

## Riding the wave

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# Program promotes success in U.S. math and science

What happens when you expand math and science education across the nation? More students do better in college, including disadvantaged youths and minorities.

► Over the past five years, the National Math and Science Initiative's *Advanced Placement* program has dramatically improved high school student scores in math and science courses, helping students perform at a higher level in college.

Thanks to a \$125 million commitment from Exxon Mobil Corporation, today the Initiative is in 19 states and achieving record-setting results. For example, schools that have gone through the program average an increase of almost 80 percent in the number of qualifying *Advanced Placement* math, science and English exams after just one year, 11 times the national average. These gains are sustained year after year, transforming the school culture and young lives.

Gains for minority groups are equally impressive. In the Initiative's 70 new schools for the 2011-2012 school year, African-American students more than tripled the number of qualifying scores achieved on math, science and English exams. Hispanics doubled their number of qualifying scores – a significant step toward reducing the minority achievement gap in



technical proficiency.

In addition, the program has helped female students double their number of qualifying scores on recent exams.

Why are these numbers so significant? Studies show that students who master this coursework in high school are three times more likely to graduate from college. Graduation rates for students passing even one *Advanced Placement* course increase from 30 percent to more than 70 percent.

## Raising the bar

The program's origins began in the 1990s, after the federal government selected Waxahachie, Texas, as the location for its supercollider project. Dallas philanthropist Peter O'Donnell approached Gregg Fleisher, a calculus teacher, with a unique proposal: Let's raise the bar on math and science education in public schools to make the area more attractive for scientists and researchers who might move there with their families.

Above: Alabama high school teacher Karen Naquin says the Initiative has helped student qualifying scores increase by nearly 600 percent in her state.





National Math and Science Initiative Chairman Tom Luce and Sue Payne, chief operating officer, work with teachers nationwide to increase student proficiency in science, technology, engineering and math.

## Making eyes light up

Another effort by the National Math and Science Initiative includes the UTeach program, which recruits and trains students in technical studies to become teachers in America's public schools. Today, more than 5,500 college students are enrolled in the teacher preparation program at 34 universities across the United States.

In response to national concerns about the need to develop highly qualified science and math teachers, UTeach offers an integrated-degree plan, financial assistance and early teaching experience to encourage math and science majors to enter that profession. More than 90 percent of university students who complete the UTeach program go on to teach. More than 80 percent are in the classroom five years later.

National Math and Science Initiative Chairman Tom Luce understands that the stakes are high. "Our country faces tough challenges that can only be solved with new ideas that are rooted in science, technology, engineering and math education. We must answer the need for more educated workers," he says.

"The key is hiring more teachers who have majored in math and science. They need to know the subject thoroughly. And they need to be trained to involve students in hands-on learning. If you don't know math and science, you can't teach math and science," Luce notes. "You may stay a day ahead of the students, but you can't make a student's eyes light up."

Although the supercollider was later cancelled, the impact of Fleisher's academic program created dramatic results in area schools, increasing the number of qualifying scores from 54 to 521 in just five years. In 1996, the program came to the Dallas Independent School District where, before any formal programs began, only 29 African-American and Hispanic students from 10 urban schools earned qualifying *Advanced Placement* scores in math, science and English. By last year, with training in place since 1997, that number had grown to more than 1,100.

### Nationwide rollout

With its goal to get more American students college-ready and prepared for future jobs, the Initiative recruited Fleisher to roll out the program nationwide, with ExxonMobil funding making that possible.

Its success hinges on four key elements that help students perform at a higher level. First, the entire school district, from classroom teachers to school administrators, works toward specific accountability goals and welcomes all students to enroll in advanced classes.

Second, teachers receive extra training and ongoing support from experienced educators. Third, after-school and Saturday study sessions are used to reinforce student learning. And finally, teachers receive a stipend for meeting performance measures, and students earn \$100 per course if they score 3 or higher on the *Advanced Placement* qualifying exam.

Karen Naquin, a calculus teacher at Stanhope Elmore High School in Alabama, has seen a 50 percent increase in the number of students in her class receiving qualifying

scores since her district started the program three years ago. In the first year alone, her school increased the number of students with qualifying scores from nine to 62, an increase of nearly 600 percent.

"The training and resources are invaluable, and have made a difference in the way I teach," Naquin says. "The rigor of the course really prepares my students for what they will see when they get to college. Completing these courses gives them confidence."

