VITALSIGNS

COLORADO

Attachment C

Business leaders Colorado 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, Colorado 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.

Colorado needs to ensure that all schools and students have opportunities to meet a higher bar. The good news is that students have made real progress in math over the past decade. Yet not enough students are getting exposed to challenging content to prepare them for college and careers. Colorado must remediate nearly half its students when they reach higher education, and only one in 10 of the state's college degrees or certificates is in a STEM field, down from 15 percent a decade ago.

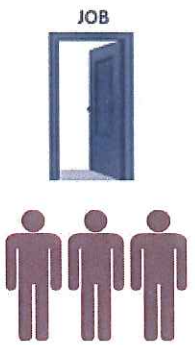
To its credit, the state stretches its math and science education dollars farther than other states do. Smart investments will be critical as business leaders work with educators and state leaders to tackle new reforms in lean times.

STEM SKILLS

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

STEM:
1.5 jobs for every
1 unemployed person

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



CAN COLORADO 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 Colorado have made gains on the National Assessment of Educational Progress (NAEP), also known as "the nation's report card." Yet many still have far to go to reach a score of 299, NAEP's cutoff for "Proficient" performance.

8th Grade NAEP scale scores, 2003 & 2011

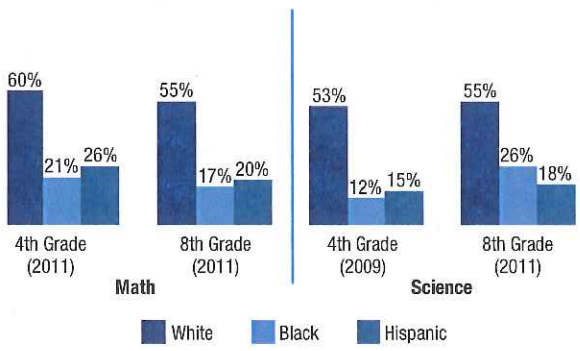
	NAEP Scale Score		Change Since 2003	
	2003	2011	CO	Most Improved State
All	283	292	+8	+17 (DC)
Low Income	262	273	+11	+19 (MA)
White	292	302	+10	+17 (HI)
Black	255	270	+15	+19 (NJ)
Hispanic	259	271	+11	+24 (AR)

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 scoring at or above proficient in math and science, 2009 & 2011

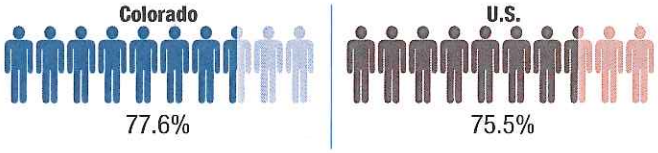


CHANGE THE EQUATION™ IN PARTNERSHIP WITH the American Institutes for Research.

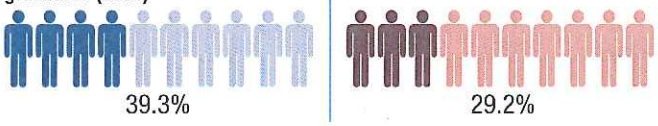
For the complete state report, methodology, and sources, visit changetheequation.org/stem-vital-signs.

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

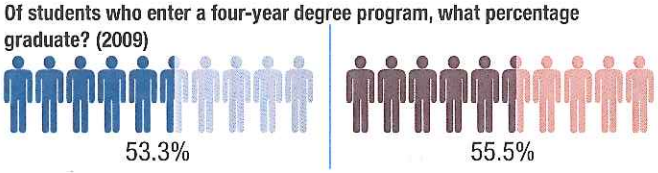
What percentage of high school students graduate? (2009)



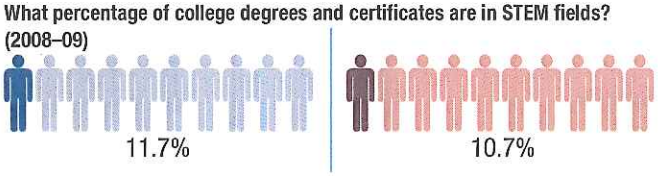
Of students who enter a two-year degree program, what percentage graduate? (2009)



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)



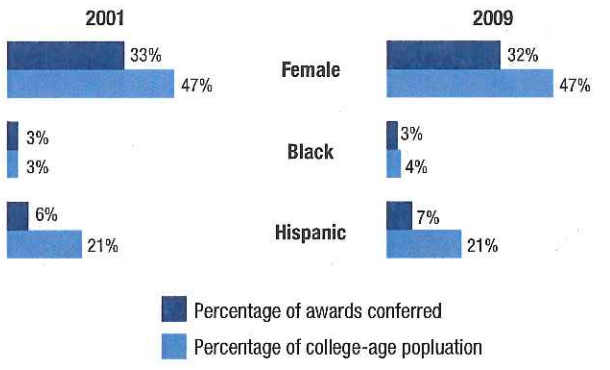
No student should need remediation

46% of Colorado's first-time community college students who just graduated from high school need remediation in math, which costs the state **$16,700,782** each year.

