

Mathematics competency is an essential part of academic success and its benefits extend far beyond the academic domain. Basic arithmetic is used on a daily basis and is a necessary skill for students heading into an increasingly technology-based workplace. Additionally, students who take higher-level mathematics and science courses are more likely to attend and complete college.

Focusing on creating a bright future for our students, Arizona Ready has implemented measurable goals that hold our students, teachers, administrators, and schools accountable to higher standards in order to achieve improved results. As part of Arizona’s education reform plan, the state has set a goal of at least 85% of eighth grade students achieving scores of basic or better on the mathematics portion of the National Assessment of Educational Progress (NAEP).

STATEWIDE PROGRESS (FIGURE 2.1)

Arizona's Progress Toward its 8th Grade NAEP Math Goal

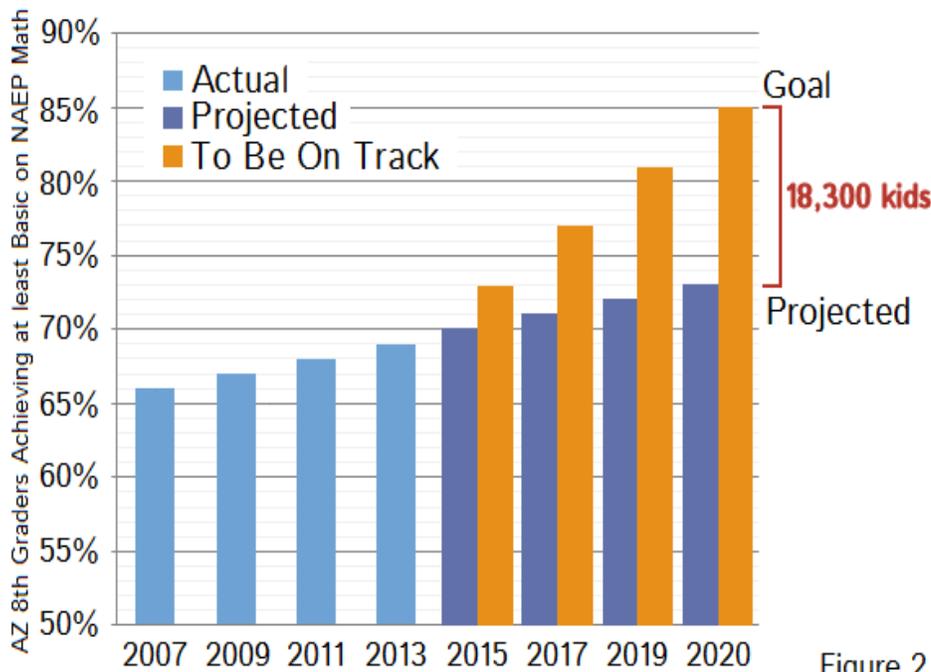


Figure 2.1

The NAEP is administered every two years and tests a representative sample of Arizona students. In 2013, that sample included 2,800 eighth grade students. NAEP results are provided as scale scores in addition to achievement levels.

NAEP Achievement levels include basic, proficient, and advanced. Since 2007, the percentage of students meeting the benchmark of basic performance or better has risen slowly but steadily. Arizona ranked 17th nationally in average score growth from 2007 to 2013. The statewide average passing rate has increased three percentage

points during the last four test administrations of NAEP, from 66% in 2007 to 69% in 2013. If average scores continue improving at the current rate, 73% of eighth graders will meet the basic performance or better benchmark by 2020, twelve percentage points below Arizona’s target goal. Meeting the state’s goal of an 85% basic or better rate by 2020 would equate to 18,300 additional Arizona students testing at grade level.

Overall, an increasing number of students are achieving advanced or proficient level scores. The percentage of students who are reaching basic level scores has dropped slightly, from 40% in 2007 to 38% in 2013. However, the percentage of students who are performing at below basic levels has dropped over the last four test administrations of NAEP, from 952 students in 2007 to 868 students in 2013. The rise in percentage of students achieving a score of

basic or better has been driven primarily by a rise in percentage of students achieving advanced or proficient scores.

