VITALSIGNS

CALIFORNIA

Business leaders in California have sounded an alarm. They cannot find the science, technology, engineering and mathematics (STEM) talent they need to stay competitive. Students' lagging performance in K–12 is a critical reason why.

To address this challenge, California is raising the bar. The state has joined 44 others in adopting rigorous math standards for K–12 — the Common Core State Standards — and it is working with other states to create robust tests aligned to those standards. These are promising developments, but to succeed amid political and financial challenges, the state has to maintain its resolve.

The state needs to ensure that schools and students have opportunities to meet a higher bar: Students have made some progress in math over the past decade. Yet not enough California students, least of all minorities, have the chance to learn challenging content to prepare them for college and careers. Students dodged a bullet when the governor dropped a bid to cut the high school science requirement from two years to one. Yet challenges persist. Elementary students spend very little time on science, and the state sets a very low passing score on its 8th-grade science test.

These challenges loom large in lean times. California gets a smaller return on its investment than other states do. Smarter investments will be critical as business leaders work with educators and state leaders to tackle new reforms.

STEM SKILLS ARE IN DEMAND

In California, STEM skills have stayed in demand even through the economic downturn.

STEM:
1.4 jobs for every
1 unemployed person

Non-STEM:
4.9 unemployed people for every **1 job**

CAN CALIFORNIA MEET THE DEMAND FOR STEM SKILLS?

Students have made real academic strides in most states, but no state is on track to getting all students the STEM skills they need to succeed in college and careers. Low-income and minority students lag farthest behind.

Students have improved in math

Since 2003, eighth graders in California have made gains on the National Assessment of Educational Progress (NAEP), also known as "the nation's report card." Yet most still have far to go to reach a score of 299, NAEP's cutoff for "Proficient" performance.

8th Grade NAEP scale scores, 2003 & 2011

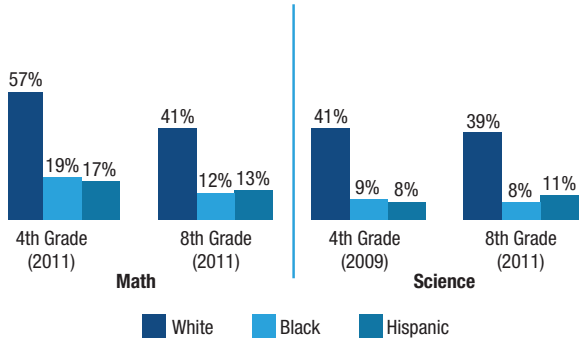
	NAEP Scale Score		Change Since 2003	
	2003	2011	CA	Most Improved State
All	267	273	**+6**	+17 (DC)
Low Income	251	260	**+9**	+19 (MA)
White	283	290	**+7**	+17 (HI)
Black	246	254	**+8**	+19 (NJ)
Hispanic	250	260	**+10**	+24 (AR)

Totals may not sum due to rounding errors.

Closing achievement gaps must remain a priority

No state has closed the persistent achievement gaps among racial and ethnic groups.

Percentage of students in California scoring at or above proficient in math and science, 2009 & 2011

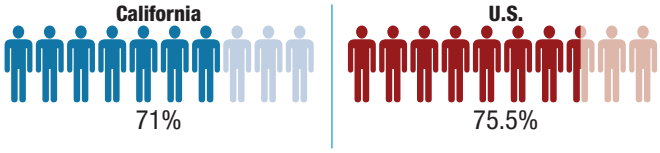


CHANGE THE EQUATION™ IN PARTNERSHIP WITH the American Institutes for Research.

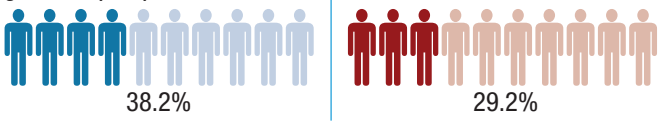
For the complete state report, methodology, and sources, visit changetheequation.org/stem-vital-signs.

