Support K-12 Computer Science Education in California

Computer science drives job growth and innovation throughout our economy and society. Computing occupations are the **number 1 source of all new wages in the U.S.** and make up over half of all projected new jobs in STEM fields, making Computer Science one of the most in-demand college degrees. And computing is used all around us and in virtually every field. It's foundational knowledge that all students need. But computer science is marginalized throughout education. Only 57.5% of U.S. high schools teach any computer science courses and only 4% of bachelor's degrees are in Computer Science. We need to improve access for all students, including groups who have traditionally been underrepresented.

93% of parents want their child's school to teach computer science, but only **53% of high schools** offer it.

More than **70% of superintendents and principals** say offering computer science is just as important as offering subjects like English, math, history, and science.

50% of Americans rank computer science as one of the two most important subjects of study after reading and writing.

Students who learn computer science in high school are **six times** more likely to major in it, and **women are ten times more likely**.

Black students are **more interested** in CS and **more confident** in their abilities than white students but are less likely to enroll in a class.

Yet, there were only 9,339 graduates in computer science in 2020 and only 45% of all public high schools teach a foundational computer science course.

Computer science in California

- Only **32,235 exams were taken in AP Computer Science by high school students in** California in 2020 (11,989 took AP CS A and 20,246 took AP CSP).
- Only 32% were taken by female students (27% for AP CS A and 35% for AP CSP); only 7,400 exams were taken by Hispanic/Latino/Latina students (1,666 took AP CS A and 5,734 took AP CSP); only 619 exams were taken by Black/African American students (149 took AP CS A and 470 took AP CSP); only 110 exams were taken by Native American/Alaskan students (22 took AP CS A and 88 took AP CSP); only 70 exams were taken by Native Hawaiian/Pacific Islander students (16 took AP CS A and 54 took AP CSP).
- Only **848 schools** in CA (40% of CA schools with AP programs) offered an AP Computer Science course in 2019-2020 (24% offered AP CS A and 31% offered AP CSP), which is 62 more than the previous year.
- Teacher preparation programs in California only graduated 3 new teachers prepared to teach computer science in 2018.
- According to a representative survey from Google/Gallup, school administrators in CA support expanding computer science education opportunities: 70% of principals surveyed think CS is just as or more important than required core classes. And one of their biggest barriers to offering computer science is the lack of funds for hiring and training teachers.

What can you do to support K-12 CS education in California?

- Send a letter to your school/district asking them to expand computer science offerings at every grade level: %a{href:"https://code.org/promote/letter"} www.code.org/promote/letter
- Find out if your school teaches computer science or submit information about your school's offerings at **www.code.org/yourschool**.
- Visit **www.code.org/educate/3rdparty** to find out about courses and curriculum from a variety of providers, including Code.org.

Code.org's impact in California

- In California, Code.org's curriculum is used in
  - 24% of elementary schools
  - 22% of middle schools
  - 16% of high schools
- There are 123,689 teacher accounts and 4,827,629 student accounts on Code.org in California.
- Of students in California using Code.org curriculum last school year,
  - 59% attend high needs schools
  - 7% are in rural schools
  - 42% are female students
  - 7% are Black/African American students
  - 34% are Hispanic/Latino/Latina students
  - 0% are Native American/Alaskan students
  - 1% are Native Hawaiian/Pacific Islander students
  - 20% are white students
  - 16% are Asian students
  - 7% are students who identify as two or more races
- Code.org, its regional partner(s) Contra Costa County Office of Education, Fresno County Superintendent of Schools, Los Angeles Unified School District, Riverside County Office of Education, Sacramento County Office of Education, Silicon Valley Education Foundation, University of California San Diego CREATE, and USC Viterbi School of Engineering, and 59 facilitators have provided professional learning in California for
  - 11,379 teachers in CS Fundamentals (K-5)
  - 1,047 teachers in Exploring Computer Science or Computer Science Discoveries
  - 711 teachers in Computer Science Principles

What can your state do to improve computer science education?

