Project LIFTOFF

February 15, 2012

Project LIFTOFF

"Elevating the Level of STEM Afterschool"

What is STEM?

S: Science
T: Technology
E: Engineering
M: Mathematics

is an initiative to build *statewide systems* for informal science education that

- increases the quality and frequency of afterschool STEM learning opportunities.
- inspires young people to pursue scientific or technical education and careers.
- increases the capabilities of afterschool program staff to facilitate engaging and inspirational STEM opportunities for youth.

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is an initiative to build *statewide systems* for informal science education that

- engages afterschool program administrators in assessing, improving, and advocating for quality STEM education in their programs.
- fosters leadership among stakeholders to support afterschool STEM education and informal science system sustainability.

Why is this important?

- STEM can be scary
- STEM in the United States
- High stakes tests

What are we doing in Missouri?

- Creating a Professional Development model that:
  - Increases the confidence of Afterschool Professionals
  - Changes the way students see and feel about STEM
  - Creates a community of learners

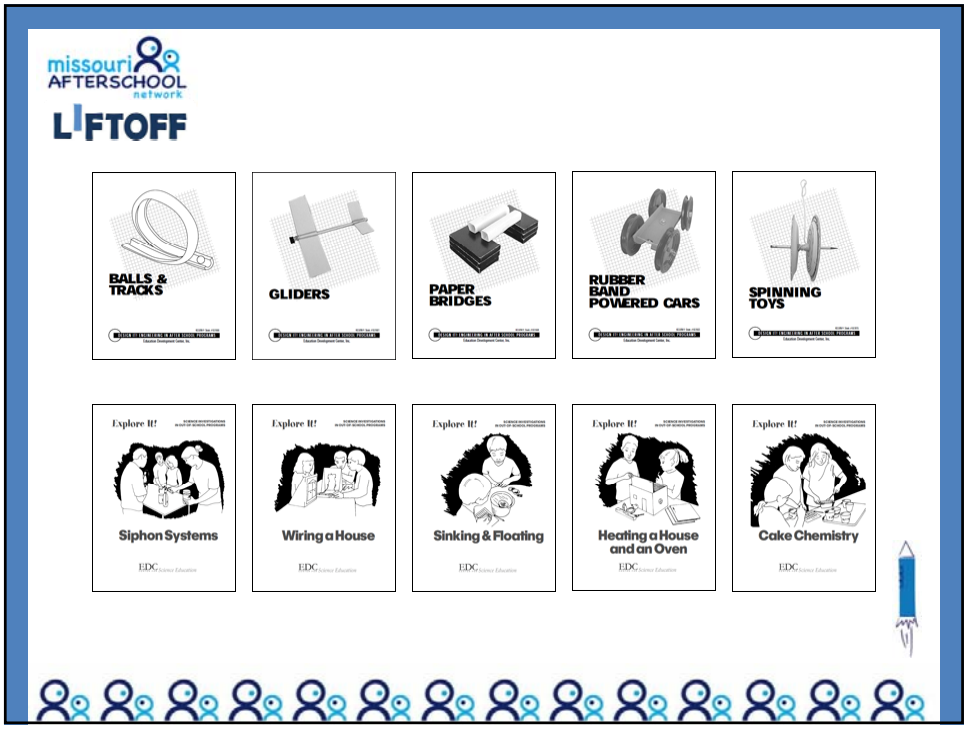
How are we doing this in Missouri?

- NPASS2
- SciGirls
- MASA

National Partnerships for After School Science

Train-the-Trainer Model

350+ programs
9000 youth participants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LIFTOFF
BALLS & TRACKS
GLIDERS
PAPER BRIDGES
RUBBER BAND POWERED CARS
SPINNING TOYS
Explore It!
Siphon Systems
Wiring a House
Sinking & Floating
Heating a House and an Oven
Cake Chemistry

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SciGirls
PBS Television show and hands-on activities!

