www.changetheequation.org

CHANGE THE EQUATION

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April 15, 2011

The Honorable Jeremiah Nixon
Governor of the State of Missouri
Missouri Capitol Building
Room 216
Jefferson City, MO 65101

Dear Governor Nixon,

As members of Change the Equation, a non-profit partnership of more than 110 CEO's who have pledged to work together to improve U.S. students' performance in science, technology, engineering and mathematics (STEM), we urge you to be unwavering in your support for high academic standards in math and science.

As governor, you know firsthand how important the performance of Missouri students in math and science is to the state's future prosperity. We are business leaders with a major stake in Missouri's future, so we share your commitment to ensuring a strong workforce and a thriving citizenry.

We therefore commend the state for maintaining high expectations for student performance in math. Missouri is one of the few states whose achievement standards have remained on par with those of the National Assessment of Educational Progress, which many experts consider the "gold standard" for U.S. tests. **We pledge to stand firmly behind you as you implement the new strong standards and challenging assessments you are creating in collaboration with other states, and we urge you to maintain your commitment to cut scores that reflect real-world expectations for success.**

As you undertake these efforts, we think you will find the enclosed *Missouri STEM Vital Signs* report helpful. It compiles the most recent available data on the condition of STEM learning in the state from respected third party sources. We have prepared similar reports for all 50 states and the District of Columbia. In 2012, Change the Equation will release a second, more robust Missouri Vital Signs report with the most complete data on STEM learning ever assembled. The report will give the state key information on where the state is making gains, where it has work to do, and what it can do to prepare many more of its students for life and work in the coming decades.

In the meantime, Change the Equation members will do our part to make the case for higher standards, to improve the effectiveness of our STEM related philanthropy and to expand proven STEM learning programs to communities that need them most. One such program to improve STEM Vital Signs is U.S. FIRST, a robotics competition that gives students from elementary school to high school exciting hands-on experience in STEM fields. That program is inspiring students from Missouri and across the country to pursue fields like technology and engineering.

With the right expectations and support, Missouri students can look forward to a bright future. We look forward to working with you to realize that promise.

Sincerely,

William D. Green, Chairman
Accenture

Gregory S. Babe, President & CEO
Bayer Corporation

Antonio M. Perez, Chairman & CEO
Eastman Kodak Company

James S. Turley, Chairman & CEO
Ernst & Young

Craig R. Barrett, Retired CEO/Chairman of the Board
Intel Corporation

Larry Ellison, CEO
Oracle

Dr. Sally Ride, CEO
Sally Ride Science

Glenn Britt, Chairman & CEO
Time Warner Cable

cc: Dr. Chris Nicastro, Commission of Education

Missouri STEM Vital Signs

The future of Missouri depends on its ability to boost student performance in science, technology, engineering and mathematics (STEM). Young people in Missouri will increasingly face stiff competition for jobs from people across the world, and to succeed in the global economy, students will need a much stronger foundation in STEM subject areas.

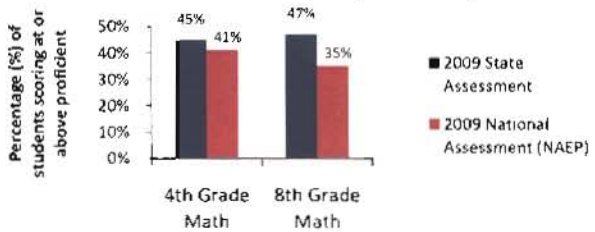
In this STEM Vital Signs report, Change the Equation has compiled critical data on the condition of STEM learning in Missouri. We provide these data to inform vigorous conversations about what it will take to improve STEM learning in the state. While there are no silver bullet fixes, the state can boost student outcomes by focusing on some key areas. For example:

- **Hold the line on high expectations.**
  Missouri deserves praise as one of few U.S. states whose state tests hold students to high expectations. As states seek to declare more students proficient, some have lowered the scores students need to be deemed proficient on state tests. Missouri should hold the line on high expectations, even if state leaders face pressure to lower the bar.
- **Focus on achievement gaps.**
  Like all U.S. states, Missouri has large achievement gaps between students of color and white students. Closing those gaps is both a moral and an economic imperative. The state should continually ensure that its policies target the diverse learning needs of all students, especially those who face the biggest hurdles, without diluting expectations.
- **Focus on teachers' content knowledge.**
  Fewer than half of 8th graders in Missouri have a teacher with a major or minor in math. University-based programs to recruit top STEM majors into teaching are one strategy for bringing more qualified teachers into the classroom.

ACADEMIC EXPECTATIONS

We evaluated Missouri's academic expectations in math by comparing the proficiency rates on the state test with the proficiency rates on NAEP. When NAEP results are far worse than the results on the state test, the state might have low academic expectations.

