



# Libraries as STEM Education Centers

## STEM in Libraries

### Why STEM in Libraries?

Science, Technology, Engineering, and Math (STEM) is a critical engine for innovation and growth. The STEM workforce accounts for more than 50% of U.S. sustained economic growth (U.S. Department of Labor, 2011). In the next six years, there will be a predicted 2.4 million job openings in STEM fields, and STEM workers earn 26% more than their non-STEM counterparts (Carnevale, A.P., Smith, N., & Melton, M., 2011; U.S. Department of Commerce, 2011).

Libraries are essential to STEM education efforts because of their strong connections to families and communities. Statistics gathered by the American Library Association show that high percentages of families with children, including families from underrepresented minority groups, visit libraries frequently, and there is a public library in nearly every community in the U.S. Libraries have long supported formal education efforts by providing literacy programs and other educational opportunities, and are considering new ways to engage their patrons in STEM learning experiences.

STAR\_Net's *Discover Earth and Discover Tech* programs provide an example of the impact that a public library can have on its community by offering exciting and engaging STEM experiences.

### ***Discover Earth* in Ephrata, PA and the Pennsylvania STEM Girls Collaborative Project**

The *Discover Earth: A Century of Change* exhibition features interactive, multimedia displays that allow library patrons to explore local and global earth system topics—such as weather, water cycle, and ecosystem changes.

The Pennsylvania STEM Girls Collaborative Project (PA STEM) hosted a Role Models Matter Forum at the Ephrata Public Library in conjunction with the *Discover Earth* exhibit. Role Models Matter, funded by the National Science Foundation, is a collaborative effort between Techbridge, the Society of



STAR\_Net education programs were created to inspire lifelong learning through inquiry and play. The project has developed two interactive traveling exhibits (*Discover Earth: A Century of Change* and *Discover Tech: Engineers Make a World of Difference*), coupled with a variety of education and outreach programs. These include hands-on activities related to the content of the exhibits for different age groups, a training program for librarians (online and in-person), and a comprehensive outreach program for classroom teachers and out-of-school instructors. STAR\_Net has also developed an online community of librarians and STEM professionals.

To join the community go to <http://community.starnetlibraries.org>

Women Engineers, the National Girls Collaborative Project and Girl Scout Councils to bring resources to role models and girl serving organizations. The goal of the project is to increase girls' interest in STEM by creating resources to train STEM professionals to interact with girls in a meaningful way. The Forum gave opportunities for attendees to learn how to increase and improve the quality of their outreach to girls in STEM.

Lisa Kovalchik, PA STEM Collaborative Lead, gave participants time to explore the *Discover Earth* exhibit midday. She plans to partner with area libraries in the future to provide professional development workshops for individuals and organizations serving girls in STEM.

### **Discover Tech in Spokane, WA and Glasgow, KY**

*Discover Tech: Engineers Make a World of Difference* shows how engineering provides solutions to better meet human needs and explores how engineers create new technologies to solve problems.

#### **Spokane Public Library**

At the Spokane Public Library in Spokane, Washington, Sally Chilson, Youth Services Coordinator, used *Discover Tech* as a catalyst to focus all library programming on engineering for the duration of the exhibit. Children from nearby schools, elementary through high school, visited the library to interact with the exhibit. They partnered with a local science museum, Mobius, which offered discounted tickets to children who would visit Mobius in the morning and *Discover Tech* in the afternoon. Tincan, a local nonprofit offering technology training, provided 8 weeks of programming at the library, as well.

In conjunction with *Discover Tech*, the Spokane Public Library offered a variety of engineer-focused programming, including sessions with engineers from the City of Spokane and a female student from Gonzaga University representing Engineers Without Borders. Her presentation focused on sparking interest in STEM education among the elementary and middle school girls in attendance. Additionally, the library hosted a well-attended biomedical engineering program with professionals from the field. These sessions were received with enthusiasm by the community and helped promote the library as a center for STEM education.



