	88%	92%	81%	97%	79%
South Carolina	69%	2018	74%	66%	82%	64%	82%	69%
Utah	66%	2018	70%	56%	68%	52%	72%	51%
Virginia	66%	2017	72%	59%	73%	58%	74%	56%
Vermont	27%	2018	50%	25%	31%	N/A	25%	30%
Wisconsin	42%	2018	46%	40%	47%	21%	51%	31%
West Virginia	46%	2018	41%	31%	39%	N/A	59%	22%
Wyoming	60%	2018	78%	63%	75%	40%	78%	53%

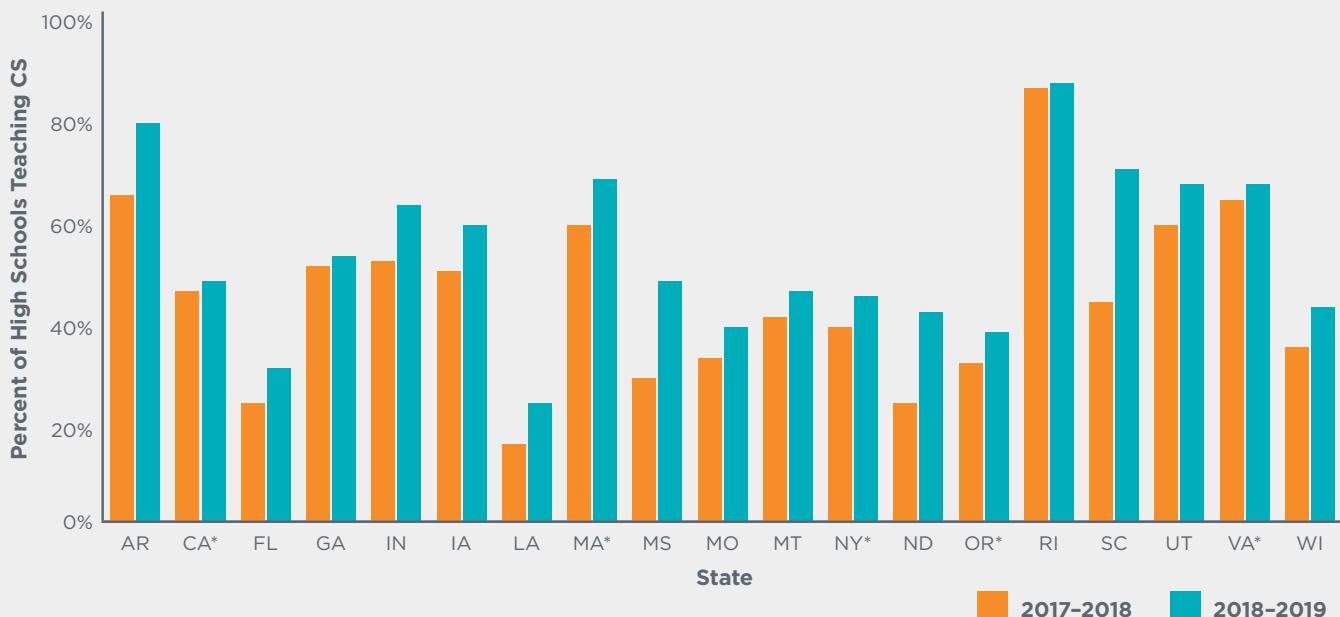
Percent of High Schools Teaching Computer Science

Across 39 states, 45% of public high schools teach computer science.



Growth in Implementation Rate

Only states reporting all public high school data for two consecutive school years are included.