- **Does Missouri have high academic expectations of its students?**
  In 2009, there were relatively small gaps between the percentage of students who were proficient on NAEP and the percentage who were proficient on state tests. This was especially true in 4th grade.



Sources *NAEP, National Center for Education Statistics (NCES), 2009.*
Paul Peterson, "State Standards Rise in Reading, Fall in Math," Education Next, fall 2010

STATE STANDARDS AND TESTS

Strong academic standards and tests are a critical foundation for teaching and learning. Forty-three states have agreed to adopt Common Core State Standards in math, and all of those states have joined state consortia to develop tests aligned to those standards. A national evaluation recently gave Common Core's math standards an A-minus for their quality.

- Has Missouri adopted *Common Core State Standards* in math? **Yes**
- Has Missouri joined a state testing consortium? **Yes**
- How do Missouri math standards fare on a national evaluation? **D**

Sources *Common Core State Standards Initiative, 2011*
SMARTER Balanced Assessment Consortium, 2011
Fordham Foundation, The State of State Standards—and the Common Core—in 2010.

STUDENT PERFORMANCE AND ACHIEVEMENT GAPS

Student performance varies widely within and among states. NAEP allows states to compare themselves against other states, measure achievement gaps among different groups of students and track students' improvement over time.

- **How do Missouri students compare nationally?**

2009 NAEP: Percentage of Students at or Above Proficient

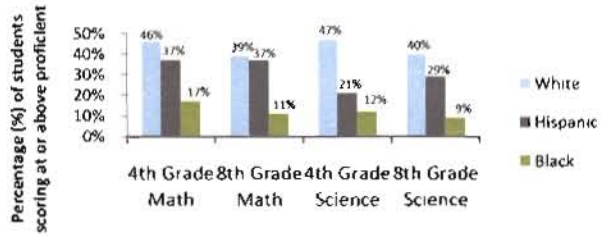
	Missouri	U.S.	Average of Top 3 States
4th grade math	41%	38%	56% (MA, MN, NH)
8th grade math	35%	33%	48% (MA, MN, NJ)
12th grade math	N/A*	25%	33% (MA, NH, NJ)
4th grade science	40%	32%	46% (MA, NH, VA)
8th grade science	36%	29%	42% (MA, MT, ND)

Source: NAEP, 2009.

** Missouri was not among the 11 states that participated in NAEP's 12th grade State Pilot Program for Mathematics in 2009.*

- **How large are achievement gaps among demographic groups?**

2009 NAEP: Percentage of Missouri Students at or Above Proficient



Source: NAEP, 2009

Change the Equation is a national coalition of more than 110 corporate CEOs who are committed to improving science, technology, engineering, and mathematics (STEM) learning for every child, with a particular focus on girls and students of color.

STUDENT PERFORMANCE AND ACHIEVEMENT GAPS (CONTINUED)

- **Is student performance improving?**

NAEP scale scores give states a way to track trends in student performance. NAEP scores in math range from 0 to 500. The average national score for 4th grade math is 240 and the average for 8th grade math is 283. The tables below compare progress in Missouri to progress in the most improved states.

4th grade math

	MO NAEP Scale Score			Change since 1996	
	1996	2003	2009	Missouri	Most Improved State
All	225	235	241	+16	+32 (DC)
White	230	240	245	+15	+26 (MA)
Black	200	216	221	+21	+35 (FL)
Hispanic	N/A	220	237	N/A	+38 (DE)

8th grade math

	MO NAEP Scale Score			Change since 1996	
	1996	2003	2009	Missouri	Most Improved State(s)
All	273	279	286	+13	+21 (DC, MA)
White	278	284	290	+12	+22 (MA)
Black	244	250	260	+16	+28 (FL)
Hispanic	N/A	N/A	284	N/A	+39 (DC)

Source: NAEP, 2009. "N/A" denotes insufficient data for analysis.
** The science NAEP tests were revised for 2009, making comparisons with prior years invalid.*

- **What percentage of 9th graders graduates from high school in four years?**

Missouri: 75% **U.S.: 69%**

Source: Editorial Projects in Education, 2011. Data for school year 2009-10.

TEACHING AND LEARNING

All students should carry out and reflect on engaging science projects. Yet many U.S. 4th and 8th graders say they hardly ever do. This table lays out what Missouri students say about math and science in their schools.

