

The future of Iowa depends on its ability to boost student performance in science, technology, engineering and mathematics (STEM). Young people in Iowa 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.

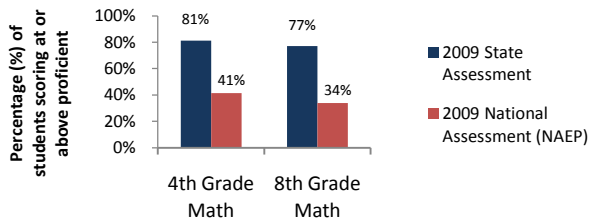
In this STEM Vital Signs report, Change the Equation has compiled critical data on the condition of STEM learning in Iowa. We provide these data to inform vigorous conversations about what it will take to improve STEM learning in the state. While there are no silver bullet fixes, the state can boost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

- Raise the bar on state tests.**  
 The Iowa state test rates 81 percent of the state's 4<sup>th</sup> graders as proficient in math. That's far more than the 41 percent of Iowa 4<sup>th</sup> graders who score proficient on the National Assessment of Educational Progress (NAEP), which sets a consistent bar for student performance across the states and tracks international assessments.
- Focus on achievement gaps.**  
 Like all U.S. states, Iowa 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.**  
 All new elementary teachers in Iowa must pass a general subject matter test, but the state sets the passing score for that test well below the mean score for all test takers. The state should raise the bar for elementary teachers' content knowledge.

## ACADEMIC EXPECTATIONS

We evaluated Iowa'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 Iowa have high academic expectations of its students?**  
 Much smaller percentages of Iowa students were proficient on NAEP than on Iowa state tests.



Sources: NAEP, National Center for Education Statistics, 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 Iowa adopted *Common Core State Standards* in math? **Yes**
- Has Iowa joined a state testing consortium? **Yes**
- How do Iowa math standards fare on a national evaluation? **C**

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

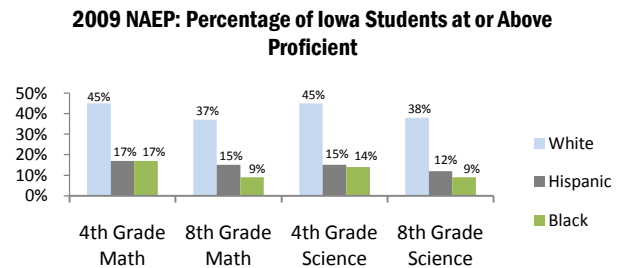
Student performance varies widely within and among states. NAEP allows states to compare themselves against other states, measure achievement gaps among different groups of students and track students' improvement over time.

- How do Iowa students compare nationally?**

	2009 NAEP: Percentage of Students at or Above Proficient		
	Iowa	U.S.	Average of Top 3 States
4 <sup>th</sup> grade math	41%	38%	56% (MA, MN, NH)
8 <sup>th</sup> grade math	34%	33%	48% (MA, MN, NJ)
12 <sup>th</sup> grade math	25%	25%	33% (MA, NH, NJ)
4 <sup>th</sup> grade science	41%	32%	46% (MA, NH, VA)
8 <sup>th</sup> grade science	35%	29%	42% (MA, MT, ND)

Source: NAEP, 2009.

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



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 in math\*?

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 4<sup>th</sup> grade math is 240, and the average for 8<sup>th</sup> grade math is 283. The tables below compare progress in Iowa to progress in the most improved states.

#### 4<sup>th</sup> grade math

	IA NAEP Scale Score			Change since 1996	
	1996	2003	2009	Iowa	Most Improved State
All	229	238	243	+14	+32 (DC)
White	230	241	245	+15	+26 (MA)
Black	205	215	226	+21	+35 (FL)
Hispanic	N/A	222	223	N/A	+38 (DE)

#### 8<sup>th</sup> grade math

	IA NAEP Scale Score			Change since 1996	
	1996	2003	2009	Iowa	Most Improved State(s)
All	284	284	284	0	+21 (DC, MA)
White	285	287	287	+2	+22 (MA)
Black	256	257	259	+3	+28 (FL)
Hispanic	N/A	255	266	N/A	+39 (DC)

Source: NAEP, 2009. "N/A" denotes insufficient data for analysis.

\* The NAEP science tests were revised in 2009, making comparison with prior years invalid.

### What percentage of 9<sup>th</sup> graders graduates from high school in four years?

Iowa: 80%                      U.S.: 69%

Source: Editorial Projects in Education, 2011. Data for school year 2006-07.

## TEACHING AND LEARNING

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

### • Percentage of Iowa 4<sup>th</sup> grade students who report that:

	Iowa	U.S.
They "often" or "almost always" like math	61%	63%
They "often" or "almost always" think math work is too easy	34%	38%
They "never or hardly ever" do activities or projects in science	16%	23%
They "never or hardly ever" talk about results of science projects	39%	36%
They "never or hardly ever" write reports about a science project	54%	54%

### • Percentage of Iowa 8<sup>th</sup> grade students who report that:

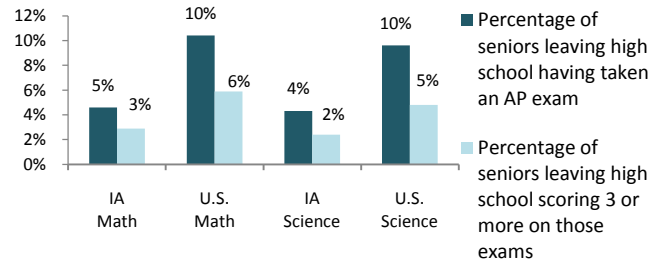
	Iowa	U.S.
They "agree" or "strongly agree" that they like math	69%	64%
They "always" or "almost always" think math work is too easy	28%	29%
They "never or hardly ever" design a science experiment	37%	39%
They "never or hardly ever" watch their teacher do an experiment	28%	24%
They "never or hardly ever" write reports on science projects	47%	47%

Source: NCES, 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 class of 2010.

### • What percentage of students attends and graduates from college?

	Iowa	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	61%	56%
Percentage of all 18-24 year olds enrolled in college	42%	36%

Source: National Center for Higher Education Management Systems, 2008.

### • What percentage of bachelor's degrees conferred in Iowa is in STEM fields?

Iowa: 12%                      U.S.: 15%

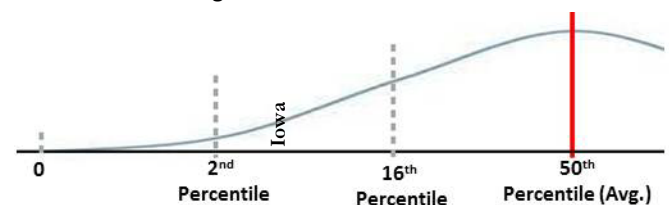
Source: NCES, 2009 Integrated Postsecondary Education Data System, fall 2009. Data for school year 2008-09.

## 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 Iowa set the passing scores on elementary content licensure tests?

Far below the average score for all test takers.



Source: National Council on Teacher Quality, 2010.

### • What percentage of 8<sup>th</sup> graders have teachers with a major or minor in math?

Iowa: 67%                      U.S.: 57%

Source: NAEP, 2009.

For more information on data sources for this report, see [www.changetheequation.org/vitalsigns](http://www.changetheequation.org/vitalsigns).