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Girls and STEM ***(Science, Technology, Engineering and Mathematics)***



Inspiring all girls
to be strong,
smart, and boldSM

Over the past several decades, and in defiance of persistent stereotyping, girls and women have demonstrated that they have the intellectual capacity and drive to excel in the critical fields of science, technology, engineering and math (STEM). During this time period, the number of girls enrolling in high-level and Advanced Placement (AP) math and science courses has dramatically increased, and the percentage of women receiving bachelor degrees in these areas has doubled. Unfortunately, in spite of this progress, barriers persist. Girls Incorporated calls on Congress to undertake targeted, concerted efforts to boost girls' entrance and retention in STEM, and ensure that every student's talent in these areas is fully utilized.

Across the country, Girls Inc. offers proven, research-based programming to dispel stereotypes and promote girls' interest in STEM. Our 20-year history developing, implementing, and evaluating STEM programs forms the basis of our advocacy in this area. Girls Inc. Operation SMART encompasses:

- **Eureka!** On college campuses, during two consecutive summers, girls learn math, science, computer technology, sports, and personal and career development.
- **Girls Dig It.** Girls use an on-site or prepared archaeological dig to learn how to preserve, interpret, and document findings, as well as consider the gender and cultural questions raised by archaeological investigation.
- **Thinking SMART.** A community-based approach to STEM education that offers girls opportunities to think *like* scientists by thinking *with* local scientists. Case studies include Galaxy Girls (space science) and Biotech Girls (agronomy and food science).
- **Operation SMART Activity Guides** feature hands-on activities that allow girls to manipulate equipment, explore, and solve problems.

Progress in STEM

Girls' participation rates and achievement in STEM courses have unquestionably increased since the passage of Title IX, the federal law that requires equal educational opportunity in schools. Statistics show remarkable improvements in these areas, for example:

- The 2005 National Assessment of Educational Progress in math and



science for grades 4, 8, and 12, found the largest gap between boys' and girls' scale scores to be a mere four points.¹

- Girls now comprise 48% of AP test takers in calculus AB, 47% in chemistry, and 58% in biology.
- Half of the 40 finalists in the 2007 Intel Science Talent Search were girls.²

At the university level, in 1970, women earned 17.5% of bachelor's degrees in natural sciences and engineering. By 2004, they earned 38.4% of these degrees, and are now over-represented in biological and agricultural sciences. In the same timeframe, women's share of doctorate degrees in these fields more than quadrupled from 6.7% to 30.5%.³

Substantial Gaps Remain

Despite this progress, barriers to girls' and women's advancement in STEM remain, beginning in K-12 education, where subtle messages can have lasting consequences. In a 2006 Girls Inc. survey conducted by Harris Interactive, 44% of girls and 38% of boys agreed with the statement, "the smartest girls in my school are not popular," and 17% of girls and 14% of boys thought it was true that "teachers think it is not important for girls to be good at math."⁴ These numbers went unchanged since a similar survey conducted in 2000, suggesting that these stereotypes are difficult to eradicate⁵. Attitudes and messages like these can influence girls' academic paths, and curtail future options in STEM.

- Girls continue to lag behind boys in computer science and physics, comprising only 31% of AP physics test takers and just 16% in computer science AP test takers in 2006.
- Of college-bound seniors in 2005, young women comprised just 13% of those intending to major in computer science, 15% of those intending to major in engineering, and 40% of those intending to major in math.

At the university level, although women make up 60% of the undergraduate college population, they earn only 20% of all bachelor's degrees granted in engineering and physics, and a decreasing share of bachelor's degrees in mathematics and computer science.⁶

Recommendations

In light of these persistent challenges, Girls Inc. calls on Congress to:

- **Promote informal STEM education through federally-funded afterschool programs.** Afterschool and summer programs in STEM have been proven effective in increasing interest, knowledge, and course enrollment in STEM, and even reducing dropout rates. They have the



capacity to be more flexible, creative, and hands-on than school-day classes, and can feature female role models and field trips that increase girls' confidence and competence in science and math. Proven, national programs like those offered by Girls Inc. incorporate the latest research on girls' engagement and persistence in STEM, and should be equal partners with schools in addressing the under-representation of girls and minorities in these fields.

- **Provide professional development opportunities** that give classroom teachers and administrators the tools to be partners in promoting STEM to girls, and to help them foster learning environments (including classrooms and computer rooms) free of harassment.
- Support projects to **connect girls with real world scientists** in a structured positive setting to connect STEM coursework to appealing future careers.
- **Adequately fund the Office for Civil Rights** in the U.S. Department of Education so that this office can be proactive in monitoring compliance with Title IX in this area. This includes providing technical assistance to schools, and enforcing existing requirements for Title IX coordinators in every building who can inform students, parents, and faculty of their rights and responsibilities under Title IX.
- **With regard to new initiatives** such as Math Now and P-16 Councils, ensure that these promising approaches include goals to increase the representation of girls and minorities in STEM.

For questions about this policy statement, please contact Alison Harms, Girls Inc. Public Policy Associate at 202/463-1881. Girls Incorporated® is a nonprofit organization that inspires all girls to be strong, smart, and boldSM. With local roots dating to 1864 and national status since 1945, Girls Inc. has provided vital educational programs to millions of American girls, particularly those in high risk, underserved areas. Girls Inc. was formerly Girls Clubs of America.

¹ U.S. Department of Education. National Center for Education Statistics. *2005 Assessment Results, The Nation's Report Card*, http://nces.ed.gov/nationsreportcard/nrc/reading_math_2005/.

² "66th Annual Intel Science Talent Search (2006-2007) Finalists," *Science Service*, Jan 2007. <<http://www.sciserv.org/sts/66sts/finalists.asp>>

³ "Four Decades of STEM Degrees, 1966-2004: The Devil is in the Details. STEM Workforce Data Project: Report No. 6," *Commission on Professionals in Science and Technology*. 10.

⁴ Girls Incorporated. *The Supergirl Dilemma: Girls Grapple with the Mounting Pressure of Expectations, Summary Findings*. Harris Interactive. Oct 2006: 22.

⁵ *Ibid*, page 6.

⁶ National Science Foundation, Division of Science Resources Statistics (2004). *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2004*. (NSF 04-317).