California must plug gaps in the STEM pipeline from high school through college

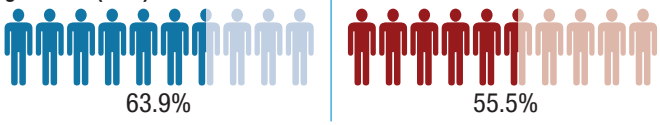
What percentage of high school students graduate? (2009)



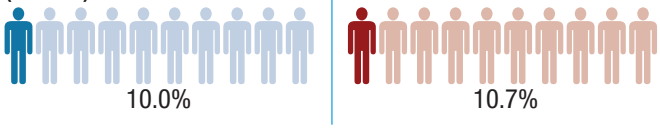
Of students who enter a two-year degree program, what percentage graduate? (2009)



Of students who enter a four-year degree program, what percentage graduate? (2009)



What percentage of college degrees and certificates are in STEM fields? (2008–09)



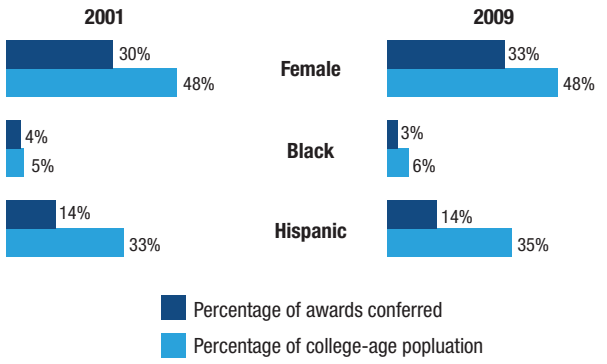
No student should need remediation

California did not provide data on the cost and extent of college remediation in math.

Women and minorities are too critical a resource to remain untapped

Women and minorities are a very large share of the population but they earn just a small share of STEM degrees and certificates.

Percentage of degrees/certificates conferred in STEM fields in California



WILL CALIFORNIA STAND FIRM ON HIGH EXPECTATIONS?

Setting high expectations is a critical step toward raising student performance in STEM.

California is showing a commitment to high expectations

California has joined **44 other states in adopting Common Core State Standards in math.** California is also working with other states on common math tests to gauge students' mastery of those standards.

Common standards and tests in math could be a game changer

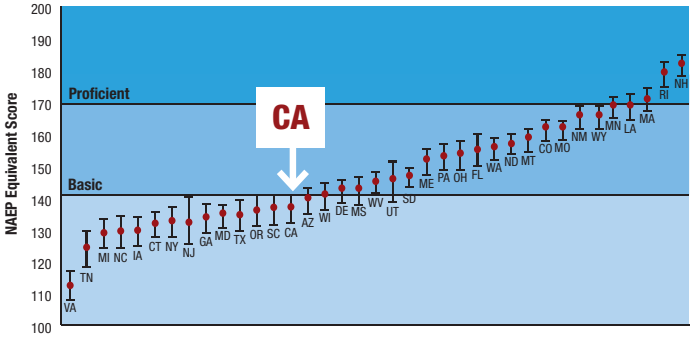
As **states adopt common tests aligned to the Common Core,** they will also have to **set a common high passing score** or threaten the credibility of the entire common standards enterprise. As the bar goes up, the rate of California students passing may plummet. California **leaders will have to stand strong** on high expectations, even in the face of pressure to back down.

Science is the next frontier for better standards and higher expectations

Twenty-six states, including California, are collaborating on common, **"Next Generation" content standards in science,** which they aim to complete in 2013. If these standards meet a high bar, California should adopt them or standards as rigorous.

California also should raise the bar on its 8th-grade science test. in 2009, California set the passing score for the test below NAEP's bar for "Basic" performance.

