

The Washington State Board of Education

Governance | Accountability | Achievement | Oversight | Career & College Readiness

Title:	<u>STEM Vital Signs Report—Joint Discussion with the Professional Educator Standards Board</u>	
As Related To:	<input type="checkbox"/> Goal One: Effective and accountable P-13 governance. <input checked="" type="checkbox"/> Goal Two: Comprehensive statewide K-12 accountability. <input checked="" type="checkbox"/> Goal Three: Closing achievement gap.	<input checked="" type="checkbox"/> Goal Four: Strategic oversight of the K-12 system. <input checked="" type="checkbox"/> Goal Five: Career and college readiness for all students. <input checked="" type="checkbox"/> Other
Relevant To Board Roles:	<input checked="" type="checkbox"/> Policy Leadership <input type="checkbox"/> System Oversight <input type="checkbox"/> Advocacy	<input checked="" type="checkbox"/> Communication <input checked="" type="checkbox"/> Convening and Facilitating
Policy Considerations / Key Questions:	<p>Policy considerations informed by the information presented by Washington STEM could include:</p> <ul style="list-style-type: none"> • How will Common Core State Standards and Next Generation Science Standards affect student preparation for college and careers, particularly in STEM fields? • What are the specific impacts of the achievement gap for STEM fields, and how might they be address? <p>Considerations of joint interest to SBE and the Professional Educator Standards Board include:</p> <ul style="list-style-type: none"> • Are teachers prepared to teach to high standards? • How can the state support improved teacher preparation in STEM? 	
Possible Board Action:	<input checked="" type="checkbox"/> Review <input type="checkbox"/> Adopt <input type="checkbox"/> Approve <input checked="" type="checkbox"/> Other	
Materials Included in Packet:	<input type="checkbox"/> Memo <input type="checkbox"/> Graphs / Graphics <input checked="" type="checkbox"/> Third-Party Materials <input type="checkbox"/> PowerPoint	
Synopsis:	<p>Washington STEM is a nonprofit organization dedicated to advancing science, technology, engineering and math education in Washington State. Representatives from Washington STEM will present information on the Vital Signs report for Washington State and answer questions concerning the report. Information in the report impacts some responsibilities of the Board, including accountability, graduation requirements, and the achievement gap. SBE and the Professional Educator Standards Board will hold a joint discussion concerning the report.</p>	

VITAL SIGNS



WASHINGTON

Business leaders in Washington 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, Washington 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 profound practical, political and financial challenges, the state has to maintain its resolve.

Washington needs to ensure that schools and students have opportunities to meet higher expectations. Students have made some progress in math over the past decade, yet not enough students have the chance to learn challenging content to prepare them for college and careers. Washington's high school graduation requirements in math and science do not align with college entrance requirements, which may contribute to the high cost of math remediation for its underprepared college students.

To its credit, Washington 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 ARE IN DEMAND

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

STEM:
2.1 jobs for every
1 unemployed person



Non-STEM:
3.7 unemployed
people for every 1 job



CAN WASHINGTON 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 Washington 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

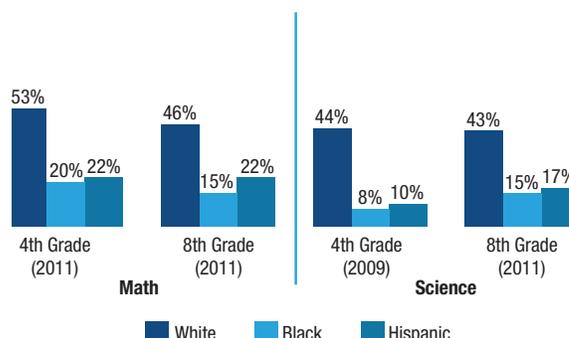
	NAEP Scale Score		Change Since 2003	
	2003	2011	WA	Most Improved State
All	281	288	+7	+17 (DC)
Low Income	265	273	+7	+19 (MA)
White	285	294	+9	+17 (HI)
Black	262	265	+2	+19 (NJ)
Hispanic	263	269	+6	+24 (AR)

Totals may not sum due to rounding errors.

Closing achievement gaps must remain a priority

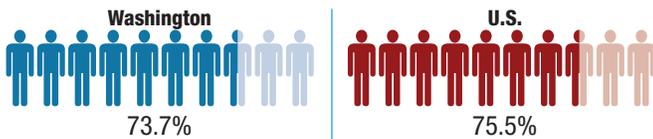
No state has closed the persistent achievement gaps among racial and ethnic groups.

