

Support K-12 Computer Science Education in Pennsylvania

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.



Yet, there were only 4,985 graduates in computer science in 2020 and only 71% of all public high schools teach a foundational computer science course.

Computer science in Pennsylvania

- Only **6,207 exams were taken in AP Computer Science by high school students in Pennsylvania** in 2020 (2,361 took AP CS A and 3,846 took AP CSP).
- Only 27% were taken by female students (21% for AP CS A and 31% for AP CSP); only 341 exams were taken by Hispanic/Latino/Latina students (124 took AP CS A and 217 took AP CSP); only 275 exams were taken by Black/African American students (71 took AP CS A and 204 took AP CSP); only 36 exams were taken by Native American/Alaskan students (10 took AP CS A and 26 took AP CSP); only 3 exams were taken by Native Hawaiian/Pacific Islander students (2 took AP CS A and 1 took AP CSP).
- Only **330 schools** in PA (43% of PA schools with AP programs) offered an AP Computer Science course in 2019-2020 (28% offered AP CS A and 31% offered AP CSP), which is 34 more than the previous year.
- Teacher preparation programs in Pennsylvania only graduated 4 new teachers prepared to teach computer science in 2018.
- According to a representative survey from Google/Gallup, school administrators in PA support expanding computer science education opportunities: 71% 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 Pennsylvania?

- 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/your-school.
- 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 Pennsylvania

- In Pennsylvania, Code.org's curriculum is used in
 - 22% of elementary schools
 - 20% of middle schools
 - 25% of high schools
- There are 30,770 teacher accounts and 1,971,857 student accounts on Code.org in Pennsylvania.
- Of students in Pennsylvania using Code.org curriculum last school year,
 - 34% attend high needs schools
 - 26% are in rural schools
 - 47% are female students
 - 16% are Black/African American students
 - 9% are Hispanic/Latino/Latina students
 - 0% are Native American/Alaskan students
 - 0% are Native Hawaiian/Pacific Islander students
 - 53% are white students
 - 5% are Asian students
 - 5% are students who identify as two or more races
- Code.org, its regional partner(s) Allegheny Intermediate Unit 3 and Montgomery County Intermediate Unit (MCIU), and 28 facilitators have provided professional learning in Pennsylvania for
 - 4,181 teachers in CS Fundamentals (K-5)
 - 307 teachers in Exploring Computer Science or Computer Science Discoveries
 - 179 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** - Pennsylvania **has not** yet created a state plan for K-12 computer science. A plan that articulates the goals for computer science, strategies for accomplishing the goals, and timelines for carrying out the strategies is important for making computer science a fundamental part of a state's education system.

▮ **K-12 Standards** - Pennsylvania endorsed the CSTA K-12 Computer Science Standards in 2018. Standards within each grade band address concepts of equity, such as bias, accessible technology, and inclusivity.

▮ **Funding** - Pennsylvania budgets (Act 1A for FY 2019, FY 2020, FY 2022, and FY 2023, and the FY 2021 interim budget) each dedicated \$20M annually to PAsmart, a program established to expand STEM and computer science education, including teacher professional development. PAsmart grants prioritize proposals that boost participation in computer science education for historically underserved and underrepresented populations. In FY 2024 this was increased to \$25M

▮ **Certification** - In Pennsylvania, teachers with existing licensure can obtain a 9-12 certification through passing the state content exam; teachers can also earn an initial license in computer science.

▮ **Pre-Service Programs** - The Pennsylvania Department of Education developed specific program guidelines for state approval of professional educator programs in computer science and lists these programs publicly.

▮ **Dedicated State Position** - The Pennsylvania Department of Education has a Consultant to the Secretary of Education on STEM/Computer Science.

▮ **Require High Schools to Offer** - Pennsylvania **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** - In Pennsylvania, any computer science course aligned with the computer science standards can count as a mathematics or

science credit for graduation.

▣ **IHE Admission** - Pennsylvania **does not yet** allow computer science to count as a core admission requirement at institutions of higher education. Admission policies that do not include rigorous computer science courses as meeting a core entrance requirement, such as in mathematics or science, discourage students from taking such courses in secondary education. State leaders can work with institutions of higher education to ensure credit and articulation policies align with secondary school graduation requirements.

▣ **Graduation Requirement** - Pennsylvania **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.

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.