NAEP scale equivalents of grade 8 science standards for proficient performance, by state, 2009



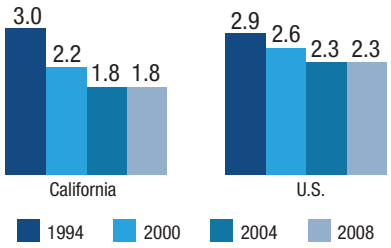
ARE STUDENTS EXPOSED TO CHALLENGING AND ENGAGING CONTENT?

Lack of access to such content severely limits young people's college and career prospects.

Building a strong foundation in science takes time

Time for science in California elementary schools has fallen since 1994.

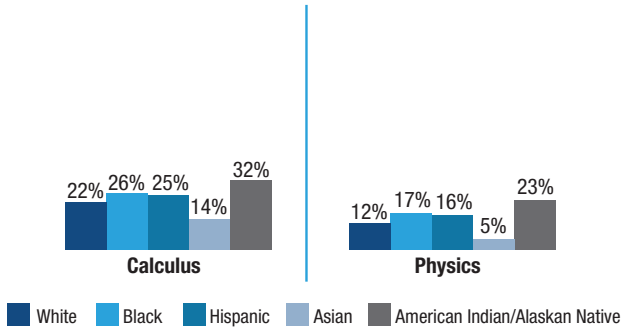
Hours per week spent on science in grades 1–4, 1994–2008

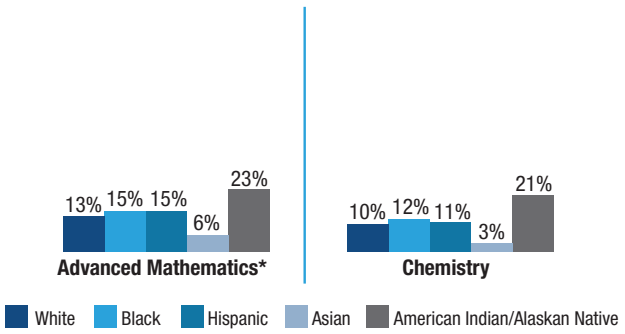


Students of all backgrounds need access to challenging math and science courses

Nationwide, many minority students lack access to such courses.

Percentage of students in schools that do not offer challenging math and science courses, by race/ethnicity, 2009





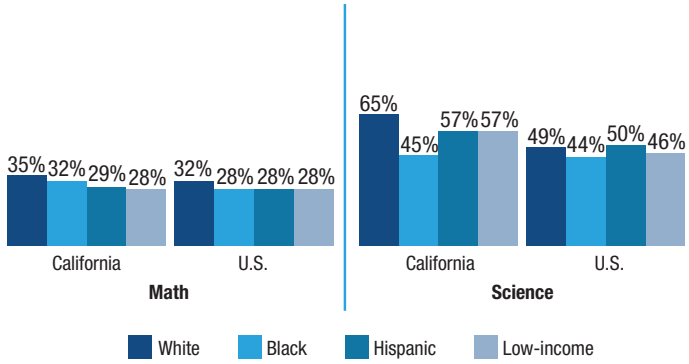
** Includes trigonometry, elementary analysis, analytic geometry, statistics, and precalculus*

ARE TEACHERS PREPARED TO TEACH TO HIGH STANDARDS?

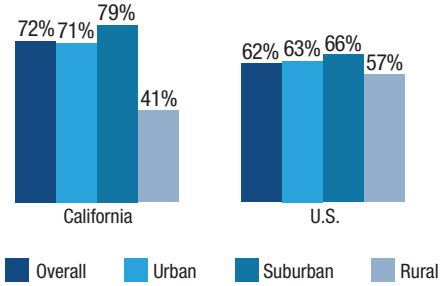
Research shows that teachers' content knowledge and teaching experience can affect student performance.

