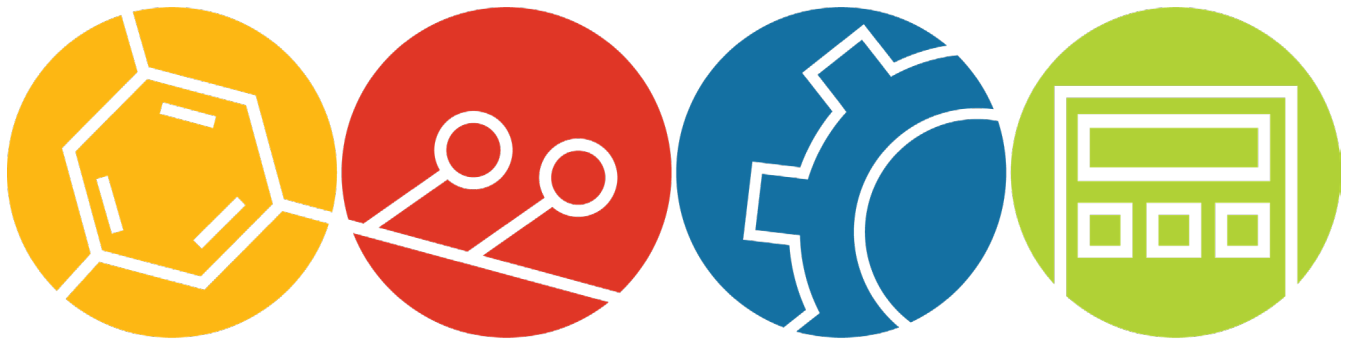


State Library STEM Guide and Workbook

Empowering STEM in Public Libraries: A Guide for State Library Agencies



STEM **LIBRARIES**

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About the Empowering Libraries Project

Our overall goal for this project is to provide the nation's 9,000 public libraries with a field-tested and replicable science literacy model that staff can adapt to engage their patrons in meaningful and relevant science experiences.

This Guide advances library practice and empowers the nation's 52 State Library Agencies to effectively build the science literacy capacity of their public libraries. The hope is library patrons and their communities are better connected to informal science and technology experiences, equipment, books, media and the scientific community.

In addition to this guide, the grant project includes *Public Library STEM Guide and Workbook*, online learning tool kits, and STEM resources for libraries.

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Introduction

The *Empowering STEM in Public libraries: a Guide for State Library Agencies* is based on the results of a 3-year IMLS project entitled **Empowering Public Libraries to Become Science Resource Centers for Their Communities** #LG80150041. One of the project's goals was to provide the nation's State Library Agencies (SLA) with a field-tested, replicable model that they could use to build and strengthen public library STEM (science, technology, engineering and mathematics) literacy capacity. This guide and related products are available through <https://stemlibraries.org>.

The *Empowering Libraries* project builds on our shared observations, experiences and collaborations developed through the STEM literacy partnership of the Maine State Library and Cornerstones of Science – a 501c3 organization in Maine. We learned: 1) there is strong public library interest and demand for science experiences, tools and resources; 2) public library staff can create public demand for STEM as well as attract new audiences to their libraries; and finally, 3) librarians often look to outside providers and/or borrowed turnkey facilitated kits to engage their patrons in STEM experiences. Though these are great first steps, once the provider left, or the STEM kit was returned, so did patron access to those STEM experiences, information and resources.

Why do libraries find it difficult to sustain STEM literacy as a regular offering to their patrons? The Cornerstones of Science Model was developed to answer this question.

For over a decade Cornerstones of Science, which has its origins within a Maine public library, has evolved to partner with over 55 public libraries interested in building their STEM literacy capacity. In addition, the major strategic effort by the Maine State Library to bring digital literacy and broadband technology to rural libraries through the Broadband Technology Opportunity Program (BTOP) provided the opportunity for collaboration between Cornerstones of Science and the Maine State Library that led to this project. This relationship bolstered public library interest in STEM programming and made integrating STEM literacy within library services a priority.

