

# Local Education Fund Issue Brief

PUBLIC  
EDUCATION  
NETWORK

## MATH AND SCIENCE REFORM

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## OVERVIEW

Politicians, academics, and business and community members all seem to be raising concerns that America is not as globally competitive as it once was. This is due, in part, to the fact that public schools in America are not producing high school graduates with the math, science, and technical skills to succeed in higher education or be employed in a knowledge-based, global marketplace. According to the Bureau of Labor Statistics, jobs requiring science, engineering or technical training will increase 24 percent between 2004 and 2014 to 6.3 million.<sup>1</sup> However, less than half of high school graduates in the United States are academically prepared for college-level math and science. Between 1970 and 2010, America's proportion of science and engineering doctorates will fall from 50 percent to 15 percent.<sup>2</sup> Additionally, the U.S. ranked 27 out of 39 countries in the 2003 Program for International Student Assessment (PISA), which measures 15-year-olds' ability to solve real-life math problems.<sup>3</sup>

What can be done in math and science reform by local education funds (LEFs)?

A number of LEFs have been working to improve math and science instruction in public schools and have approached the problem from a variety of angles:

- Building **coalitions** of educators, businesses, and community members to pool energy and expertise;
- Establishing **teacher networks** so teachers learn from and support one another;
- Training **subject-matter specialists** to build the capacity and knowledge of teachers in a school, and
- Redirecting and supporting math and science **curriculum**, which will more effectively build students' abilities and interests.

1. U.S. Department of Education. *Strengthening Education: Meeting the Challenge of a Changing World (Fact Sheet)*. January 2006.
2. U.S. Department of Education. *Increasing America's Competitiveness*. January 2006.
3. Lemke, M., Sen, A., Pahlke, E., Partelow, L., Miller, D., Williams, T., Kastberg, D., Jocelyn, L. (2004). *International Outcomes of Learning in Mathematics Literacy and Problem Solving: PISA 2003 Results From the U.S. Perspective*. (NCES 2005-003). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

## EDUCATION-BUSINESS-COMMUNITY COALITION



Philadelphia Math and Science Coalition ([www.philaedfund.org/mathandscience/index.html](http://www.philaedfund.org/mathandscience/index.html))  
 Carol S. Fixman, Executive Director, [cfixman@philaedfund.org](mailto:cfixman@philaedfund.org)

The Philadelphia Education Fund has convened a coalition of Philadelphia's corporate, university, and school district communities to address the pressing challenge of preparing youth to excel in mathematics and science, and to help secure the future economic growth of the Philadelphia region and the nation. The coalition is dedicated to positioning Philadelphia students to succeed in post-secondary education, and join the workforce in jobs that increasingly require math and science backgrounds; preparing youth to compete in and contribute to a knowledge based economy; and graduating students who are well-informed citizens able to make smart decisions throughout their personal and public lives regarding issues of personal finance, health, the environment, the economy, and related local and national policy issues.

The Philadelphia Education Fund is taking the leadership role in convening the partners as well as synthesizing, articulating and implementing the goals of the Coalition. The Coalition is focusing on developing highly qualified math and science teachers through partnerships among universities, corporations, and schools. A steering committee is currently leading the strategic planning for developing and sustaining this long-term partnership.

An education-business-community coalition is also being convened by

***Linking Education and Economic Development in Sacramento, CA***  
[leedpubdev.altosagroup.com/LEEDAPP/pub/jsp\\_include\\_test\\_2.jsp?page=/wd-consortia.html](http://leedpubdev.altosagroup.com/LEEDAPP/pub/jsp_include_test_2.jsp?page=/wd-consortia.html)

## TEACHER NETWORK



Math and Science Network ([www.sfedfund.org/programs/network\\_overview.php](http://www.sfedfund.org/programs/network_overview.php))  
 Mark Triplett, Program Manager, [mark@sfedfund.org](mailto:mark@sfedfund.org)

San Francisco Education Fund brings together K-12 math and science teachers to both educate and support one another in their mutual pursuit of quality math and science education. Teachers involved in the program learn about new developments in math and science education; share personal experiences and techniques with others working in the same subject area or grade level; collectively develop effective teaching strategies that address the needs of diverse student populations, and cultivate professional relationships within and across schools. The program emphasizes self-reflection and self-assessment as important tools in a teacher's efforts to improve. Network teachers overwhelmingly report the success of the program: 93 percent reported a positive change in their instructional practice based on their participation in the Network, and 86 percent noticed improved student performance that could be attributed to their involvement in the Network.

Other LEFs facilitating teacher networks in math and science:

**New Visions for Public Schools** in New York, NY  
[www.newvisions.org/teaching\\_learning/ln/index.asp](http://www.newvisions.org/teaching_learning/ln/index.asp)

**Urban Education Partnership** in Los Angeles, CA ([www.laep.org/target/](http://www.laep.org/target/))

## TEACHER PROFESSIONAL DEVELOPMENT



K-5 Mathematics Initiative ([www.houstonaplus.org/k5math.htm](http://www.houstonaplus.org/k5math.htm))  
 Patricia Lucey-Burks, Program Coordinator, [plucey-burks@houstonaplus.org](mailto:plucey-burks@houstonaplus.org)

Houston A+ Challenge chose to focus on elementary school because of its importance in establishing a firm understanding of mathematical concepts. Mathematics specialists are selected for their experience as classroom teachers; their expertise in teaching mathematics, and their interest in working with teachers as well as students. At the inception of the K-5 Mathematics Initiative in 2000-2001, there were five mathematics specialists in eight elementary schools. By the 2005-2006 school year, this project — a joint partnership of the Houston Independent School District, the ExxonMobil Foundation and the Houston A+ Challenge — has grown to include 17 elementary schools with 18 math specialists and two middle schools. The specialists participate in professional development to improve their mathematics content knowledge and to learn the latest research and the most effective instructional practices in mathematics, assist classroom teachers onsite by co-teaching math lessons, and conduct sessions to educate administrators and teachers on best practices in math instruction. Participating schools also host parent and family math events designed to enhance parents' math skills, teach the processes their children undertake when learning mathematics, and share specific lessons their children are learning.