States and local school districts need to adopt a broad policy framework to provide all students with access to computer science. The following ten recommendations are a menu of best practices that states can choose from to support and expand computer science. Not all states will be in a position to adopt all of the policies. Read more about these 10 policy ideas at **https://advocacy.code.org/2023_making_cs_foundational.pdf** and see our rubric for describing state policies at **http://bit.ly/9policiesrubric**.

 State Plan - The California State Board of Education adopted the Computer Science Strategic Implementation Plan in 2019. The plan includes practices and recommendations for equitable outcomes, such as providing culturally responsive training materials to support educators.

 K-12 Standards - California adopted K–12 computer science standards in 2018. The introduction includes "Issues of Equity," describing equity, access, and representation. Standards within each grade band address concepts of equity, such as bias, accessible technology, and inclusivity. The California NGSS Curriculum Framework also includes major sections on computational thinking and computer science for educators.

 Funding - AB 181 (FY 2023) allocated $15M for competitive grants for professional learning to K-12 teachers to provide high-quality instruction in computer science. AB 128 (FY 2022) allocated $5M to establish the Educator Workforce Investment Grant to provide professional development in computer science for K-12 teachers and AB 130 (FY 2022) allocated an additional $15M for the Computer Science Supplementary Authorization Incentive Grant Program. SB 75 (FY 2019) appropriated $22.1M to the Educator Workforce Investment Grant Program, including $5M to support professional learning for computer science teachers, though the state reallocated this funding for COVID-19 relief in April 2020.

 Certification - In California, teachers with existing licensure can obtain a supplementary authorization for PreK–12 through academic coursework. The state provided dedicated funding in FY 2022 to offset the cost of computer science certification.

 Pre-Service Programs - California **has not yet** established programs at institutions of higher education to offer computer science to preservice teachers. The computer science teacher shortage can be addressed by exposing more preservice teachers to computer science during their required coursework or by creating specific pathways for computer science teachers.

 Dedicated State Position - The California Department of Education has a Computer Science Coordinator.

 Require High Schools to Offer - California **does not yet** require that all secondary schools offer computer science. The state can support the expansion of computer science courses by adopting policies that require schools to offer a computer science course based on rigorous standards, with appropriate implementation timelines and allowing for remote and/or in-person courses.

Count Towards Graduation - California passed a permissive and encouraging policy to allow computer science to count as a science or mathematics credit for graduation, but it is a district decision.

 Higher Ed Admission - Approved computer science courses can count as the recommended third-year science course (area D) or as a mathematics credit (area C) required under the University of California system admissions criteria, which aligns with the high school graduation policy.

 Graduation Requirement - California **does not yet** require students to take computer science to earn a high school diploma. Graduation requirements ensure that all students get exposure to computer science.

Follow us!

Join our efforts to give every student in every school the opportunity to learn computer science. Learn more at **code.org**, or follow us on **Facebook** and **Twitter**.

Launched in 2013, Code.org® is a nonprofit dedicated to expanding access to computer science, and increasing participation by women and underrepresented youth. Our vision is that every student in every school should have the opportunity to learn computer science.

Who can you connect with locally to talk about K-12 CS education policy?

- You can reach Code.org's policy contact for your state, Amber Mariano Davis, at amber@code.org.
- The Expanding Computing Education Pathways (ECEP) Alliance (**www.ecepalliance.org**), an NSF funded Broadening Participation in Computing Alliance, seeks to increase the number and diversity of students in computing and computing-intensive degrees by promoting state-level computer science education. ECEP supports 22 states and the territory of Puerto Rico to develop effective and replicable interventions to broaden participation in computing and to create state-level infrastructure to foster equitable computing education policies. You can reach your ECEP point of contact Julie Flapan at flapan@gseis.ucla.edu or Debra Richardson at djr@ics.uci.edu and see your state ECEP project at **http://access-ca.org/**.

Data is from the Conference Board for job demand, the Bureau of Labor Statistics for state salary and national job projections data, the College Board for AP exam data, the National Center for Education Statistics for university graduate data, the Gallup and Google research study Education Trends in the State of Computer Science in U.S. K-12 Schools for parent demand, the 2018 Computer Science Access Report for schools that offer computer science, and Code.org for its own courses, professional learning programs, and participation data.