

Key methods encourage girls

TO ENCOURAGE GIRLS IN MATH AND SCIENCE, EDUCATORS CAN FOSTER CONFIDENCE ABOUT THEIR ABILITIES, SPARK THEIR ONGOING INTEREST, AND BUILD SKILLS.

By **Carla Thomas McClure**

A panel of experts convened by the U.S. Department of Education's Institute of Education Sciences (IES) has analyzed existing research and identified five ways educators can encourage girls in math and science. The strategies backed by the strongest research evidence involve changing the way students think about their abilities, performance, and opportunities in math and science.

Why are researchers interested girls' achievement in math and science?

Almost half of the U.S. workforce is female, but only 26% of the nation's scientists and engineers are women. Researchers are curious about why more women are not choosing advanced degrees and careers in the physical sciences, computer science, and engineering. Girls, on average, graduate from high school with slightly more credits in math and science than boys. Although boys do slightly better than girls on SAT tests in math, girls' grades in math are as good as boys'. These data suggest that ability, per se, may not be the factor that's holding girls back when it comes to making academic and career choices related to math and science. What is holding them back? That's the question researchers are asking.

What does the research say about it?

According to an IES practice guide published in 2007, girls begin showing less interest in science and math careers than boys during early adolescence. Some studies show that many

HANDS-ON SCIENCE AND MATH ACTIVITIES

Uncommon Knowledge: Projects That Help Middle-School-Age Youth Discover the Science and Mathematics in Everyday Life was developed by AEL (now Edvantia) through a National Science Foundation Grant and published by the ERIC Clearinghouse on Rural Education and Small Schools.

The two-volume set is available online from ERIC. Volume 1 contains science activities involving herbs, nutrition, and food preservation:

http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/17/96.pdf

Activities in Volume 2 teach math concepts through quilting and craft activities:

http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/17/f1.pdf



girls lack confidence in their math and science abilities and tend to underestimate their potential for success in these subject areas. Meanwhile, girls and boys who are confident about their math and science abilities tend to take elective courses in these fields, perform well, and select college majors and careers related to math and science. According to the expert panel convened by IES, empirical research suggests that "children's beliefs about their abilities are central to determining their interest and performance" in academic and career pursuits. A new study reported in *Science Daily* echoes this conclusion and suggests that parents and teachers should do more to promote an "I can" approach to learning before girls enter middle school.

EDVANTIA

Carla Thomas McClure is a staff writer at Edvantia (www.edvantia.org), a nonprofit research and development organization that works with federal, state, and local education agencies to improve student achievement.

What can teachers do to encourage girls in math and science?

First, teachers can strengthen girls' beliefs in their own abilities. To do this, they can (a) teach explicitly that one's academic abilities are not "set in stone" and can be expanded and improved with effort and practice and (b) provide prescriptive, informational feedback on strategies, effort, and the process of learning.

Second, teachers can cultivate girls' interest in math and science by selecting activities that connect course content to related careers without reinforcing gender stereotypes and by offering supplemental resources outside of class to students who show strong interest in a particular topic.

The IES expert panel found these strategies to be supported by research evidence having a "moderate" level of rigor. The panel also recommends exposing girls to female role models and training students in spatial skills (e.g., mentally rotating images, drawing spatial representations). Both strategies are supported by research, although the panel rated the rigor of this research to be "low."

What can be done at the school and district levels?

The IES panel reminds us that ultimately, students' career choices "reflect multiple influences that accumulate over time." To minimize the possibility that girls will prematurely rule out careers in math and science, schools and districts need to build students' confidence and skills in both subject areas at the elementary, middle, and high school levels.

References

Halpern, D., Aronson, J., Reimer, N., Simpkins, S., Star, J., & Wentzel, K. (2007). *Encouraging girls in math and science* (NCER 2007-2003). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Research. Available at <http://ies.ed.gov/ncee/wwc/pdf/practiceguides/20072003.pdf>

University of Wisconsin-Milwaukee. (2008, Sept. 8). Tracking the reasons many girls avoid science and math. *Science Daily*. Available at www.sciencedaily.com/releases/2008/09/080905153807.htm ◆




 Impacting the Future Now is a foundation dedicated to impacting the future by growing a new generation of leaders who act on their belief that continuous learning by educators is essential to improving the achievement of all students. Impacting the Future Now shares with NSDC a belief that improving the quality of teaching and leadership are essential for enhancing the success of all children.

CALL FOR APPLICATIONS

Impacting the Future Now Foundation 2009 Scholarship and Grant Opportunities

Impacting the Future Now annually awards grants and scholarships to educational leaders in three categories. The foundation awarded more than \$21,000 in monetary and in-kind donations in 2008.

LYNNE CHIDLEY ACADEMY FUND. This scholarship fund develops leadership in the field of professional learning by providing two scholarships annually for tuition to participate in NSDC's Academy for Staff Developers.

THE BRIDGE BUILDERS FUND. This scholarship fund supports registration for a principal to attend three successive NSDC Annual Conferences (three days each) and three pre-conferences (one day each).

THE E* GRANT. This leadership grant supports team efforts to advance NSDC's purpose: Every educator engages in effective professional learning every day so that every student achieves. The grant awards up to \$5000 and the registration fee for a three-day NSDC Annual Conference for three members of the project team.

Applications Due February 13, 2009

For more information or to download an application, visit www.nsd.org/connect/foundation.cfm