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

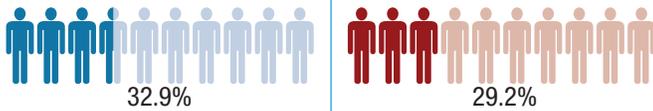


Washington must plug gaps in the STEM pipeline from high school through college

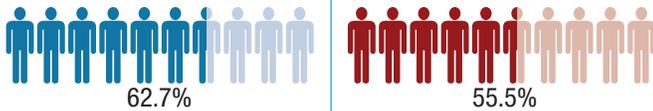
What percentage of high school students graduate? (2009)



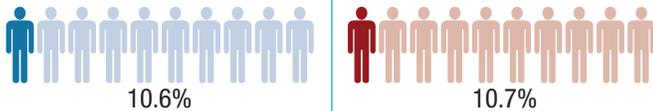
Of students who enter a two-year degree program, what percentage graduate? (2009)



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)



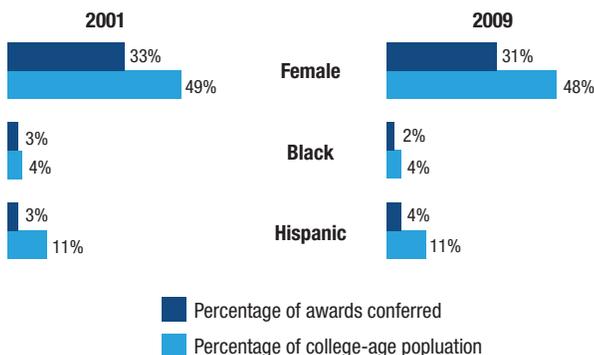
No student should need remediation

51% of Washington's community college students need remediation in math, which costs the state **\$93,017,341** 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 Washington



WILL WASHINGTON STAND FIRM ON HIGH EXPECTATIONS?

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

Washington is showing a commitment to high expectations

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

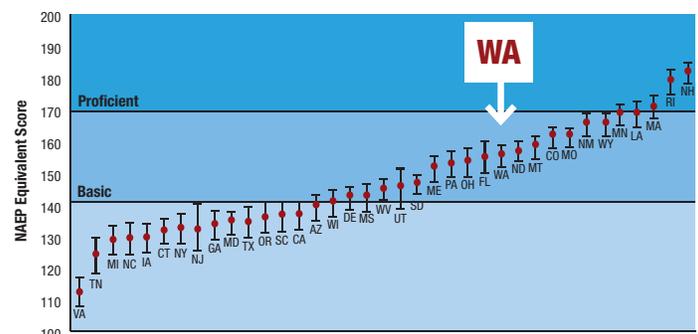
As **states adopt common tests aligned to the Common Core**, they will also have to **set a common high passing score** or threaten the credibility of the entire common standards enterprise. Washington is well prepared for this transition, because it has traditionally set the passing threshold on its math and science tests very high.

Science is the next frontier for better standards and higher expectations

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

Washington 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



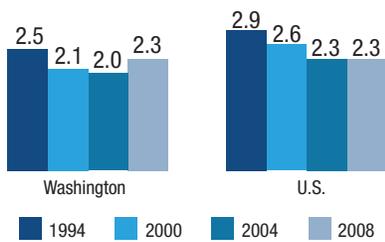
ARE STUDENTS EXPOSED TO CHALLENGING AND ENGAGING CONTENT?

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 Washington elementary schools has held steady since 1994.

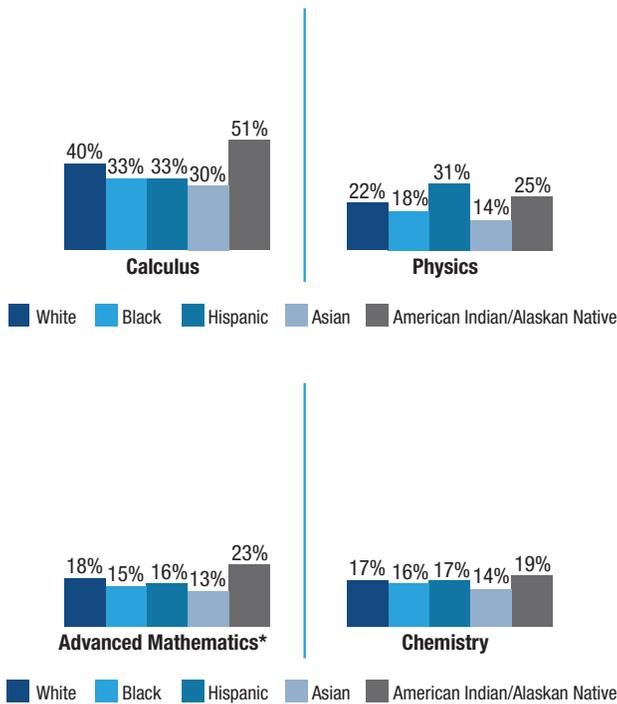
Hours per week spent on science in grades 1–4, 1994–2008