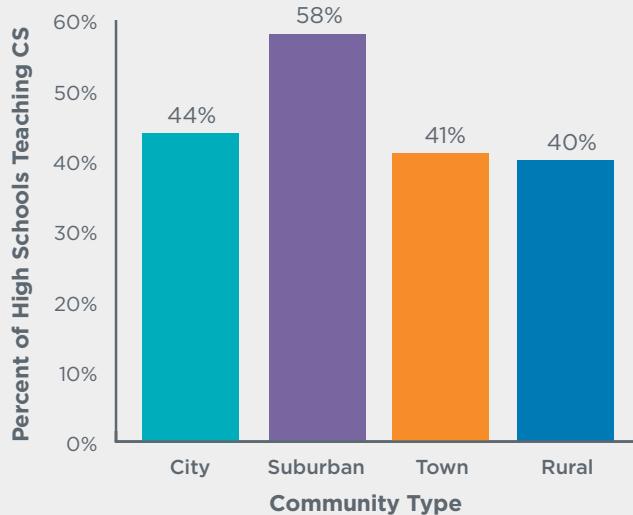


*State lags one year behind in reporting. The comparison is between the 2016–2017 and 2017–2018 school years.

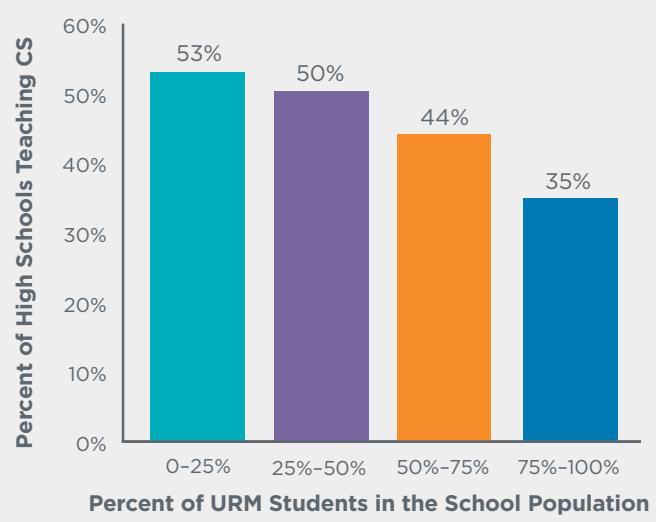
Community, Race/Ethnicity, and Socioeconomic Status and Access to Computer Science

Schools in rural communities, schools with higher percentages of underrepresented minority students, and schools with higher percentages of students receiving free and reduced lunch are less likely to teach computer science.

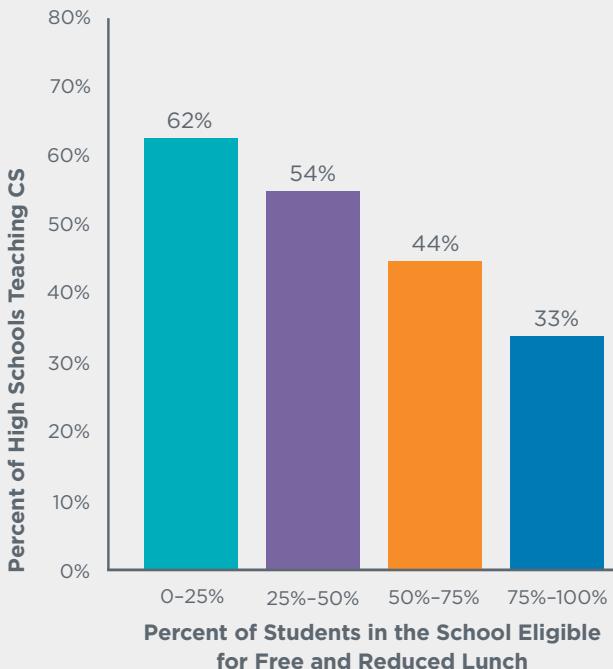
Percent of High Schools Teaching Computer Science by Community Type



