

# Support K-12 Computer Science Education in Maryland

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 53% 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.

In Maryland, there are currently 15,118 open computing jobs with an average salary of \$122,332.

Yet, there were only 5,121 graduates in computer science in 2020 and only 98% of all public high schools teach a foundational computer science course.

## Computer science in Maryland

- Only **7,610 exams** were taken in **AP Computer Science** by high school students in Maryland in 2020 (2,145 took AP CS A and 5,465 took AP CSP).
- Only 36% were taken by female students (26% for AP CS A and 40% for AP CSP); only 536 exams were taken by Hispanic/Latino/Latina students (121 took AP CS A and 415 took AP CSP); only 935 exams were taken by Black/African American students (263 took AP CS A and 672 took AP CSP); only 44 exams were taken by Native American/Alaskan students (7 took AP CS A and 37 took AP CSP); only 7 exams were taken by Native Hawaiian/Pacific Islander students (3 took AP CS A and 4 took AP CSP).
- Only **201 schools** in MD (57% of MD schools with AP programs) offered an AP Computer Science course in 2019-2020 (43% offered AP CS A and 50% offered AP CSP), which is 15 more than the previous year.
- Teacher preparation programs in Maryland only graduated 5 new teachers prepared to teach computer science in 2018.
- According to a representative survey from Google/Gallup, school administrators in MD support expanding computer science education opportunities: 76% of principals surveyed think CS is just as or more important than required core classes. And their biggest barrier 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 Maryland?

- Send a letter to your school/district asking them to expand computer science offerings at every grade level: [www.code.org/promote/letter](https://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](https://www.code.org/yourschool).
- Visit [www.code.org/educate/3rdparty](https://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 Maryland

- In Maryland, Code.org's curriculum is used in
  - 27% of elementary schools
  - 38% of middle schools
  - 46% of high schools
- There are 24,074 teacher accounts and 1,061,341 student accounts on Code.org in Maryland.
- Of students in Maryland using Code.org curriculum last school year,
  - 36% attend high needs schools
  - 19% are in rural schools
  - 47% are female students
  - 36% are Black/African American students
  - 12% are Hispanic/Latino/Latina students
  - 0% are Native American/Alaskan students
  - 0% are Native Hawaiian/Pacific Islander students
  - 29% are white students
  - 8% are Asian students
  - 4% are students who identify as two or more races
- Code.org, its regional partner(s) Maryland Codes, and 16 facilitators have provided professional learning in Maryland for
  - 1,424 teachers in CS Fundamentals (K-5)
  - 447 teachers in Exploring Computer Science or Computer Science Discoveries
  - 216 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 nine 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 9 policy ideas at [https://code.org/files/Making\\_CS\\_Fundamental.pdf](https://code.org/files/Making_CS_Fundamental.pdf) and see our rubric for describing state policies at <http://bit.ly/9policiesrubric>.

□ **State Plan** - The Maryland Center for Computing Education developed a state plan for computer science in 2018. The plan addresses efforts to increase enrollment in computer science courses for female students, students with disabilities, and students from marginalized racial and ethnic groups underrepresented in computer science.

□ **K-12 Standards** - Maryland approved K–12 computer science standards aligned to the CSTA standards in 2018. Standards within each grade band address concepts of equity, such as bias, accessible technology, and inclusivity. Maryland is currently developing standards' annotations, which assist teachers as they implement lessons aligned to the standards.

□ **Funding** - HB 281 (FY 2020 and 2021) allocated \$1M annually, an additional \$1M was allocated in HB 588 (FY 2022), and SB 185 (FY 2019) allocated \$5M for the computer science education initiative. The grants prioritize applications that focus on serving areas with high poverty, rural areas, students with disabilities, female students, or students from marginalized racial and ethnic groups.

□ **Certification** - In Maryland, teachers with existing licensure can obtain a 7–12 endorsement through academic coursework or passing the Praxis CS exam. An initial computer science licensure requires completing academic coursework and passing the exam. Pathways for CTE, alternative certification, and an accelerated certificate also exist. A stipend is available through the MCCE for teachers who pass the exam.

□ **Pre-Service Programs** - The Maryland State Department of Education has approved teacher preparation programs leading to certification in computer science and lists these programs publicly. MCCE provides funding for public or private teacher preparation institutions to establish computer science education programs or integrated computer science into existing programs via HB 281 (2018).

□ **Dedicated State Position** - The Maryland State Department of Education has a Computer Science Education Specialist as well as a Career Programs, STEM, and Computer Science Coordinator who work with the Director of the Maryland Center for Computing Education to oversee computer science education. Each local school system has also designated a central office administrator who is the point of contact for computer science.

□ **Require High Schools to Offer** - HB 281 (2018) required all high schools to offer at least one computer science course by the 2021–2022 school year, all middle schools are required to teach computational thinking, and all school boards are asked to incorporate computer science in each elementary school

and to increase the enrollment of female students, students with disabilities, and students of underrepresented ethnic or racial groups. The Maryland Computing Education dashboards provide, among other data points, school system and high school data.

□ **Count Towards Graduation** - In Maryland, Foundations of Computer Science, Computer Science Principles, AP Computer Science A, and other computer science courses can fulfill the credit requirement in Computer Science, Engineering, or Technology Education. AP Computer Science A can also count as one of the four mathematics credits for graduation.

□ **Higher Ed Admission** - AP Computer Science can count as one of the four mathematics credits required for admission at institutions of higher education, as long as computer science is not the final year course, which aligns with Maryland's high school graduation policy.

□ **Graduation Requirement** - Maryland **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](https://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.

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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, Pat Yongpradit, at [pat@code.org](mailto:pat@code.org).
- The Expanding Computing Education Pathways (ECEP) Alliance ([www.ecepalliance.org](http://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 Dianne O'Grady-Cunniff at [dogrady@usmd.edu](mailto:dogrady@usmd.edu) or Megean Garvin at [mgarvin@umbc.edu](mailto:mgarvin@umbc.edu).

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.