

**Ideas that Work!** to  
achieve school readiness  
and student success from  
Rhode Island KIDS COUNT  
in partnership with the  
Northeast and Islands  
Regional Educational LAB.



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## Math and Science Programs for Minority and Disadvantaged Students

*"SMILE fills an important gap in connecting our young women and minorities with potential careers in the science and mathematics fields. Students gain a great deal of confidence from the experience. SMILE is an important contributor in achieving equity for all our students."*

*John M. Harrington  
School Superintendent  
South Kingstown  
School District*

### What Works

Students with a strong grasp of mathematics have an advantage in academics and in the job market. The 8th grade is a critical point in mathematics education. Achievement at that stage clears the way for students to take rigorous high school math and science courses. High-level mathematics instruction is critical for all students, especially low-income and minority students who have typically been underrepresented in math and science courses at the high school and college levels. Programs are most effective when they involve these students in math and science in the early grades, treat math and science as subjects that everyone can learn, assist with math and science course selection in middle school and high school, and help students explore college and career choices.

### Background

As the nation's economy shifts increasingly toward technology, achievement in math and science has become more important in the job market. Workers who have strong mathematics and science backgrounds are more likely to be employed and generally earn more than workers with lower achievement, even if they have

not gone to college. Minority students and low-income students often have less access to science and math courses and are not encouraged to pursue math and science careers. Female students and students from disadvantaged backgrounds may also experience discouragement and biases about their ability to succeed in math and science from teachers, parents, and school counselors.

Students of all income levels who take rigorous mathematics and science courses in high school are more likely to go to college. According to data from the National Educational Longitudinal Study, students from low-income families who took algebra I and geometry were almost three times as likely to attend college as those who did not take these higher level math courses.

Men and women of minority racial and ethnic backgrounds and women of all races are significantly underrepresented among engineers and scientists in the United States. The National Science Foundation reported in 1994 that African-Americans, Hispanics and Native Americans made up 19% of the labor force, but only 8% of the science and engineering labor force. Women made up 46% of the total labor force,

but only 22% of the science and engineering labor force.

### Promising Program

The Science and Math Investigative Learning Experiences (SMILE) began in 1994 as a partnership between the University of Rhode Island and selected Rhode Island school districts. SMILE provides science and math enrichment to minority and disadvantaged students in grades 4 through 12. The purpose of the program is to increase the number of minority and low-income students who graduate from high school qualified to go on to higher education and pursue careers in science, math, engineering, and health professions.

The University of Rhode Island SMILE Program replicates the successful SMILE program at Oregon State University. The Rhode Island program began with 20 students in 1994 and now serves 160 elementary, middle, and high school students in South Kingstown, West Warwick, and Woonsocket. Each year about 80% of SMILE's participants are ethnic minorities and 60% are female. The program has an 80% retention rate. Since the beginning of the program in 1994, all of the seniors who have participated in the program have graduated from high school and all have gone to college.

The SMILE program is provided through after-school clubs, each comprised of twenty students and two teachers. Sixteen teachers in the three school districts serve as SMILE teachers. SMILE activities emphasize hands-on math and science learning and team-based problem solving. SMILE staff offer support to students with their regular school work, help students choose math and science courses in middle school and high school, and provide advice on searching for the right college and applying for financial aid. SMILE clubs also take monthly field trips to explore math and science topics and explore career options. Professional development workshops for SMILE

"SMILE has enhanced my son's self-esteem and has provided him with hands-on learning experiences. SMILE has enabled my son to be exposed to career paths which will help him when it comes to decide."

Lori Rodrigues  
Parent  
South Kingstown, RI

teachers provide hands-on science and math activities, techniques for integrating science and math, computer training, and culturally-appropriate teaching techniques.

### Lessons from the Field

Providing opportunities for low-income and minority students to explore math and science through hands-on activities in a fun and supportive environment can break down the barriers that often keep talented students from pursuing advanced education and careers in math and science fields.

Teachers or counselors who help students plan their high school courses with attention to college requirements are critical to opening up opportunities in math and science careers for minority and disadvantaged students.

### Resources

The University of Rhode Island  
SMILE Program

[www.uri.edu/smile](http://www.uri.edu/smile)

Carol Englander, Director  
401-792-9682

Maria-Gabriela Lizano,  
Development Coordinator  
401-783-3057

Clark, J.V. (1999). "Minorities in Science and Math." *ERIC Digest*.

*Mathematics Equals Opportunity* (October 1997). Washington, DC: U.S. Department of Education.

**LAB**

### Northeast and Islands

#### Regional Educational Laboratory

A Program of The Education Alliance at Brown University  
222 Richmond Street, Suite 300  
Providence, RI 02903  
800-521-9550 or fax 401-421-7650  
email: [lab@brown.edu](mailto:lab@brown.edu)  
[www.lab.brown.edu](http://www.lab.brown.edu)

### in partnership with Rhode Island KIDS COUNT

One Union Station, Providence, RI 02903  
401-351-9400 or fax 401-351-1758  
email: [rikids@rikidscount.org](mailto:rikids@rikidscount.org)  
[www.rikidscount.org](http://www.rikidscount.org)