Underrepresented Minority Students and Access to Computer Science

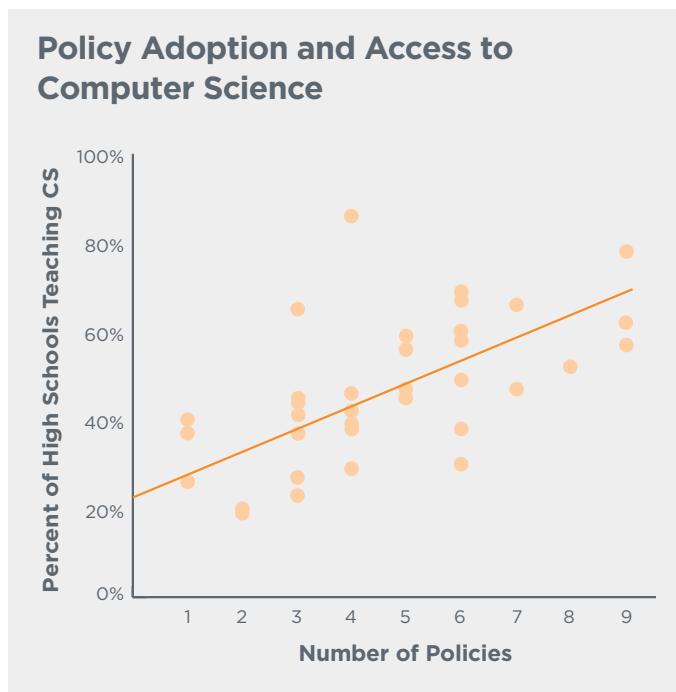


Income Level and Access to Computer Science

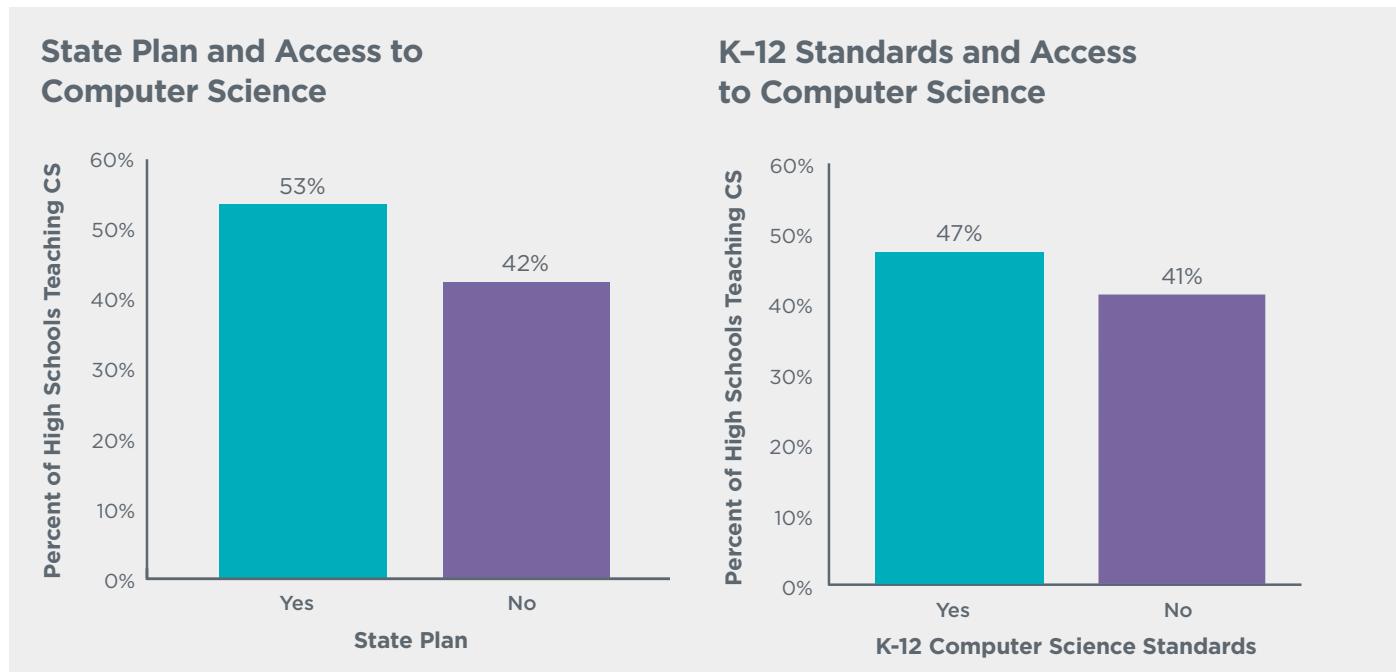


Policies and Access to Computer Science

Individually, many of the nine policies show a positive relationship with the percentage of high schools teaching computer science. In addition, the total number of policies that a state has adopted has a positive relationship with the percentage of high schools teaching computer science. Results