For NAEP’s eighth grade mathematics assessment, scale scores include: Basic (262+), Proficient (299+) and Advanced (333+). A good rule of thumb is that each 10 point difference in scale score equates to roughly one year’s worth of learning. Arizona’s average scale score has increased by 4 points over the last 6 years. In 2013, the average score of eighth grade students in Arizona was 280.

SCORES BY INCOME (FIGURE 2.2)

Average Arizona 8th Grade NAEP Math Scores by Eligibility for Subsidized Lunch

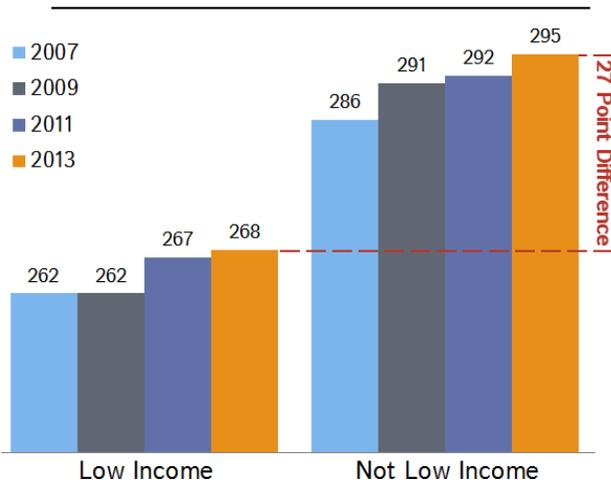


Figure 2.2

The National School Lunch Program (NSLP) is a federally-funded program that provides meals to students whose family’s income meet specific eligibility requirements. For example, for a family of four to qualify for the NSLP program in 2014, their annual income would have to be less than \$23,850.

Across the last four test administrations, students identified as low-income based on NSLP eligibility have scored significantly lower than students who are not low-income. Scores for low-income students have risen over time; however, average test scores for students who are not low-income have seen similar increases. It is important to note that although we have seen improvements in both groups, the disparity between the two

groups has increased slightly. In 2007, there was a 24 point difference between low-income students and students who are not low-income. In 2013, that number increased slightly to 27 points.

SCORES BY PARENT EDUCATION LEVEL (FIGURE 2.3)

The educational achievement level of a student’s parents plays a significant role in a student’s NAEP score. As parental education levels increase, students reach significantly higher scores on NAEP. Over the last four test administrations, the disparity between the scores of students whose parents either graduated from high school or had less than a high school level education nearly closed completely, exhibiting only a 1 point difference by 2013. Despite the decreased disparity between these two groups, there is still a significant difference between their scores and those of students whose parents had more education. Scores show that students whose parents had at least some post-secondary education scored nearly 20 points higher, while students whose parents were college graduates scored nearly 30 points higher.

Average 8th Grade NAEP Math Scores by Parent Education Level

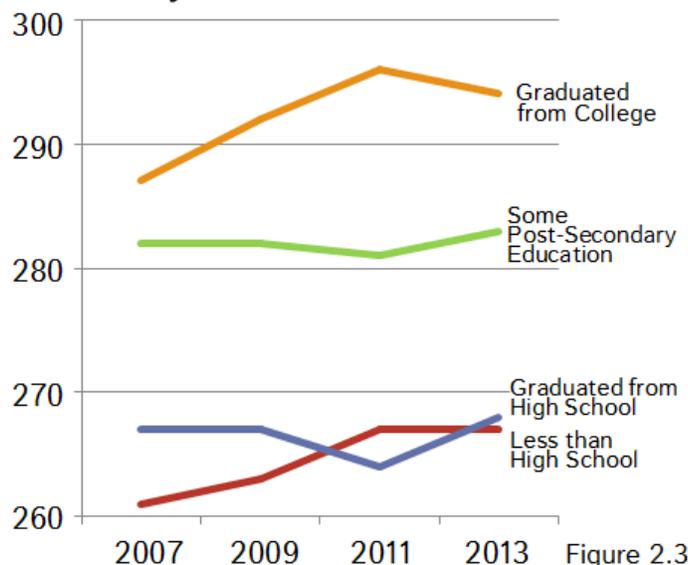


Figure 2.3

SCORES BY ETHNICITY (FIGURE 2.4)

