



CANDIDATE QUESTIONNAIRE ON COMPUTER SCIENCE

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Position: State Superintendent of Public Instruction
Candidate: Marshall Tuck

As the son of a public school teacher, the product of public schools, and a public school parent, I believe strongly in the power of public schools. But California's public schools need big changes to give all students the education they deserve. We have a lot of work to do to ensure that we are preparing every child to meet the demands of the future, and in the 21st century that includes access to computer science education.

[My plan for California's public schools](#) includes as one of its main pillars, "[Schools for the 21st Century](#)" and calls for "courses that are forward thinking, such as engineering and computer science, so students are ready for the economy of tomorrow." I'm pleased to have this opportunity to go into more detail on my vision for computer science in California's public schools.

In just over the past five years growing momentum has developed that computer science education should be included in the preK-12 curriculum as a foundational subject for all students. There are many strong rationales for this.

Students are growing up and preparing for life in the digital age; today's students need to understand how the digital world they live in works in the same way they study science to learn how the natural world works, or study history to understand cultures and politics. Additionally, computer science provides opportunities for students to learn to create technology, rather than just use it.

Exposure to computer science concepts and practices in preK-12 also enables all students to explore their interest and aptitude for computer science as a college major and/or career. And given that California has over 75,000 unfilled computing jobs with an average annual salary of \$110,078, diversifying student access to computer science is not only a significant workforce issue for California, it is a serious equity and social mobility opportunity for low-income youth.

In spite of how important computer science education is, far too few kids have access. Level Playing Field, the Kapor Institute, ACCESS and other nonprofit organizations working on this issue have been reporting since 2015 on the inequities in the distribution across California high schools in computer science offerings. A close examination of lack of access to the AP Computer Science courses also tells the story: In the 2016-17 year the new Computer Science Principles AP test, designed for broader student access, saw more increased diversity in student test taking; still, although about 54% of

California's public school students are Hispanic, those students only made up 25% of all AP Computer Science test takers in 2017. Similarly, while they make up 5.5% of California's K12 population, African American students were only 3% of the test takers.

College Board data indicates that for 2017-2018, only 569 of the state's 1,311 public high schools even offered at least one of the two AP Computer Science courses. That means California -- home of the Silicon Valley -- is not offering those computer science courses in even half of all its public high schools.

This has to change, and it means expanding access to computer science, to make it available to all students.

In September, the State Board of Education anticipates adopting model K12 computer science standards to serve as guidance for school districts in choosing curricula and courses. Also, this March, the Board will consider adopting a plan "to broaden the pool of teachers that can teach computer science and ensure all pupils have access to quality computer science courses."

Given that school districts won't be required to implement the computer science standards, it will be important that the next State Superintendent has the strong education experience and proven track record necessary to help lead school districts in this important area.

The California Department of Education (CDE) will need strong and visible leadership from the State Superintendent to implement the recommendations from the Computer Science Strategic Implementation Advisory, and to support school districts as they use the new standards when determining how best to incorporate computer science into their curricula.

As State Superintendent, there are several steps I would consider pursuing to make California a national leader in computer science education, including the following:

- Report publicly the numbers and demographics of California public school students with access to computer science coursework. We need a robust data system that also captures student performance in these courses, as well as their pursuit of majors and careers that rely on computer science skills.
- Help ensure that teachers are adequately prepared to teach computer science. In addition to sharing best practices related to professional development, I will leverage my role as a voting member of the Commission on Teacher Credentialing to support teacher preparation in this area. The Next Generation Science Standards include computational thinking, modeling and simulation, and engineering design standards, and the UC system plans on allowing computer

science to start counting towards admissions under Area D Science in the 2018-19 year. Therefore, it is increasingly important that educators are prepared to teach computer science into their curricula. This potentially includes the creation of a single subject credential in computer science, as well as modifications to the Industrial and Technology Education credential to include a computer science track.

- Develop guidance for districts and schools so they understand how their Local Control Funding Formula supplemental and concentration funds can be used to start or expand computer science, when doing so would create new or expanded instructional services that will benefit low-income, English Learner, and other student subgroups.
- Work with educators and industry experts from around the state to develop recommendations for the governor and legislature on bills that would support the equitable expansion of computer science, in the context of local control.
- Identify other resources for computer science implementation and support. In addition to state funding, I would work to develop partnerships in the technology industry and other sectors that benefit from a large and diverse pipeline of students well versed in computer science. In the public schools I've led, I have had success pursuing partnerships like these, and it has opened up many new opportunities for the students we served. We can do this statewide.
- Learn which programs are having the most success, and help other schools learn from those practices-- especially with regards to those serving high-needs students. The Local Control Funding Formula provides additional funding for vulnerable student populations, and I would leverage the CDE to identify which schools have been able to utilize those dollars to increase achievement, including through the expansion of access to computer science. Then, I would provide the educators in those schools with the resources and platform they needed to coach and grow the capacity of other schools.
- Help create cohesion between the preK-12 public school system and our public higher education system, when it comes to preparing students for majors and

careers in computer science. As State Superintendent, I will be a member of the UC Regents and the CSU Board of Trustees, and plan on using this role to push for alignment between the computer science opportunities students receive throughout their schooling, and the expectations and need of the workforce in this area.

- Review current Department of Education staffing levels and potentially establish a high level staff position within the CDE to focus on providing support to district and schools' efforts to bring computer science into their curricula, as well as help ensure we are focused on implementing our state computer science education plan well, and make clear that expanding *equitable* access to computer science is a priority.

California is the innovation capital of the world. It is home to the Jet Propulsion Laboratory, Apple, Google, and is every year the birthplace of thousands of new jobs and opportunities in the digital economy. And yet we've lagged behind when it comes to the accessibility of computer science education for all students who attend California's public schools. Over the next decade, we can change that. With strong leadership from the State Superintendent, in partnership with the governor and legislature, as well as leaders in the nonprofit, advocacy, technology, business, and education communities, California can be a leader in preK-12 computer science. We owe all California's 6.2 million public school students the opportunity to better understand their digital world, and to explore the vast possibilities that await them and the world when equipped with a computer science education.