**“The *Discover Tech* exhibit was a huge commitment for the library and a big draw for the community. It was the most work but the most fun I’ve had at work.”**

— Sally Chilson, Youth Services Coordinator at Spokane Public Library

### Mary Wood Weldon Memorial Library

Like the Spokane Public Library, the Mary Wood Weldon Memorial Library in Glasgow, Kentucky, formed successful local partnerships through the *Discover Tech* exhibit. Librarian Martha Nell Thomas coordinated exciting programming that incorporated the history of the town, presentations from local engineers from the water and electric utilities, and workshops hosted by university students. Local schools took field trips to the exhibit, and children of all ages enjoyed independently going through the exhibit – many becoming so engaged that they went through multiple times.

The Mary Wood Weldon Memorial Library was especially successful in partnering with the local university to create science and engineering programming. Western Kentucky University (WKU) hosted a series of SkyTeach (WKU’s innovative math and science teacher education program) workshops, getting young people excited about math and science. Additionally, the Center for Gifted Studies at WKU provided special programming that allowed children to create working hand pollinators and wind turbines. Students were thrilled to participate in the hands-on activities, and it provided an opportunity for WKU to recruit potential students.

### Resources for Librarians

- **LEGO Mindstorms:** LEGO® Robotics kits used at the Mary Wood Weldon Memorial Library and by formal and informal STEM educators. <http://mindstorms.lego.com>
- **Institute of Museum and Library Services:** Information on STEM library partnerships and grants. <http://www.ims.gov>
- **Grand Challenges:** The “Grand Challenges” of engineering, and what is being done to solve them. <http://www.engineeringchallenges.org>
- **Engineering Games:** Fun games and activities that show how engineering affects our day to day lives. <http://www.engineering.com/GamesPuzzles/tabid/82>
- **PBS Kids:** Printable activities on Science, Engineering, the 5 senses and more! <http://pbskids.org/zoom/printables/activities>

More resources are available at the STAR\_Net website:  
<http://starnetlibraries.org/resources.html>.



“The Ephrata Public Library is truly a community center and a good place to offer STEM programming.”

— Lisa Kovalchik, PA STEM Collaborative Lead

## Partners

- **Space Science Institute**

The Space Science Institute (SSI) is a nonprofit, public benefit 501(c)(3) corporation founded in 1992. NCIL is dedicated to expanding the understanding and participation of families, youth, teachers, and citizens in science and technology (www.nc4il.org). We foster collaboration between STEM professionals and educators to bring the wonder of science and engineering directly to people. We bridge the worlds of public schools, libraries, museums, and the Internet. Our programs span a range of audience needs and delivery methods, including traveling museum and library exhibitions; award-winning educational films, videos, and websites; hands-on teaching resources and activities; and educator workshops. Our programs are designed to be accessible to all and to inspire the next generation of STEM innovators.



- **American Library Association**

The American Library Association (ALA) is the oldest and largest library association in the world, providing association information, news, events, and advocacy resources for members, librarians, and library users. ALA provides leadership in the transformation of libraries and library services in a dynamic and increasingly global digital information environment. The association provides opportunities for the professional development and education of all library staff members and trustees; it promotes continuous, lifelong learning for all people through library and information services of every type.



- **Lunar and Planetary Institute**

The Lunar and Planetary Institute, a division of the Universities Space Research Association, was established during the Apollo missions to foster international collaboration and to serve as a repository for information gathered during the early years of the space program. Today, the LPI is an intellectual leader in lunar and planetary science. The research carried out at the LPI supports the National Aeronautics and Space Administration's (NASA) efforts to explore the solar system.



- **National Girls Collaborative Project**

The National Girls Collaborative Project (NGCP) seeks to maximize access to shared resources within projects and with public and private sector organizations and institutions interested in expanding girls' participation in STEM. Funded primarily by the National Science Foundation, the NGCP is a robust national network of more than 14,000 girl-serving STEM organizations. Currently, 31 Collaboratives, serving 40 states, facilitate collaboration between more organizations who serve more than 8 million girls and 4.4 million boys. We strengthen the capacity of girl-serving STEM projects by facilitating collaboration among organizations by sharing promising practice research and products through webinars, collaboration training, and institutes.



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