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 Colorado



WILL COLORADO STAND FIRM ON HIGH EXPECTATIONS?

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

Colorado is showing a commitment to high expectations

Colorado has joined **44 other states in adopting Common Core State Standards** in math. Colorado 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

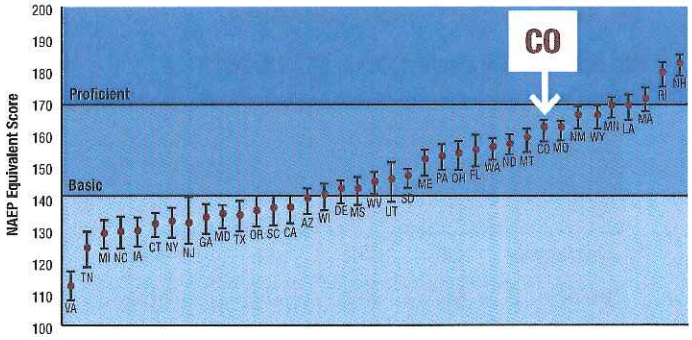
As **states adopt common tests aligned to the Common Core,** they will also have to **set a common high passing score** or threaten the credibility of the entire common standards enterprise. As the bar goes up, the rate of Colorado students passing the tests may plummet. Colorado **leaders will have 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, not including Colorado, are collaborating on common **"Next Generation" content standards in science,** which they aim to complete in 2013. If these standards meet a high bar, Colorado should adopt them or standards as rigorous.

Colorado sets the passing score on its 8th-grade science test higher than most other states do, though it still falls short of NAEP's bar for proficiency.

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



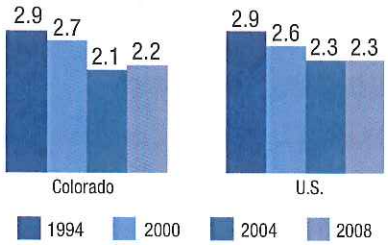
ARE STUDENTS EXPOSED TO CHALLENGING AND ENGAGING CONTENT?

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 Colorado elementary schools has fallen since 1994.

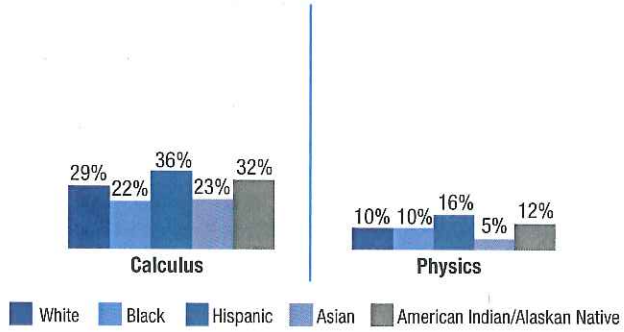
Hours per week spent on science in grades 1–4, 1994–2008

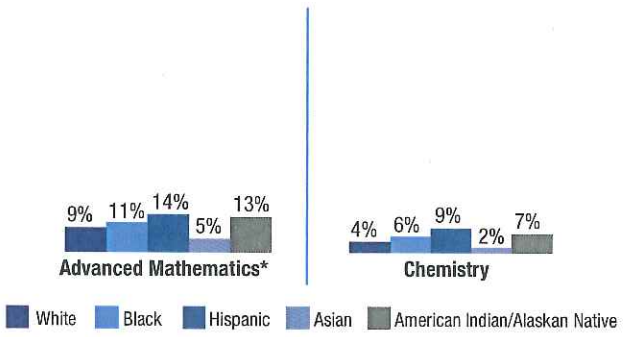


Students of all backgrounds need access to challenging math and science courses

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





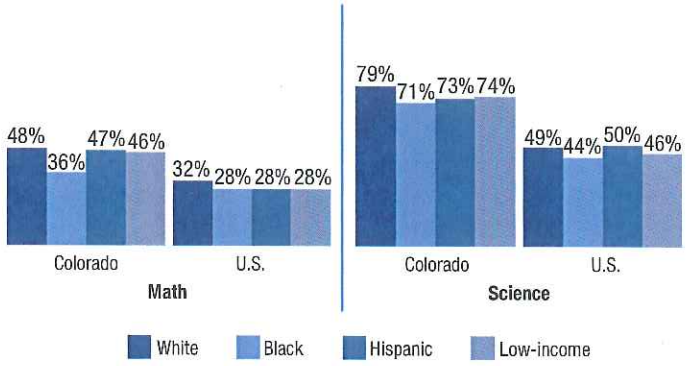
** Includes trigonometry, elementary analysis, analytic geometry, statistics, and precalculus*