The Big Idea

To change how millions of girls (ages 8-13) think about STEM

Activity Guides

pbs.org/teachers/scigirls

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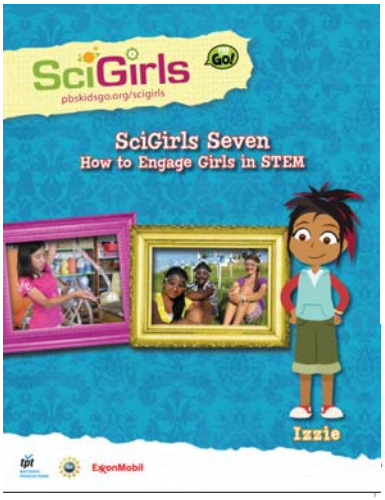
- Rationale/Research
- *SciGirls Seven*: Strategies to engage girls in STEM
- Tips for using the *SciGirls Seven*
- Applying the *SciGirls Seven*
- References and Readings



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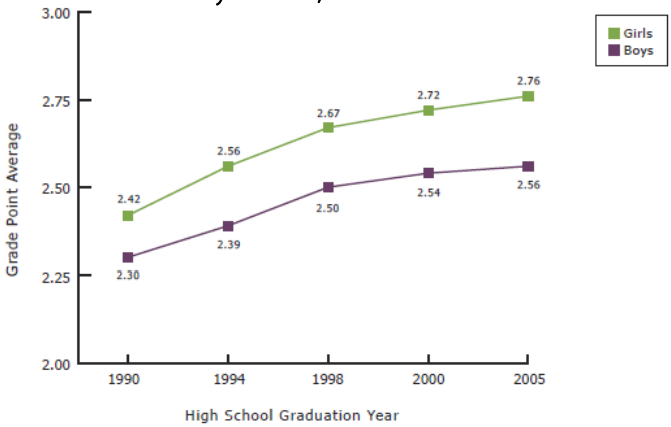
AAUW Report

SciGirls

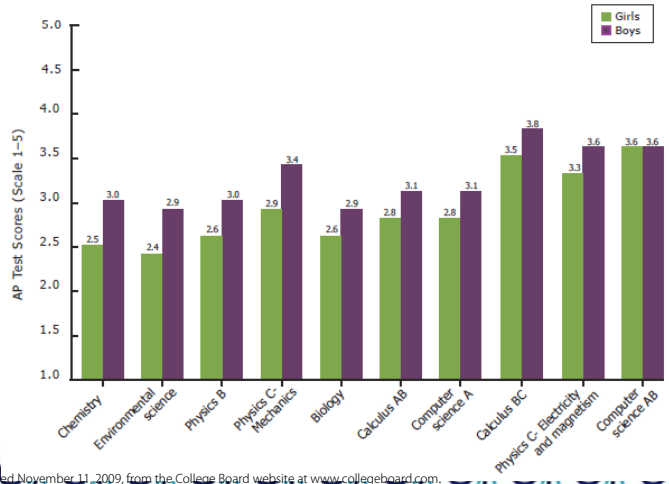
Grade Point Average in High School Mathematics and Science (Combined), by Gender, 1990–2005



Source: U.S. Department of Education, National Center for Education Statistics, 2007, *The Nation's Report Card: America's high school graduates: Results from the 2005 NAEP High School Transcript Study*, by C. Shettle et al. (NCES 2007-467) (Washington, DC: Government Printing Office).

AAUW Report

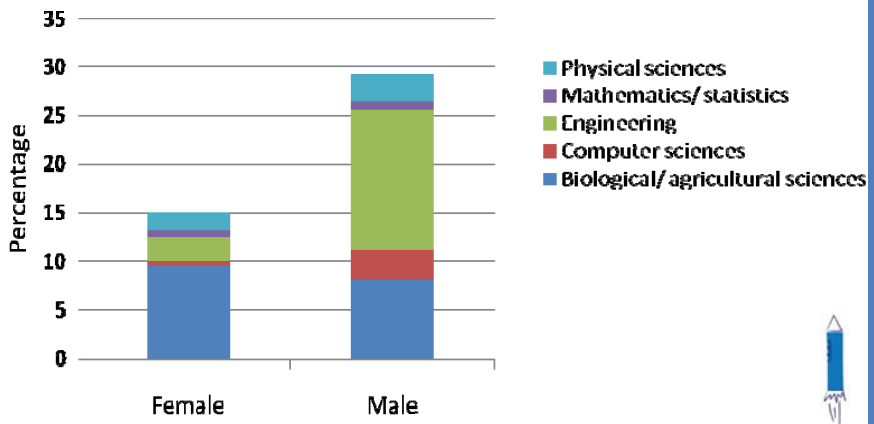
Average Scores on Advanced Placement Tests in Mathematics and Science Subjects, by Gender, 2009



