

# Mathematics and Science for Every Girl and Boy

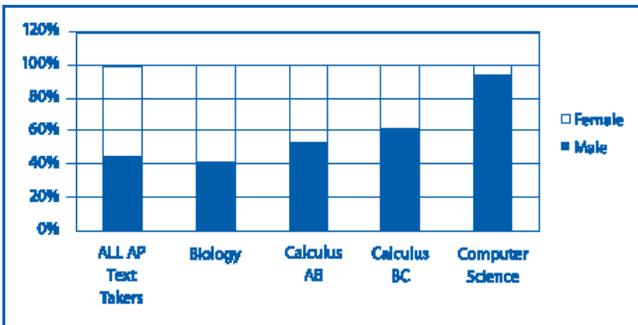
*Research tells us that education is not a zero-sum game. High achievement for one group of students shouldn't come at the expense of another group. By providing an equitable education for girls, we are improving education for boys as well. Our country's future prosperity is tied to innovation spurred on by all students' engagement in science, technology, engineering, and mathematics (STEM). We must increase the number of girls and boys who choose to study in the STEM fields.*

—NEA President Dennis Van Roekel

America's future economic success and national security depend upon a technologically literate society that is well versed in mathematics and science. But today, decades after the landmark Title IX legislation, there are still too few girls pursuing studies and careers in science, technology, engineering, and mathematics. The Department of Labor predicts that millions of new jobs will be created in the next decade that will require math and science expertise. NEA believes that identifying and developing talent in science, technology, engineering, and mathematics (STEM) should be a priority for our educational system.

## Despite gains under Title IX, gender-based stereotypes still exist

With its landmark Title IX legislation in 1972, Congress promised the nation that the talents of all students—women and men, girls and boys—would no longer be fettered by gender discrimination. For-



## What We Know

By the 3rd grade, 51% of boys have used a microscope in class—just 37% of girls have.

Boys receive more math – and science-related toys than do girls.

A recent study found that 71% of male teachers are more likely to attribute boys' success in technology to talent, while dismissing girls' success as luck or diligence.

Children's science programs feature three times as many male characters as female characters and twice as many male scientists as female scientists.

mally known as Title IX of the Education Amendments of 1972, the law requires institutions that receive federal funds to maintain policies, practices, and programs that do not discriminate on the basis of sex. Its sponsors wrote the law broadly to ensure equal opportunity for women and girls in all aspects of education—from access to higher education to fair treatment in elementary and secondary classrooms to equal opportunity in athletics.

But even with the changes that have come about under Title IX, research confirms that traditional gender-based stereotypes and inequities still exist and are still limiting the academic and social development of both females and males. For girls, this bias remains especially prevalent in science, technology,

engineering, and mathematics, the so-called STEM subjects, which historically have been dominated by male students.

### More progress needed

On the surface, things appear to be moving in the right direction. It is true, for example, that female enrollment in science and mathematics courses has increased dramatically in recent years, and today girls are likely to make up a significant percentage of students in biology classes. But, if you look further, you will find that boys still dominate physics, calculus, and other more advanced courses. Research shows that boys also are more likely to take all three core science courses—biology, chemistry, and physics—which experts believe leads to greater success in college and university.<sup>1</sup>

Females take more Advanced Placement (AP) tests than do boys, except in mathematics, science, and computer science.<sup>2</sup> Girls represent only 10-15 percent of all students taking AP physics classes.<sup>3</sup> They were significantly less likely in 2002 to take the AP exam in calculus and physics, and girls made up only 6 percent of the students taking the AP test in computer science in 2003.

Females lag behind males in America's high stakes tests such as the SAT (across all races and ethnicities) and that limits their access to higher education (academically and financially). Girls and women score lower on both the verbal and mathematics section of the Scholastic Aptitude Test (SAT), the mathematics, science, and computer science AP exams, and the Graduate Record Exam (GRE) for master's and doctoral programs.<sup>4</sup>

The reason these inequities are a problem is the huge growth in the number of STEM careers in the future. By the year 2014, the Department of Labor predicts an increase of 28 percent in professional,

scientific, and technical services, which translates to 1.9 million new jobs. And still, girls are five times less likely than boys to consider technology-related careers, and girls from all ethnic groups rate themselves considerably lower than do boys on technological ability.

In 2000, 46 percent of all master's and 57 percent of doctoral degrees in engineering were awarded to foreign nationals. Women make up only 10 percent of all tenure-track faculties in U.S. engineering colleges.<sup>5</sup> The need for a work force that is technologically, scientifically, and mathematically literate is on the rise. Our future STEM workforce will look very different from years past. We must provide opportunities for women and girls to succeed in STEM careers. Not only is this important for America's economic future, but for our national security as well.

### NEA supports educational settings where both females and males flourish

NEA has been on record regarding equal opportunities in mathematics and science since the early 1990s. Our resolution (B-17) says NEA believes that mathematics and science education provide women and minorities access to equal opportunities and equitable treatment for employment in mathematics and science-related careers.

NEA supports creating and sustaining environments in which *both females* and *males* have:

- an equal chance of learning in all subjects,
- equally high learning and academic expectations communicated to them, and
- equal opportunities and encouragement to participate and achieve in courses that prepare them for further education and a wide range of career choices.

## References

- <sup>1</sup> National Coalition for Women and Girls in Education, Title IX at 30: Report Card on gender equity, *Digest of Education Statistics* (Washington, D.C.: National Center for Education Statistics, 2002).
- <sup>2</sup> National Science Foundation, Division of Science Resources Statistics, *Women, Minorities, and Persons With Disabilities in Science and Engineering—2002* (Arlington, Va.: NSF 03-312, September 2003).
- <sup>3</sup> American Association of University Women, *How Schools Shortchange Girls* (Washington, D.C.: American Association of University Women, 1992)
- <sup>4</sup> National Coalition for Women and Girls in Education, Title IX at 30: Report Card on gender equity, *Digest of Education Statistics* (Washington, D.C.: National Center for Education Statistics, 2002).
- <sup>5</sup> Engineering Workforce Commission of the American Association of Engineering Societies, *Engineering and Technology Degrees, 1973-2003* (Washington, D.C.: American Association of Engineering Societies).

## Resources

### **Gender Equity in the Mathematics and Science Classroom: Confronting the Barriers that Remain**

[www.nea.org/achievement/images/genderdoc.pdf](http://www.nea.org/achievement/images/genderdoc.pdf)

**“Beautiful Minds: An innovative math program helps change the face of gifted and talented education,”** Mentoring Mathematical Minds (Project M3) aims to identify children in grades 3–5 capable of higher level math. It is a boon to girls who traditionally have been underrepresented in advanced math programs. *NEA Today*, January 2006, [www.nea.org/neatoday/0601/gifted.html](http://www.nea.org/neatoday/0601/gifted.html)

**www.iwaswondering.com**, a Web site sponsored by the National Academy of Sciences, showcases the notable accomplishments of contemporary women in science and spotlights for young girls the varied and intriguing careers of some of today’s most prominent scientists.