ARE TEACHERS PREPARED TO TEACH TO HIGH STANDARDS?

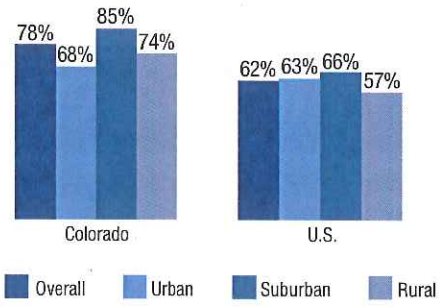
Research shows that teachers' content knowledge and teaching experience can affect student performance.

Teachers need deep content knowledge

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



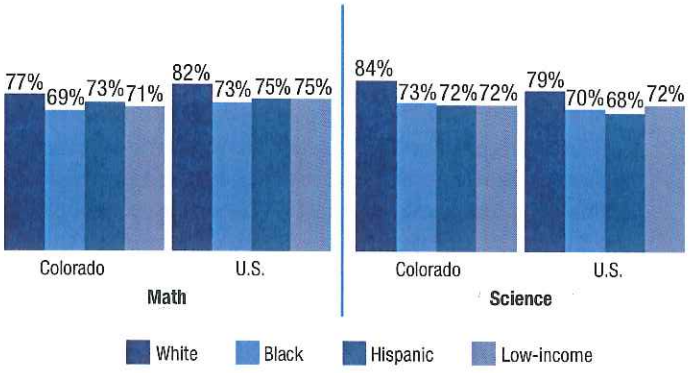
8th graders whose science teachers took three or more advanced science courses in college, 2011



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.

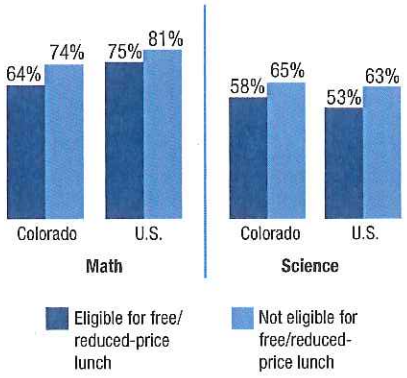
VITALSIGNS

COLORADO

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

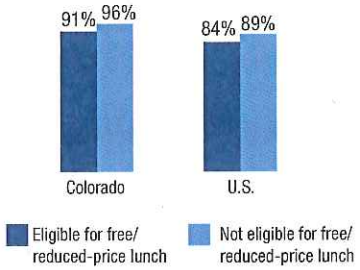
Teachers need the tools of their trade

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



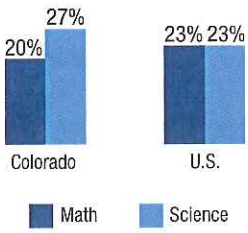
All students need access to science facilities and supplies

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.

Ease the transition between high school and college

Colorado 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 state high school graduation and college entrance requirements. Colorado also should expand access to rigorous courses in math and science. For example, the state could strengthen initiatives that help schools boost participation in AP courses, especially among women and minorities.

Light students' fires

At a time when STEM jobs are plentiful, the numbers of students earning STEM degrees and certificates in Colorado have not kept pace with demand. Women and minorities remain underrepresented in STEM fields. One way to inspire greater interest in STEM is to support out-of-school programs that give students real-world exposure to STEM work. Colorado can also promote initiatives that educate young people—especially those who are underrepresented in STEM fields—about the social and financial benefits STEM careers.

Attend to achievement gaps

Colorado continues to struggle with very large racial, ethnic and income-based achievement gaps in math and science. There is also evidence that the state's minority and low-income students have less access to some educational opportunities, such as qualified teachers who feel well supported. Colorado should ensure that its policies offer extra support to the students who need it most—while continuing to hold those students to a high bar.

CHANGE THE EQUATION™

Improving teaching and learning in science, technology, engineering and mathematics (STEM)

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