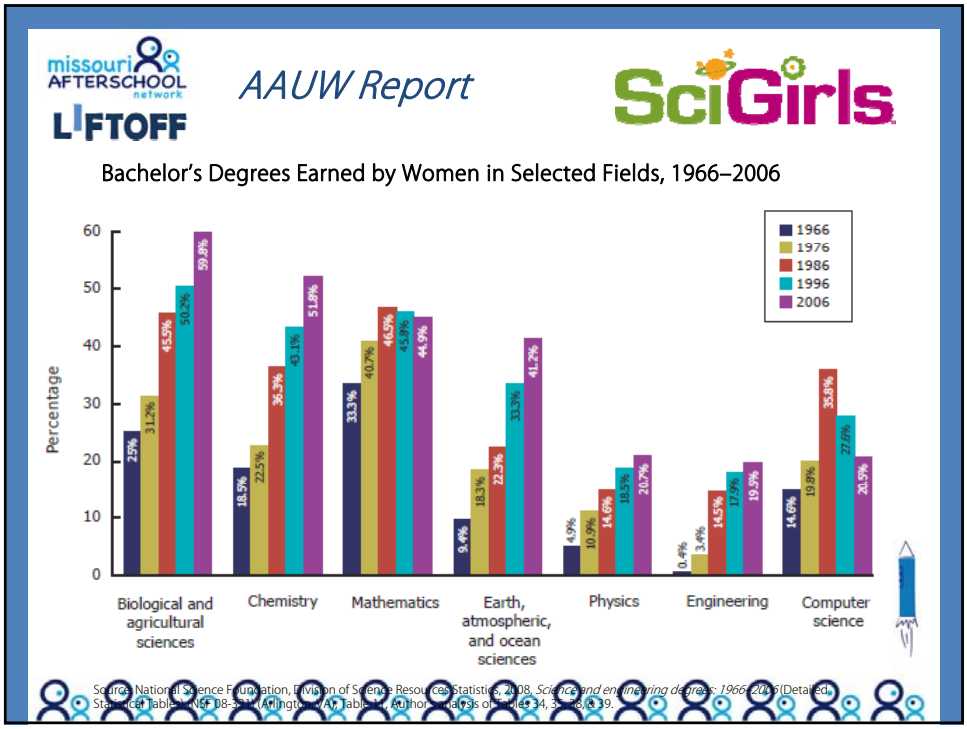
Source: Retrieved November 11, 2009, from the College Board website at www.collegeboard.com.

AAUW Report

Intent of First Year College Students to Major in Science and Engineering Fields, by Gender, 2006