from a multiple linear regression showed a significant positive relationship between the number of policies adopted and the teaching rate of computer science in a state ($p < 0.0001$, $r^2 = 0.39$).



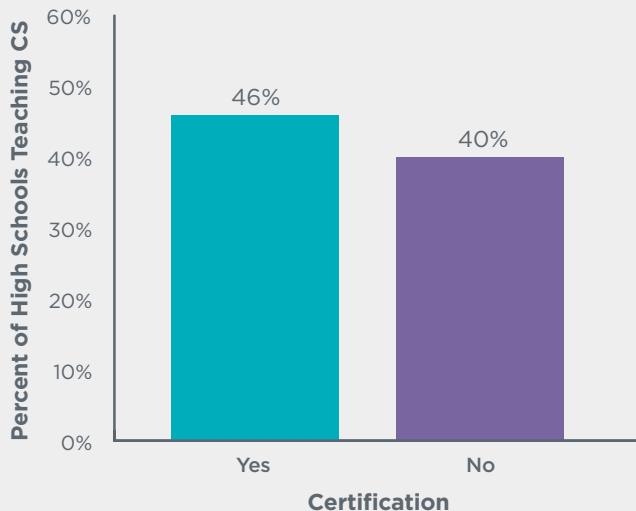
States that adopt more policies around computer science education see a higher number of schools teaching computer science.



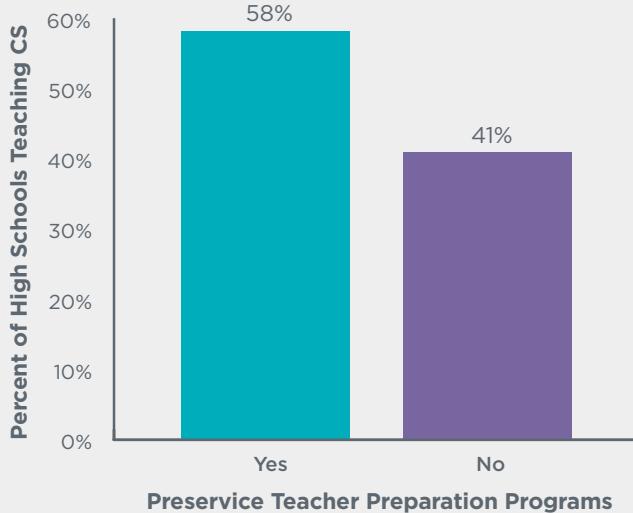
Funding and Access to Computer Science



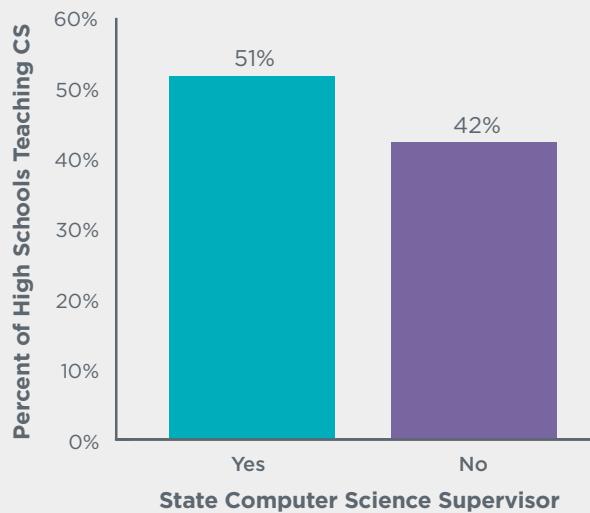
Certification and Access to Computer Science