Project Findings

The project's research and our experiences indicate that State Library Agency interest in STEM is increasing nationwide. Lessons learned from our eleven pilot libraries in Maine, Massachusetts and California reach a similar conclusion. Findings include:

1. Public and state libraries are recognizing the value of and public demand for STEM programming.
2. Formal and informal science providers recognize the ability of libraries to connect and disseminate materials, training, and resources to the public;
3. Public and state libraries want to provide their patrons direct connections with the formal and informal scientific community;
4. Informal science learning supports the nation's workforce development efforts;
5. Many libraries offer valued STEM programming. However once that program is over, the presence and perceived importance of STEM, in the library and the community, disappears until the next program;
6. Most libraries have limited STEM literacy capacity (defined as allocation of library staff and budget resources to support informal science learning in the library) to sustain public access to scientific tools, experiences, resources and connections with the scientific community.
7. There is not yet wide acceptance that STEM literacy is an essential literacy among public and state libraries. For STEM literacy to be accepted as an essential literacy library advocates (e.g. ALA, COSLA, library degree programs, etc.) and policy makers (e.g., local and state officials, etc.) need to champion the vital role libraries and librarians can play in connecting their patrons to local and nationally relevant STEM issues. In addition, they need to provide librarians with the abilities to be confident in creating the environment, experiences and resources that facilitates the acceptance of STEM literacy as an essential literacy for the library community.

Use of this STEM Guide

State libraries can use this guide to assist their public libraries with:

- Developing a STEM Development Plan;
- Connecting with informal and formal science providers;
- Providing advice and training; and
- Aligning their funding to enhance public library STEM literacy capacity.

This Guide is comprised of two sections:

Section 1 – Building State Library STEM Capacity

This section provides talking points for STEM informal education and why SLAs should promote STEM as an important literacy for public libraries, definitions of STEM Literacy, and suggestions for continuing education, partnerships and information about circulating stem kits/tools.

Section 2 - Best Practices: Assisting Public Libraries to Develop a STEM Plan

This section provides guidance to state library agencies interested in using the Public Library Guide and Workbook in their outreach and continuing education with their libraries to help them create a STEM Development Plan.

The Guide contains three appendices:

Appendix A provides an overview of the grant research and conclusions obtained prior and during the grant project. This includes the SLA survey results, LSTA plan analysis and a literature review.

Appendix B is an overview of the SLA portion of the project's evaluation

Appendix C is an overview of the contents of the stemlibraries.org website

For More Information

For more information on the Empowering Libraries project or any of the guides, worksheets or resources presented on the <https://stemlibraries.org>, please contact Cynthia Randall, Executive Director, Cornerstones of Science at cynthia.randall@cornerstonesofscience.org.

Section 1 – Building STEM Capacity

Overview

The library community has yet to adopt a definition for STEM literacy. In a 2010 report on STEM Education¹ a STEM Working Group in the state of Washington provided this definition:

“STEM literacy is the ability to identify, apply and integrate concepts from science, technology, engineering, and mathematics to understand complex problems and to innovate to solve them.”

The report further defines the literacies for each discipline:

- **Scientific literacy** is the ability to use knowledge in physics, chemistry, biology, and earth/space science to understand the natural world and to participate in decisions that affect it.
- **Technological literacy** is the ability to use new technologies, understand how new technologies are developed, and have skills to analyze how new technologies affect us, our nation, and the world.
- **Engineering literacy** is the ability to use the systematic and creative application of scientific and mathematical principles to practical ends, such as the design, manufacture, and operation of efficient and economical structures, machines, processes, and systems.
- **Mathematical literacy** is the ability to analyze, reason, and communicate ideas effectively through posing, formulating, solving, and interpreting solutions to mathematical problems in a variety of situations.

Benjamin Shen (1975) defined three kinds of scientific literacy (1) *Consumer scientific literacy* – the kind of information needs to shop in a pharmacy, a computer store, or a garden shop, (2) *Civic scientific literacy* – the kind of information that a citizen needs to read about and understand current science and technology policy issues, and (3) *Cultural scientific literacy* – an understanding of “the ways of knowing” related to science and other ways of knowing.

STEM literate individuals are able to use concepts from science, technology, engineering and mathematics to understand complex problems and to innovate with others to solve them. A STEM literate person considers how STEM can improve the social, cultural, economic, and environmental conditions of their local and global communities. Building STEM literacy ensures we have both the scientists and global citizens we need to thoughtfully build equitable and sustainable futures. <https://www.oercommons.org/hubs/stem-literacy>

Today STEM literacy is at the forefront of the literacies that State Library Agencies and public libraries should address in a focused and intentional manner. The reasons this is important for patrons include:

1. To cope and adapt to the speed of technological advancement;
2. To understand the increasing complexity of our world;
3. To foster curiosity in both children and adults and to deepen our connections to the world around us;
4. To develop the analytical and communication skills that are essential for civic responsibility, and to make informed personal, local, regional, state and federal decisions; and
5. To fully participate in the job market and be trained for the jobs of the future.