Source: Commission on Professionals in Science and Technology. Data derived from Cooperative Institutional Research Program, Higher Education Research Institute, Graduate School of Education and Information Studies, University of California, Los Angeles. *The American Freshman: National Norms for Fall 1990 through Fall 2006.* www.gseis.ucla.edu/heri/heri.html.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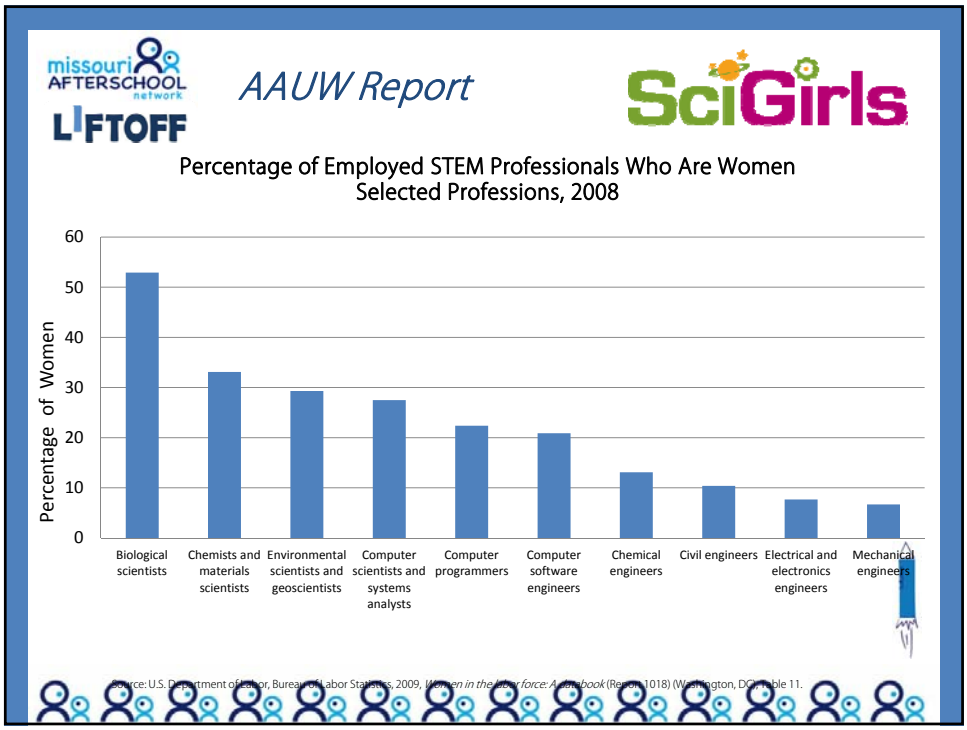
Bachelor's Degrees Earned by Women in Selected Fields, 1966–2006
Percentage
1966
1976
1986
1996
2006
Biological and agricultural sciences
Chemistry
Mathematics
Earth, atmospheric, and ocean sciences
Physics
Engineering
Computer science
Source: National Science Foundation, Division of Science Resources Statistics, 2008, Science and engineering degrees: 1966–2006 (Detailed Statistical Tables), NSF 08-321 (Arlington, VA), Table 11, Author's analysis of Tables 34, 35, 38, & 39.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SciGirls
Percentage of Employed STEM Professionals Who Are Women
Selected Professions, 2008
Percentage of Women
Biological scientists
Chemists and materials scientists
Environmental scientists and geoscientists
Computer scientists and systems analysts
Computer programmers
Computer software engineers
Chemical engineers
Civil engineers
Electrical and electronics engineers
Mechanical engineers
Source: U.S. Department of Labor, Bureau of Labor Statistics, 2009, Women in the labor force: A databook (Report 1018) (Washington, DC), Table 11.

SciGirls Seven

1. **Girls benefit from collaboration, especially when they can participate and communicate fairly.** (Parker & Rennie, 2002; Fancsali, 2002)
2. **Girls are motivated by projects they find personally relevant and meaningful.** (Eisenhart & Finkel, 1998; Thompson & Windschitl, 2005; Liston, Peterson, & Ragan, 2008)

SciGirls Seven

3. Girls enjoy hands-on, open-ended projects and investigations. (Chatman, Nielsen, Strauss, & Tanner, 2008; Burkam, Lee, & Smerdon,1997; Fanscali, 2002)
4. Girls are motivated when they can approach projects in their own way, applying their creativity, unique talents and preferred learning styles. (Eisenhart & Finkel,1998; Calabrese Barton, Tan, & Rivet, 2008)

SciGirls Seven

5. Girls' confidence and performance improves in response to specific, positive feedback on things they can control – such as effort, strategies and behaviors. (Halpern, et al., 2007; Zeldin & Pajares, 2000; Blackwell, Trzesniewski, & Sorich Dweck, 2007; Mueller & Dweck, 1998)

6. Girls gain confidence and trust in their own reasoning when encouraged to think critically. (Chatman, et al., 2008; Eisenhart & Finkel,1998)
7. Girls benefit from relationships with role models and mentors. (Liston, et al., 2008; Evans, Whigham, & Wang, 1995)

Midwest Afterschool Science Academy

March 19 – 21

www.projectLIFTOFF.net

This professional experience focuses on positive youth development, project-based learning, leadership training, and the positioning of out-of-school time learning as an essential partner in the overall STEM education of youth.

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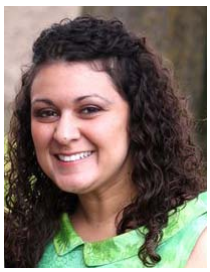

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