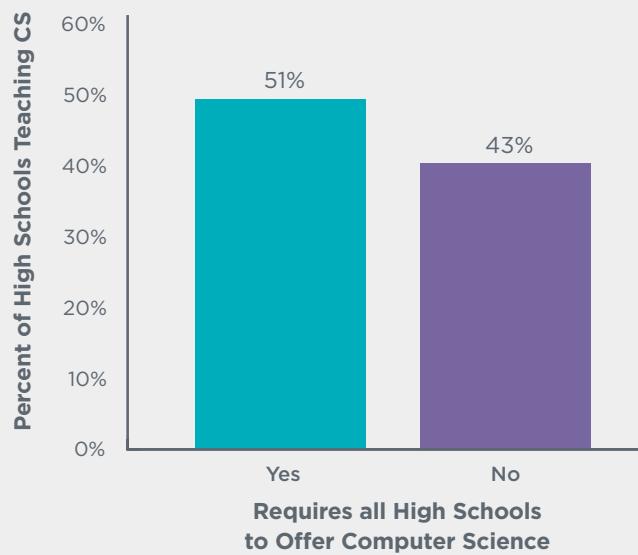
Preservice Teacher Preparation Programs and Access to Computer Science



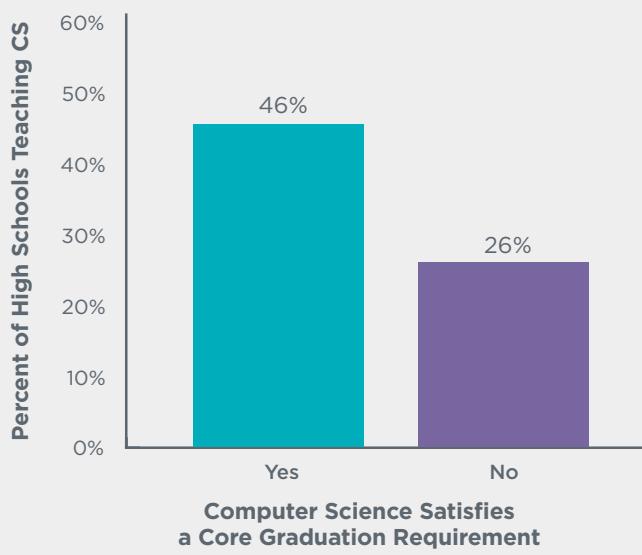
State Supervisor and Access to Computer Science



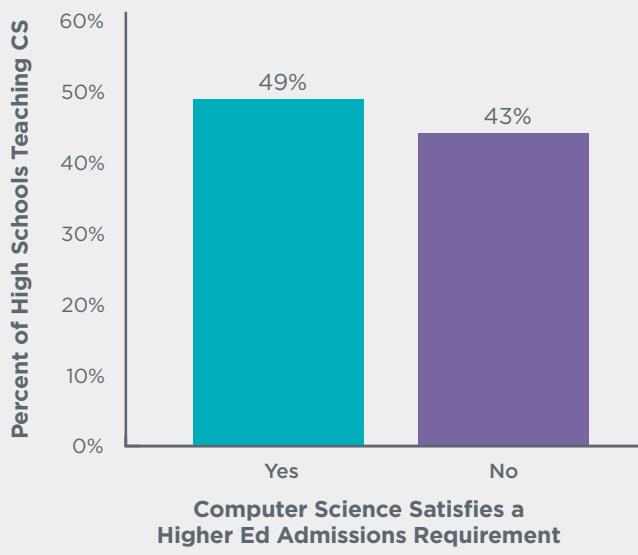
Requiring Schools to Offer Computer Science and Access to Computer Science



Computer Science Satisfying a Core Graduation Requirement and Access to Computer Science



Computer Science Satisfying a Higher Ed Admissions Requirement and Access to Computer Science



Policy and Implementation

High percentages and growth in the number of schools teaching computer science are often driven by a combination of policy and implementation. Rhode Island and Arkansas continue to show the greatest percentages of high schools teaching computer science. South Carolina, Mississippi, and North Dakota show the highest rates of growth from last year.