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



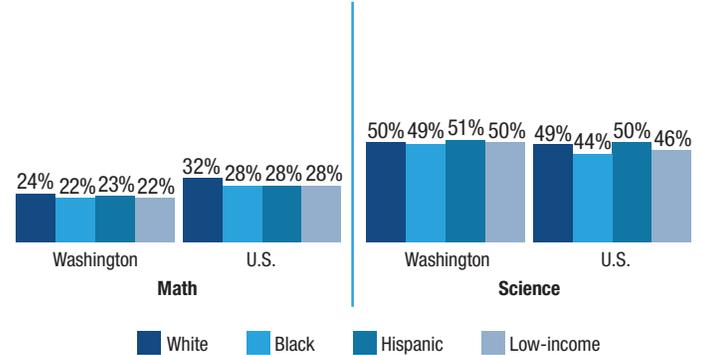
* Includes trigonometry, elementary analysis, analytic geometry, statistics, and precalculus

ARE TEACHERS PREPARED TO TEACH TO HIGH STANDARDS?

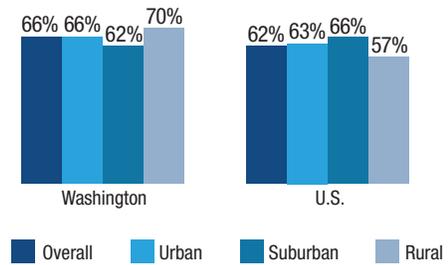
Research shows that teachers' content knowledge and teaching experience can affect student performance.

Teachers need deep content knowledge

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



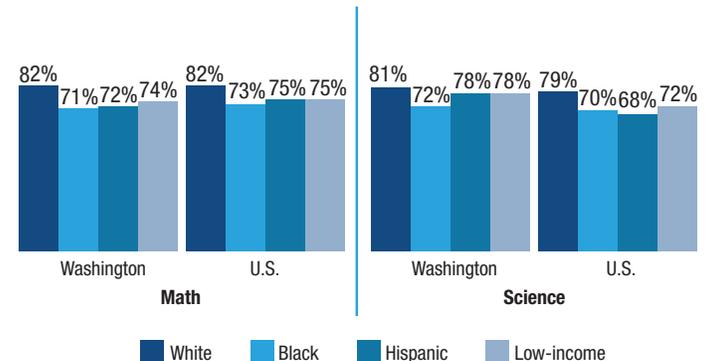
8th graders whose science teachers took three or more advanced science courses in college, 2011



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

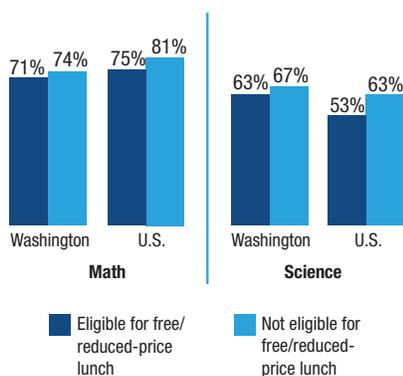


* Reporting standards not met.

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

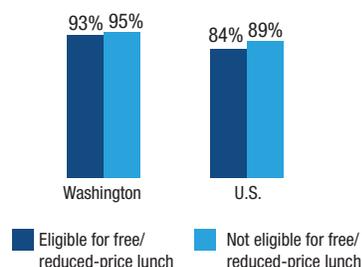
Teachers need the tools of their trade

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



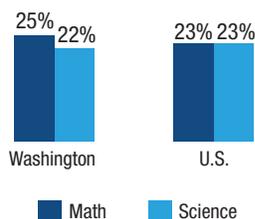
All students need access to science facilities and supplies

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



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

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

Washington students should understand the requirements for college admission and whether their high school classes are preparing them for college-level work. Unfortunately, large percentages of Washington students attend schools that don't even offer higher-level courses like calculus and physics. The state should expand access to such courses. For example, it could strengthen initiatives that help schools boost participation in AP courses, especially among women and minorities.

■ Improve teacher preparation and support

Washington needs more teachers with a strong background in STEM content and pedagogy, particularly in math. Strategies include requiring teachers to demonstrate a stronger grasp of content while broadening the supply of teachers who can clear the higher hurdles. Washington should create more pathways into teaching for STEM majors in college or STEM professionals who are interested in teaching. The state should also

strengthen incentives to attract and retain such teachers for the schools that need them most—often in low-income communities.

Current teachers must receive excellent professional development, especially as new math and science standards take effect. Rather than reporting on the amount of professional development teachers receive, states should measure and report on its quality.

■ Light students' fires

At a time when STEM jobs are plentiful, the numbers of students earning STEM degrees and certificates in Washington 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. Washington can also promote initiatives that educate young people—especially those who are underrepresented in STEM fields—about the social and financial benefits STEM careers.