



Algebra Policy in California

Great Expectations and Serious Challenges

Most California policymakers and educators would likely agree that all students need to take and master algebra early in their school careers. That said, the same Californians are much more divided regarding exactly when students should be expected to take algebra and how to ensure they have a reasonable chance for success.

This division was reflected in strong reactions to a State Board of Education decision made last July—blocked by a California court ruling that is currently under appeal—that called for the state’s Algebra I test to become the “sole test of record” in grade 8 mathematics for federal accountability purposes. This would have set California apart from virtually all other states by effectively making Algebra I the default math course in grade 8.

This is a summary of the May 2009 EdSource report, *Algebra Policy in California: Great Expectations and Serious Challenges*. The report focuses on California’s policies regarding mathematics, in particular state standards for when students should take Algebra I. It also provides a comprehensive look at state data related to both student participation and performance. The full report is available at:
www.edsource.org/pub_algebra09.html

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Events related to the State Board of Education’s algebra decision

- **February 2008:** The U.S. Department of Education says California’s General Math test for 8th graders—based on math standards for grades 6 and 7—is inconsistent with the state’s standards for grade 8, which call for algebra. One possible solution: test all 8th graders using the state’s Algebra I test.
- **Spring 2008:** With State Board of Education approval, the California Department of Education explores development of a blueprint for a new 8th grade math test based on a subset of California’s Algebra I standards.
- **July 2008:** Instead of pursuing the blueprint, the state board passes a motion to make California’s current Algebra I CST the sole test of record in 8th grade math for federal accountability purposes and establishes a transition period for doing this.
- **September 2008:** State education groups file a lawsuit to block the board’s decision.
- **January 2009:** A Sacramento County Superior Court ruling blocks the state board from taking further action to implement its July motion. The board is appealing aspects of the ruling. At this writing, there has been no final decision in this case.

California’s standards and accountability policies encourage early student participation in algebra

California does not require local school districts to enroll all 8th graders in an Algebra I course, but state officials have made it clear that they want a growing number of students to learn algebra in 8th grade. One way policymakers encouraged this is by building incentives into California’s school accountability system, such as giving schools more credit for 8th and 9th grade test results in Algebra I than in General Math.

Many more 8th graders now take Algebra I

Early student participation in Algebra I has increased greatly in recent years. In the first year (1999) that California administered course-specific math tests in grade 8, only

16% of 8th graders took the test for Algebra I. By 2003, this percentage had increased to 32%. In 2008, more than half (51%) of 8th graders took the California Standards Test (CST) in Algebra I. Some 7th graders—5% in 2008—now take the test as well.

Participation has increased among 8th graders of all racial and ethnic backgrounds. The percentage of African American 8th graders taking the test nearly doubled between 2003 and 2008 (24% to 47%). The same is also true for Latino 8th graders (26% to 48%).

Algebra I CST performance data tell two stories

On the one hand, many more 8th graders are scoring proficient or advanced on the Algebra I CST, including many who might not have had access to the course in prior years.

(Tests are scored as: advanced, proficient, basic, below basic, or far below basic.)

- Overall, 1.8 times as many 8th graders—about 104,100—scored proficient or advanced on the Algebra I CST in 2008 as in 2003.
- 3.2 times as many Latino 8th graders scored proficient or advanced, as did 2.6 times as many African American 8th graders.
- Among Asian and white 8th graders, the numbers scoring proficient or advanced grew substantially more than the numbers scoring basic or below.

On the other hand, a substantial cohort of 8th graders placed in Algebra I—who may not have had adequate preparation and/or support—had low scores on the CST.

- Overall, 1.5 times as many 8th graders—about 76,800—scored below or far below basic on the Algebra I CST in 2008 as in 2003.
- Among both Latino and African American 8th graders, nearly as many students scored below or far below basic on the Algebra I CST in 2008 as took the test *at all* in 2003. About three in four Latino and three in five African American 8th graders who took the test in 2008 were from low-income families.

More than 200,000 students repeated the Algebra I CST in 2008

Most California math educators and policymakers agree that too many students repeat Algebra I, sometimes multiple times. Some worry that continuous failure in algebra can convince students they are “unable” to understand and use mathematics, or even cause some students to drop out.

In 2008, more than 200,000 students repeated the Algebra I CST in grades 8–11, according to state data. This figure does not include students who might have repeated the course in grade 12.

Altogether 38% of 9th graders who took the Algebra I CST in 2008 had already taken it in a prior year, as had more than half of 10th and 11th graders who took the test. Repeating Algebra I in grade 10 or later is

of particular concern because students may not be able to complete college-prep courses in science that have algebra as a prerequisite.

Many in the state point to a decline in math achievement that begins in grade 5 and persists in the early middle grades as a root cause behind California’s grade 8 challenges. Larger percentages of students in these grades score below or far below basic on math CSTs. Nearly three in ten 6th and 7th graders scored in these lowest categories in 2008, compared with just 16% of 4th graders.

Algebra concerns shed light on teacher credentialing and professional development issues

Qualified and highly skilled teachers are essential for earlier student success in algebra. This raises questions about teacher credentialing and professional development that pre-date California’s current algebra policy debate and will continue regardless of how this debate is resolved.

Teacher credentialing for math is an ongoing discussion

The California Commission on Teacher Credentialing (CTC) has recently discussed the preparation of multiple-subject teachers to teach math effectively in the elementary grades, and to teach Algebra I in core or self-contained classrooms in the middle grades. CTC is also considering whether to revive a “math specialist” credential and has convened an advisory panel to review the state’s future credentialing needs for math instruction.

Recent research from the Center for the Future of Teaching and Learning (CFTL) indicates that about a third of California’s middle grades Algebra I teachers are not fully credentialed with a math authorization. Further, CFTL reports that students in lower-performing schools are less likely to be taught by teachers with a strong math background.

The state’s current professional development approach in mathematics falls short

The scale of California’s current investment in re-teaching Algebra I to the 200,000

students who repeat the course makes clear that professional development that improves math instruction in grades K–8 would be a sound investment in schools’ effectiveness. However, California’s commitment to professional development falls short of what many experts believe is warranted, given the state’s goals. State Superintendent of Public Instruction Jack O’Connell has recommended investing about \$154 million.

Currently, teachers in California receive professional development in math through a variety of sources, including two state-supported programs funded at a fraction of that amount. The Mathematics and Reading Professional Development Program provides incentive funding for teacher training connected to each district’s adopted instructional materials. The initial 2008–09 budget allocated about \$57 million for the program, but that was subsequently cut by 15%.

The California Mathematics Project (CMP), which is part of the California Subject Matter Project, focuses on strengthening teachers’ content area and pedagogical expertise. CMP has received state and federal funds totaling between \$1.2 million and \$1.4 million annually during the past several years. CMP estimates that an expansion of professional development for algebra and algebra readiness instruction would cost \$8.5 million.

Algebra I in grade 8 raises broader questions for California

Ongoing debates about the State Board of Education’s decision last July could serve as a catalyst for a deeper look at math instruction in California, including two specific questions related to grades 5–8 in particular. Could California strengthen its approach to mathematics standards, curricula, and assessment; and if so, what steps should be taken next? Do California’s teachers have the content knowledge and pedagogical skills they need to teach most effectively?

This state’s ambition to improve the math proficiency and understanding of all its K–12 students deserves support and investment. Perhaps this is an opportune time for a thoughtful review and candid discussion of math education in California. 