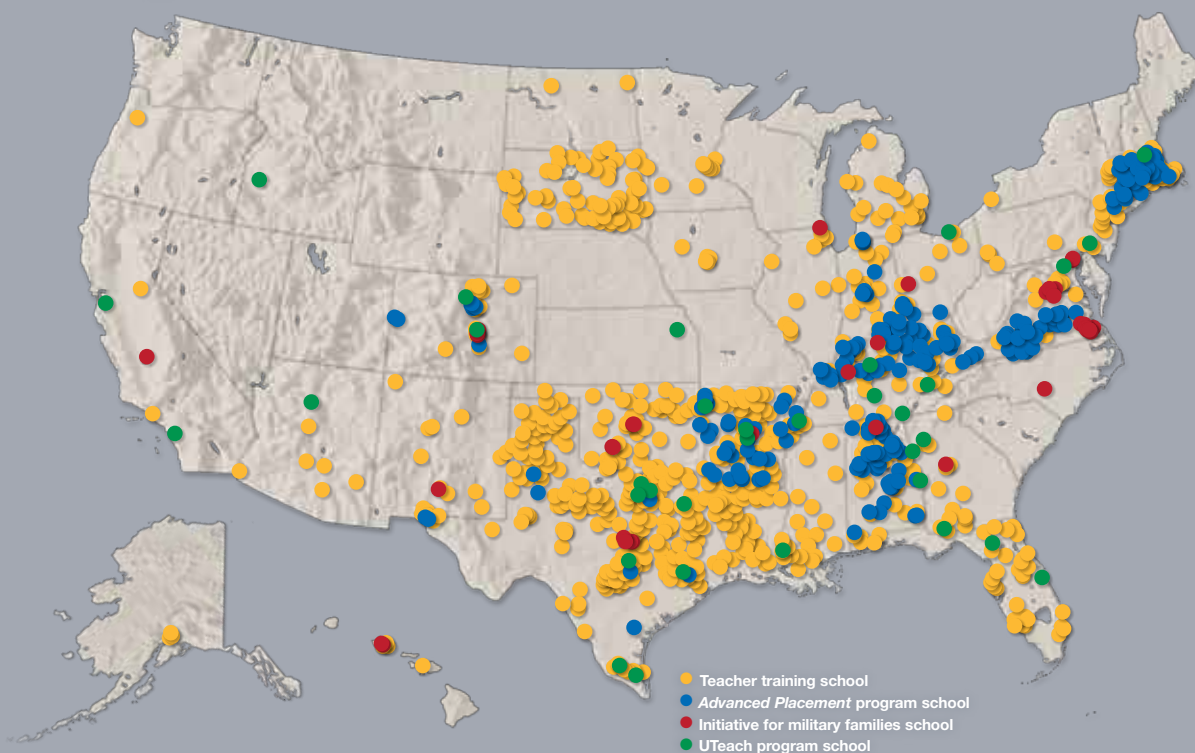
What began as a ripple is now a wave of academic achievement for Alabama, a state that historically ranked near the bottom in U.S. education achievement. During the past four years, Alabama has ranked number one among all 50 states in the percent increase in qualifying scores on *Advanced Placement* exams in math, science and English.

### Moving the needle

"Last year, the 64 schools involved in the program accounted for 67 percent of the entire state's increase in passing math, science and English scores," says Mary Boehm, president of the Alabama affiliate of the National Math and Science Initiative. "We're moving the needle in Alabama."

Similar results are seen across the nation. After the Department of Defense asked the Initiative to establish *Advanced Placement* studies in schools serving military bases around the country, participating schools achieved a 45 percent increase in passing exams, nearly six times the national average. The increase in *Advanced Placement* math and science exams was even greater – 57 percent.

## National Math and Science Initiative Program Locations – 2012



### Key facts

- ▶ ExxonMobil has committed \$125 million over 10 years to the National Math and Science Initiative
- ▶ After just one year of the *Advanced Placement* program, schools average a nearly 80 percent increase in qualifying math, science and English exams – 11 times the national average

### After just three years:

- ▶ 137 percent increase versus 24 percent nationally
- ▶ 167 percent increase among female students versus 26 percent nationally
- ▶ 203 percent increase among African-American and Hispanic students versus 50 percent nationally

### Remembering Sally Ride

The world lost an American hero with the passing of Sally Ride last summer. Best known for her accomplishments as the first American woman in space, she also inspired a new generation, particularly girls, to pursue interests in science, engineering and math.

ExxonMobil is proud to have worked with her in her role as a director of the National Math and Science Initiative, and to have helped her develop the Sally Ride Science Academy in 2009. The Academy builds teachers' skills to prepare young people for careers in science, technology, engineering and math. Ride once explained that her goal was simply to "make science and engineering cool again." Mission accomplished, Sally.

### More scientists and engineers

The Initiative's goal is to expand that success to all 50 states. "This program has achieved tremendous results in both urban and rural schools serving a broad range of students," says Sue Payne, chief operating officer for the National Math and Science Initiative. "We've demonstrated its success in just about any setting."

Payne understands firsthand the importance of building technical skills in today's youth. As a former geoscience resource manager for ExxonMobil, she managed training and career development for more than

1,500 geoscientists before joining the Initiative about a year ago.

"Having spent 35 years with ExxonMobil, I've seen what's needed to prepare young American students to work in the energy industry and other technical fields. First, it's about creating the interest and problem-solving ability to become a new engineer or scientist. By the same token, we're providing the skill sets for students to be successful in whatever they do, regardless of profession." **theLamp**

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## Let's not stop at nine.

American students rank 25th in the world in math and 17th in science. But there is reason for hope. High schools in nine states are taking part in the National Math and Science Initiative's Advanced Placement<sup>®</sup> program. In the past four years, participating schools increased the number of qualifying test scores in math and science by 160%. Imagine the impact if all 50 states join the program. Let's support math and science education. Let's solve this.<sup>SM</sup>

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