



## Issue Brief #3: Libraries Help Teens Build STEM Skills

### Introduction

“Libraries can spark an interest in their young adult patrons and... help prepare teens for a 21st century workforce.”<sup>1</sup>

In their 2008 report, *Rising Above the Storm: Energizing and Employing America for a Brighter Economic Future*, The National Academy of Sciences (NAS) includes the recommendation to, “Make the United States the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the United States and throughout the world.”<sup>2</sup>

Libraries are a key player in achieving this goal. As a community resource, information, education and programming hub, libraries are uniquely positioned to support teen acquisition of STEM related skills.

Not only do libraries provide access to resources and programs, but in school and public libraries throughout the country, teens are taught how to perform high quality research. They learn how to find, curate, analyze, and report information from library staff members who are specifically trained to teach these skills. This is in direct support of another NAS recommendation, to “sustain and strengthen the nation’s traditional commitment to long-term basic research that has the potential to be transformational to maintain the flow of new ideas that fuel the economy, provide security, and enhance the quality of life.”<sup>3</sup>

### Libraries Provide Access to Specialized Scientific Materials

Libraries evaluate, purchase and curate both print materials and e-content, including up-to-date and authoritative resources related to science, technology, engineering and math. According to the public library data statistics (collected by the Public Library Association a Division of the American Library Association) in fiscal year 2011, public libraries spent \$47,453,083 on teen collections, circulated 64,577,181 teen materials, and held 177,413 teen programs attended by 2,896,898 youth.<sup>4</sup>

Scientific materials in particular tend to be too costly for teens and their family to afford on their own, so they rely on their school or public library to provide them with these expensive but important materials. In 2012 the average cost of a journal subscription for a STEM related topic was \$1,582 (up 9% over 2011), and the average cost of an academic book was \$89.15 for the print version and \$116.25 for the e-version (up 12% over 2011).<sup>5</sup> In addition to journals, books and e-books, libraries also provide access to electronic databases and curate scientific information available via the Internet.

### Libraries are Research Hubs for Teens

Libraries are a resource that teens acknowledge are important to their educational success. Recent studies show that “90% of students recognized that the school library helped boost their confidence as proficient information seekers and users; 91.8% of students surveyed appreciated the school library’s help in sorting and analyzing information and gaining media literacy.”<sup>6</sup>

Teens grow up with technology all around

them and for teens digital tools are no different than a toaster; they are a natural and expected part of their lives. Teens access information using tablets and other mobile devices. It's how they find out what they need to know, whether they need to know something of personal interest or something for a school-related project. Yet, while teens are skilled at knowing how to use the devices they have access to in order to locate information, they are not as skilled in the best ways to sort through and analyze the information they uncover. In order to perform successful research teens need adults who are trained and skilled in understanding the information environment. Staff in libraries are those adults who can help teens be excellent researchers.

### **Libraries, Teens, Makerspaces, and STEM**

“There is an explosion of interest among museums and libraries in ‘making’ environments....these institutions are leveraging their resources, collections, and public trust to strengthen community-based learn



*Photo courtesy of Loudon County Public Library*

ing, particularly for critical thinking, problem solving, collaboration, and engagement in STEM.”<sup>7</sup> Makerspaces are quickly gaining recognition as a way to provide opportunities for people of all ages access to resources that will help them gain the skills and knowledge necessary to succeed in

STEM related fields. Because of the space, staff, access to digital resources and print collections they provide to the community, libraries are perfectly positioned to provide a wide array of maker opportunities for teens. For example:

- The HYPE Teen Center Makerspace (at the Detroit Public Library) gives teens the tools they need to learn robotics, electronics, and bike repair.<sup>8</sup>
- In branches at the Philadelphia Free Library over the past year teens have participated in e-textile and e-crafting programs. This summer the library will launch a Maker Corp program at which mentors from the community will work with teens to help them gain STEM related skills through making.<sup>9</sup>
- At the Westport Public Library in Westport Ct. teens take part in maker programs as a part of the library’s larger makerspace initiative. These maker programs include robotics and fashion design.

In connection with their makerspaces, libraries have a perfect opportunity to invite community members and experts in STEM related fields to work directly with teens. Through this engagement with those working in STEM professions teens get to learn first-hand about what it’s like to be a part of the STEM workforce and make contacts for future career planning and development.

While not all libraries have devoted space for a makerspace, many provide programs for teens that are directly related to STEM learning and engagement during the hours youth are not in school. These include:

- The Northborough Public Library’s (Il.) series on app building at which teens build their own app.
- The Iowa Public Library’s CoderDojo - a coding club for tweens and teens. In the club

teens learn how to code websites, apps, games and more.

- The Chicago Public Library's YOUmedia space is where teens learn everything from filmmaking to music-making to fashion design.

### **Libraries are Positioned to Leverage Community Resources**

As the hub of a community, libraries have connections to schools, youth programs, local businesses and more. They have the ability to pool together a community's resources in order to effectively and efficiently deliver high impact programs. Libraries make good strategic partners because of their reputation for inclusiveness, credibility, role as 'honest brokers,' infrastructure, senior staff involvement and strong skill base.<sup>10</sup>

Libraries make an effort to proactively reach out to community stakeholders in order to improve services and leverage limited resources to build better communities. A close relationship with the library provides clear benefits to the community partner, including new relationships with other community groups, expanded capacity to support literacy programs, opportunities for staff development and networking, and access to the resources of a large institution, the public library.<sup>11</sup>

Libraries build partnerships in order to provide STEM resources and programming to the youth in their community.

- The Young Adult Library Services Association partners with Best Buy Mobile to expand programs and improve digital services for teens in libraries across the country
- The iTNation internship program at the Pima County Public Library in Arizona is a paid internship for high school students. Teens get experience using various digital media software and learn how to teach introductory digital media classes. The library partners with the Saguaro Girl Scout Council and the University of Arizona Eller College of Management to implement this program.

### **Conclusion**

In communities around the United States school and libraries have the opportunity to provide teens with the support needed in order to learn science, technology, mathematics, and engineering concepts. Not only that, libraries that are given the resources to provide high-quality programs, collections, and teaching to teens can help instill a love and interest in STEM related fields in the age group. As a result libraries help guarantee that the nation's youth become key players in the STEM workforce across the country.

### **Works Cited**

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