*Another LEF initiative addressing the professional development of math and science teachers is being conducted by the*

**Mobile Area Education Foundation**  
*in Mobile, AL*

([www.maef.net/pages/All/SubPage.asp?S=Mobile%20Math%20Initiative](http://www.maef.net/pages/All/SubPage.asp?S=Mobile%20Math%20Initiative))

## CURRICULUM REFORM

A number of LEFs are conducting curriculum reform initiatives. **The Education Foundation** of Charleston, SC and the **Public Education Fund** in Chattanooga, TN have formed career academies featuring business and technology, environmental sciences, manufacturing and engineering, and health sciences in a number of high schools. These programs combine rigorous curriculum, a smaller, personalized learning environment, and an introduction to a particular career field through the classroom curriculum and internships in the community.

**Partners in Public Education**, in Memphis, TN, is utilizing an interactive online science program called Kit & Kaboodle to spur 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> graders' interest in science and technology. **Hillsborough Education Foundation** in Tampa, FL has built community financial support for Nature's Classroom, a program which has reached 300,000 sixth graders since 1969. The outdoor learning facility sponsors three-day academic adventures during which 250-350 students per day learn about the Hillsborough River ecosystem, and what people can do to protect it. The field activities are supplemented with extensive classroom preparation and follow-up.

The Education Foundation: [www.theeducationfoundation.org/content.asp?catID=9085](http://www.theeducationfoundation.org/content.asp?catID=9085)

Public Education Fund: [www.pefchattanooga.org/www/docs/3/new\\_society/](http://www.pefchattanooga.org/www/docs/3/new_society/)

Partners in Public Education: <http://www.pipememphis.org/index.php>

Hillsborough Education Foundation: [http://www.educationfoundation.com/index.cfm/fuseaction/Programs.Natures\\_Classroom](http://www.educationfoundation.com/index.cfm/fuseaction/Programs.Natures_Classroom)

## RESOURCES FOR FURTHER CONSULTATION

1. **American Association for the Advancement of Science** - An international nonprofit organization dedicated to advancing science around the world by serving as an educator, leader, spokesperson and professional association. In addition to organizing membership activities, AAAS publishes the journal *Science*, as well as many scientific newsletters, books and reports, and spearheads programs that raise the bar of understanding for science worldwide. ([www.aaas.org](http://www.aaas.org))
2. **Education Commission of the States** - An interstate compact created in 1965 to improve public education by facilitating the exchange of information, ideas and experiences among state policymakers and education leaders. Profiling the educational issues in science and mathematics, ECS provides reports on state activities as well as selected research. A new report examines high-leverage policies in the states to improve teacher recruitment, preparation and professional development for mathematics and science instructors, as well as various approaches in the states to provide students with rigorous curricula in these subject areas. ([www.ecs.org](http://www.ecs.org)) (<http://www.ecs.org/clearinghouse/68/73/6873.doc>).
3. **National Council of Teachers of Mathematics** - A public voice of mathematics education, providing vision, leadership, and professional development to support teachers in ensuring mathematics learning of the highest quality for all students. NCTM is the world's largest mathematics education organization, with 100,000 members and 250 affiliates throughout the United States and Canada. ([www.nctm.org](http://www.nctm.org))
4. **National Science Foundation** - NSF is an independent federal agency tasked with keeping the United States at the leading edge of discovery in a wide range of scientific areas, from astronomy to geology and zoology. One essential element in NSF's mission is support for science and engineering education, from pre-K through graduate school and beyond. ([www.nsf.gov](http://www.nsf.gov))
5. **National Science Teachers Association** - The largest organization in the world committed to promoting excellence and innovation in science teaching and learning for all. NSTA's current membership of more than 55,000 includes science teachers, science supervisors, administrators, scientists, business and industry representatives, and others involved in and committed to science education. ([www.nsta.org](http://www.nsta.org))
6. **TERC** - A nonprofit organization whose work in mathematics and science education includes research, curriculum and technology development, and implementation support in the form of professional development and assistance to districts and schools. TERC programs span pre-kindergarten through college, and include adult basic education and informal learning at museums, at home, and in afterschool programs. Research drives the development of all activities and products in an effort to create new knowledge about science and math teaching and learning. TERC collaborates with a variety of partners, including school districts, universities, community-based groups, and other research and development organizations. ([www.terc.edu](http://www.terc.edu))

### PEN'S MISSION

To build demand and mobilize resources for quality public education for all children through a national constituency of local education funds and individuals.

### PEN'S VISION

Every day, in every community, *every* child in American benefits from a quality public education.

### PUBLIC EDUCATION NETWORK

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