**Arizona 8th Grade NAEP Math Scores
by Ethnicity**

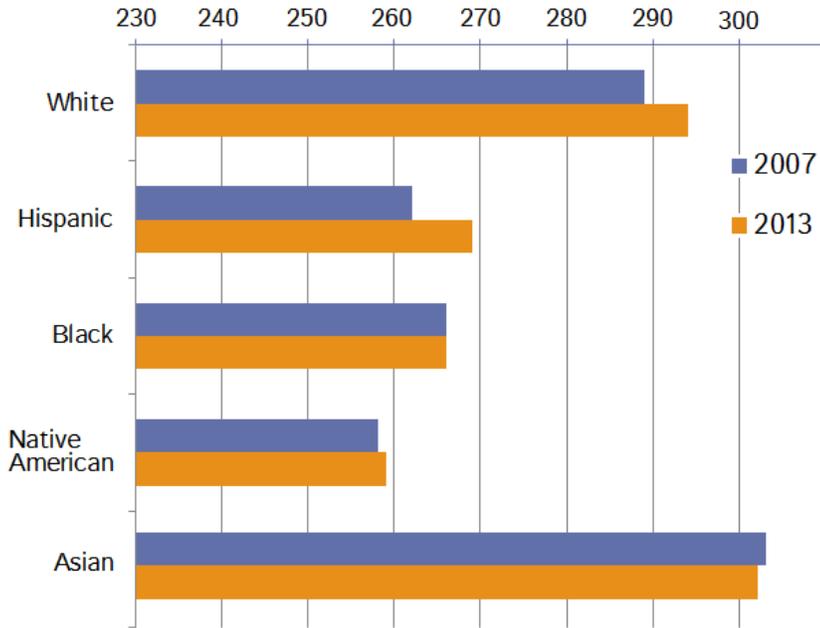


Figure 2.4

Students who identified as either White or Hispanic made steady, significant progress throughout the last four administrations of NAEP. Average scores for these two groups increased by 7% and 5% respectively. Average scores for all other ethnic groups have not exhibited significant change over the past four test administrations of NAEP. It should be noted that the NAEP tests a representative sample of Arizona’s eighth grade student population, and students who identify as either White or Hispanic made up 85% of the 2013 sample group.

ACTIONS AT THE STATE AND LOCAL LEVELS

In order to ensure that Arizona children are prepared to succeed in high school and beyond, the Arizona State Board of Education adopted Arizona’s College and Career Ready Standards in 2010 in English Language Arts and Mathematics. Mastery of these new standards will be measured by a more rigorous state assessment that will replace AIMS, beginning in the 2014-2015 school year. In addition, data on student academic progress is now included in the reformed evaluation system for school leaders and teachers. These reforms are adding accountability into Arizona’s education system, which will hold our students, teachers, administrators, and schools accountable to higher standards in order to foster student growth and future success.

ADDITIONAL ACTIONS TO CONSIDER

At a local level, school districts and charter schools can find ways to make math relevant, interesting, and engaging by using approaches such as project-based learning, real-world examples, and learning environments that are more connected with the workplace. It is important that students are invested in their education and understand why math is a fundamental and necessary skill.

At a state level, policy-makers can focus on early math interventions and improved training for teachers and school leaders. Research shows that effective teachers and leaders are the largest in-school contributors to student learning and achievement. It is clear that no education reform initiative will be successful without highly effective teachers and school leaders. Therefore, the state should consider ways to attract and retain top-quality math teachers in Arizona’s education system.

As part of this goal, Arizona can look at measuring the number of math content experts teaching math in Arizona elementary and middle schools—those who have worked in math-intensive work-places, or who had a math-based major in college. In addition, effectively teaching higher level math concepts in early grade levels has proved challenging for many elementary teachers. As higher standards have been implemented, many teachers do not have the necessary skills to help kids understand and grasp important math concepts. Arizona can consider ways to encourage and incentivize math content to become teachers in Arizona’s elementary and middle schools.

Sourcing

Figure 2.1: Nation’s Report Card - NAEP

Figure 2.2: Nation’s Report Card - NAEP

Figure 2.3: Nation’s Report Card - NAEP

Figure 2.4: Nation’s Report Card - NAEP