- **Percentage of Missouri 4th grade students who report that:**

	Missouri	U.S.
They "**often**" or "**almost always**" like math	63%	63%
They "**often**" or "**almost always**" think math work is too easy	37%	38%
They "**never or hardly ever**" do activities or projects in science	21%	23%
They "**never or hardly ever**" talk about results of science projects	32%	36%
They "**never or hardly ever**" write reports about a science project	52%	54%

- **Percentage of Missouri 8th grade students who report that:**

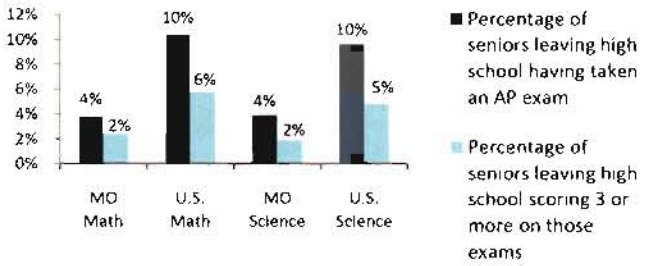
	Missouri	U.S.
They "**agree**" or "**strongly agree**" that they like math	63%	64%
They "**often**" or "**almost always**" think math work is too easy	28%	29%
They "**never or hardly ever**" design a science experiment	38%	39%
They "**never or hardly ever**" watch their teacher do an experiment	27%	24%
They "**never or hardly ever**" write reports on science projects	51%	47%

Source: NAEP, 2009

PREPARING FOR AND SUCCEEDING IN COLLEGE

The U.S. faces a shortage of 3 million college graduates by 2018, because U.S. students attend and graduate from college at low rates. States that do not meet the demand for college-educated workers may forfeit vital opportunities for economic growth.

- **What percentage of students takes Advanced Placement tests in math and science, and how do they do?**



Source: College Board, AP Report to the Nation, 2011. Data for school year 2009-10.

- **What percentage of students attends and graduates from college?**

	Missouri	U.S.
Percentage of associate's degree candidates who graduate within three years of enrolling	34%	28%
Percentage of bachelor's degree candidates who graduate within six years of enrolling	57%	56%
Percentage of all 18-24 year olds enrolled in college	36%	36%

Source: National Center for Higher Education Management Systems, 2008

- **What percentage of bachelor's degrees conferred in Missouri is in STEM fields?**

Missouri: 14% **U.S.: 15%**

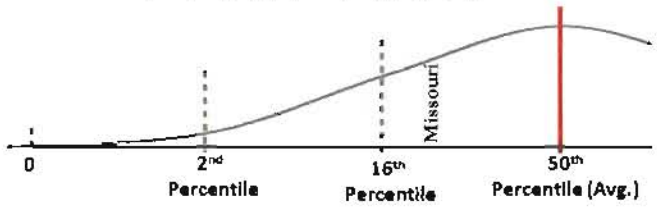
Source: NCES, 2009 Integrated Postsecondary Education Data System, fall 2009. Data for school year 2008-09.

TEACHERS

Teachers have the most significant impact on student learning among school-based factors. It is critical that math and science teachers have a strong academic background in the subjects they teach.

- **Where does Missouri set the passing score on elementary content licensure tests?**

Well below the average score for all test takers.



Source: National Council on Teacher Quality, 2010.

- **What percentage of 8th graders have teachers with a major or minor in math?**

Missouri: 46% **U.S.: 57%**

Source: NAEP, 2009

For more information on data sources for this report, see www.changetheequation.org/vitalsigns

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About Change the Equation

Change the Equation is a national coalition of more than 110 corporate CEOs who are committed to improving science, technology, engineering and mathematics (STEM) learning for every child, with a particular focus on girls and students of color, who have long been underrepresented in STEM.

Change the Equation works toward three critical goals:

- ***Great Teaching.*** Improve STEM teaching at all grade levels, with a larger and more diverse cadre of highly capable and inspirational STEM teachers.
- ***Inspired Learners.*** Inspire student appreciation and excitement for STEM programs and careers to increase success and achievement in school and opportunities for a collegiate education, especially among females and students of color.
- ***A Committed Nation.*** Achieve a sustained commitment to improving STEM learning from business leaders, government officials, STEM educators and other stakeholders through innovation, communication, collaboration and data-based decision making.

Change the Equation strives to be the conscience of a national movement to improve STEM learning by:

- ***Shining a light on progress and problems.*** Change the Equation speaks with a steady, independent voice about the urgency of improving STEM learning nationwide.
- ***Advocating and influencing.*** Our network of more than 110 CEOs seeks to influence decision makers with a clear vision for improving all students' learning in STEM, in and out of school. Our CEOs care passionately about STEM learning, and they are driven by the need for greater consensus and more action on what it will take to make a difference.
- ***Leading by example.*** Change the Equation members will carefully evaluate their own efforts in support of STEM learning to ensure their effectiveness and quality. Before calling others to task, the corporate community is "cleaning its own house".
- ***Acting as catalysts for change.*** Change the Equation aims to scale up existing, effective STEM learning programs nationwide. We are committed to a future where neither geography nor family circumstances stand in the way of a student's success.
- ***Collaborating with educators and communities.*** Change the Equation seeks to combine the best in American schools with the power and ingenuity of American business.