Teachers need deep content knowledge

8th graders whose teachers have an undergraduate major in the subject they teach, 2011



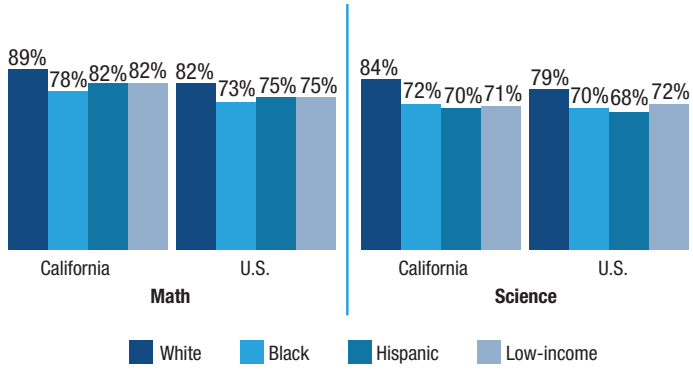
8th graders whose science teachers took three or more advanced science courses in college, 2011



High-need schools need to retain excellent teachers

In most states, minority and low-income students are more likely to have inexperienced teachers, indicating high turnover rates.

8th graders whose teachers have 5+ years of experience teaching their subject, 2011



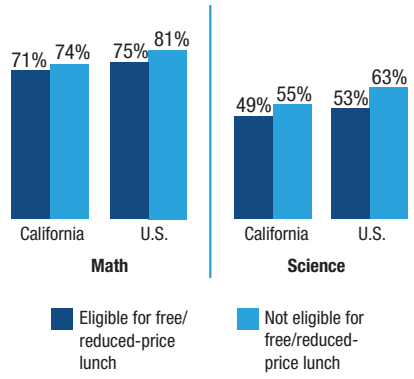
** Reporting standards not met.*

For the complete state report, methodology, and sources, visit changetheequation.org/stem-vital-signs.

DO SCHOOLS AND TEACHERS IN CALIFORNIA HAVE WHAT THEY NEED TO SUCCEED?

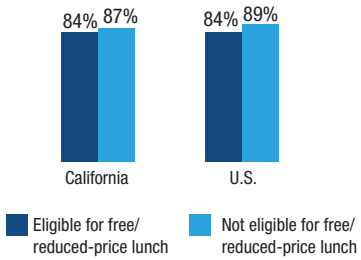
Teachers need the tools of their trade

8th graders whose teachers say they have all or most of the resources they need, by income, 2011



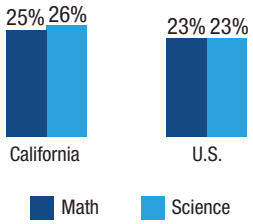
All students need access to science facilities and supplies

8th graders whose schools have science labs, by income, 2011



Parent support and engagement are critical to student success

Teachers who say lack of support is a serious problem, 2011



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RECOMMENDATIONS

Impatience is a virtue when it takes data and real solutions as its guides. The time to act is now. These Vital Signs provide business, education, state and policy leaders with an extensive and reliable set of indicators to promote STEM learning and high expectations for all students. We've crunched the numbers to offer insights into much-needed actions that can be undertaken right away with resolve.

Make science count

Unlike many states, California holds schools accountable for meeting student performance targets on science tests, not just reading and math tests. But simply holding schools accountable for science is not enough. California should also raise the passing score on its science tests. For example, the bar on its 8th-grade science test is so low that schools are being held accountable for meeting a very weak standard.

Ease the transition between high school and college

California students should understand the requirements for college admission and whether a high school diploma prepares them for college-level work. One way to ensure that diplomas have meaning is to align fully state high school graduation and college entrance requirements in math. California also should regularly report state-wide data on the extent and cost of college remediation in math. CTEq was unable to secure this information from California.

Stretch the STEM education investment

In lean or flush times, California must improve its return on investment in K–12 STEM education. Every dollar spent should be linked to student mastery of high expectations in STEM courses. This does not mean that resources are not critical to dramatically raising student performance. It does mean that California has to ask tough questions and make choices about which investments in STEM learning are most closely tied to the goals of college and career readiness.