Rhode Island

The percentage of high schools in Rhode Island that teach computer science increased from 78% in the 2017-2018 school year to 86% in the 2018-2019 school year. Strong leadership, policy decisions, and statewide coordination continue to contribute to the highest percentage of public high schools teaching computer science in this data set. The Computer Science for Rhode Island (CS4RI, cs4ri.org) initiative, launched in 2016 by the Office of Governor Gina Raimondo, has been key to this effort. Driven by a diverse team of stakeholders from government, the department of education, nonprofit partners, higher education, and industry, CS4RI strategically focuses on teacher professional development, district support, and K-12 student pathways to broaden participation and advance computer science education in Rhode Island. For more information on what types of stakeholders to include in state efforts, ECEP has collected a list of common stakeholders to consider (ecepalliance.org/resources/stakeholders-involved-bpc).



Arkansas

Arkansas not only demonstrates a large percentage of high schools teaching computer science but also continued growth, increasing from 64% in the 2017–2018 school year to 78% for the 2018–2019 school year. Arkansas has put all nine model state policies developed by the Code.org Advocacy Coalition in place, including a requirement that all high schools offer computer science (Act 187, 2015), a total allocation of \$15M in state funding, and a team of statewide Computer Science Specialists and part-time Computer Science Trainers. Arkansas has used the funding for teacher stipends and reimbursements, including: stipends to teachers who add the computer science endorsement onto their license, enroll at least ten students in a computer science course (for high school teachers), and/or attend professional development and become a K-8 Computer Science Lead Teacher at their school (for K-8 teachers).

Arkansas Sees Increase in Enrollment and Representation

In the 2018–2019 school year, only four years into its initiative, Arkansas reached its five year goal of having over 7,500 high school students enroll in a high-quality computer science course, with a statewide enrollment of 8,044. Since the 2014–2015 school year, this is an overall increase of 6,941 students (+629%) and an increase in female student enrollment of 2,261 (+1,014%).

In addition to seeing this increase in the raw number of female students enrolled in computer science courses, we have also seen the percentage representation increase—meaning that girls' enrollment is increasing at a faster rate than boys'. Across all computer science courses, the representation of female students increased from 20% in the 2014–2015 school year to 27% in the 2018–2019 school year. We attribute this growth to state policy as well as our amazing Arkansas teachers. In 2015, the state required every high school to offer at least one course and, for the first time, dedicated funding to support teachers in beginning to teach computer science. Over the past three years, hundreds of teachers have gone through professional development in computer science funded by the state. More and more of those teachers are adding the 528 4-12 Computer Science Endorsement to their teaching license: 6 teachers in 2015, 17 in 2016, 69 in 2017, and 92 Arkansas educators in 2018. As a result, 85% of the students taking a computer science course in 2018 did so in a face-to-face classroom (rather than a virtual classroom).

— Anthony Owen

State Director of Computer Science Education
Arkansas Department of Education

South Carolina

The percentage of high schools in South Carolina that teach computer science increased from 43% in the 2017–2018 school year to 69% in the 2018–2019 school year. Key to this growth was a decision to revise the list of courses approved to satisfy the state's computer science graduation requirement to include computer science courses only. South Carolina has had a graduation requirement in computer science for years but allowed students to fulfill the requirement with non-computer science courses like keyboarding. The revised course list effectively requires all students to take at least one computer science course to graduate high school. Leadership from the South Carolina Department of Education, partnerships with state organizations such as The STEM Center of Excellence at The Citadel, and dedicated state funding for professional learning from the South Carolina General Assembly are some of the factors that explain the largest improvement in this report.

Mississippi

The percentage of high schools in Mississippi that teach computer science increased from 28% in the 2017–2018 school year to 47% in the 2018–2019 school year. A number of policy and implementation decisions working together can explain this growth, including the decision to amend the state high school diploma requirements to require one credit in computer science or technology, effective for students entering high school in the 2018–2019 school year. Although students can satisfy the requirement with a technology course, most of the courses on the approved course list are computer science. Admissions requirements to state institutions of higher education were also amended to align to the high school requirement. Since 2016, the Research and Curriculum Unit (RCU) at Mississippi State University, in partnership with the Mississippi Department of Education, has provided professional development for over 1,000 teachers. RCU is increasing awareness in rural areas by hosting Hour of Code events and summer camps in rural districts. With an appropriation of \$300K for FY 2020 to the Mississippi State University Center for Cyber Education for computer science program development and teacher professional development, the state continues to set an environment in which more schools will teach computer science.

North Dakota

The percentage of high schools in North Dakota that teach computer science increased from 23% in the 2017–2018 school year to 41% in the 2018–2019 school year. Strong leadership from Superintendent Baesler of the North Dakota Department of Public Instruction and Governor Burgum has been a key factor in this growth. In March 2019, North Dakota adopted the nation's first Computer Science and Cybersecurity Standards, embedding cybersecurity knowledge and skills across all grades and strands in the standards. Later that month, the Governor signed SB 2171 (2019), giving the Department of Public Instruction the ability to credential computer science teachers.

“Our role is to align public education with the skills needed in tomorrow’s job market, and right now there’s a great demand for computer science and cybersecurity skills in North Dakota. The 18% increase in engagement is proof that students really want to learn these skills when they have the opportunity and resources.”



— Kirsten Baesler
State Superintendent
North Dakota Department of Public Instruction

Conclusion

In each of these states, we see the relationship between state policy decisions and the number of schools teaching computer science. We also see the effect of strong leadership (three of the five states are members of the Governors' Partnership for K-12 Computer Science) and collaboration between the governors' offices and the state education agency to support implementation by local education agencies.

Other states in the published data set have recently made significant policy decisions to increase the number of schools teaching computer science. California, Michigan, and Wyoming have added computer science as a priority for professional development funding and Texas has added specific computer science courses to per-student formula funding. Alaska adopted their first computer science standards and communicated to districts that computer science can count towards graduation requirements for mathematics, science, technology, or career and technical education. West Virginia and Kansas are in the process of developing state plans to expand computer science across their respective states. The Pennsylvania Training and Technical Assistance Network has a team dedicated to supporting computer science professional development statewide. Policy and implementation efforts like these create a positive outlook not only for the number of schools teaching computer science, but also for student enrollment and diversity in 2020 and beyond.



For up-to-date policy data and advocacy resources, visit advocacy.code.org

For the latest K-12 computer science access data, visit code.org/yourschool

For more information on joining the CSTA or CSTA chapters, visit csteachers.org

For more information about ECEP state teams, visit ecepalliance.org

Integrity
is
doing
the right
thing
when no one
is watching.
—CS Lewis





About the Code.org Advocacy Coalition



Bringing together more than 70 industry, non-profit, and advocacy organizations, the **Code.org Advocacy Coalition** is growing the movement to make computer science a fundamental part of K-12 education.

About the CSTA



The Computer Science Teachers Association (**CSTA**) is a membership organization that supports and promotes the teaching of computer science. CSTA provides opportunities for K-12 teachers and their students to better understand computer science and to more successfully prepare themselves to teach and learn.

About the ECEP Alliance



The Expanding Computing Education Pathways (**ECEP**) Alliance is an NSF-funded Broadening Participation in Computing Alliance (NSF-CNS-1822011). As an alliance of 22 states and Puerto Rico, ECEP seeks to increase the number and diversity of students in computing and computing-intensive degrees through advocacy and policy reform.