¹ Report to Christine Gregoire, Governor, and the Washington State Legislature *Recommendations for Science, Technology, Engineering and Mathematics Education STEM Work Group* (December 2010)
<http://www.k12.wa.us/stem/default.aspx#2>

STEM literacy is integral to our daily lives. As librarians we have a responsibility to our communities to support lifelong learning around STEM and to deal with the ever-changing complexity of science, technology, engineering and math as it affects our daily lives.

Many public librarians are trained in the humanities rather than the sciences, hence, we have learned there has been some trepidation towards integrating STEM into programming. Further, many librarians are hesitant to facilitate those programs and services. Children’s and Youth Services librarians often lead the way facilitating STEM programs with LEGOs, robotics and coding, etc.. It has taken longer to extend into adult services and programs but libraries are now holding science cafes, getting patrons involved in citizen science and celebrating and learning from events like the 2017 total solar eclipse. (Over 2 million glasses were distributed to more than 7,000 libraries and we learned that 2 million eclipse glasses were not enough to meet the demand!) This dramatic moment provides real evidence of how libraries can expand their role in exposing their communities to STEM, to foster that curiosity, and to create community events around a science topic. Read more about this at: <http://www.starnetlibraries.org/wp-content/uploads/2017/12/Moore-Final-Report.pdf>

Making the Case for STEM Literacy

There are some excellent materials that SLA staff may use to help convince public library staff that incorporating STEM literacy into daily operations is important and timely. To assist in making the case for STEM literacy our *Marketing and Communications Toolkit* offers ten tips on effective communications for science, technology, engineering and math. Specifically SLA staff can use the “Promoting STEM programs in your community” and “Messaging examples” sections of the Marketing Toolkit. Our website (<https://stemlibraries.org/additional-resources/>) also provide links to talking points for STEM informal learning in libraries that others have identified.

The Role of State Library Agencies

The State Library Agency Community can be even more intentional in integrating STEM literacy more fully into our services and programs. State library agency staff can build and enhance state library and public library STEM literacy by:

1. Defining the skills needed by a STEM literate public librarian;
2. Providing and participating in STEM continuing education/professional development;
3. Building awareness and providing libraries access to national STEM opportunities;
4. Creating or joining statewide partnerships on STEM initiatives with other state agencies, colleges/universities and/or informal STEM organizations;
5. Circulating STEM kits and other STEM tools - SLAs can invest in a collection of products and use the “Tech Petting Zoo Model” – to allow libraries to learn, try and experiment or lend actual kits with designed programming; and
6. Dedicate State Library Agency staff to STEM literacy

Creating STEM Literate Public Librarians

A long-term goal of State Library Agencies should be to integrate STEM literacy into our daily work and that of our public libraries. (This is intentional approach to STEM literacy is distinguished from periodic STEM programming that is offered to library patrons.) To achieve this, librarians (directors and staff) need to have:

- The **cultural belief** that STEM literacy is an essential literacy and recognizes the leadership role the library can play as a partner around locally relevant, STEM-based community issues (e.g. water quality, food security, health, recycling, work force development, etc.)

- The **capacity** and **competencies** to envision the role the library can play in providing services and programs that can sustain and advance locally relevant, meaningful and accessible STEM experiences with connections to STEM providers for patrons and the community; and
- **A commitment to intentional and purposeful** STEM planning that is ongoing and integrated into a library's long-range plan, annual budgets, professional development, annual work plans for staff, etc.

Providing access and connecting knowledge to the needs of individuals and the community are at the center of the mission and purpose of libraries. A STEM literate librarian does not have to be a content expert but should possess the skills and knowledge for finding STEM expertise within the community, creating durable partnerships, and facilitating STEM services, programs and experiences at the library.

Essential STEM skills and capacities in a public library translate directly in the following ways:

1. **An innovative library director**

- Understands the economic and societal value that STEM literacy brings to their community;
- Is frequently out in the community so that he or she is fully aware of the community's needs;
- Is able to articulate a vision for the library's role in the community and to communicate that vision to staff, stakeholders and the community;
- Actively pursues the library's vision; and
- Fosters a library culture of innovation and risk taking that enables the staff to try new things and abandon old things that are no longer relevant.

2. **Library staff are fully engaged and confident**, with or without science backgrounds, who are

- Innovative and comfortable "thinking outside the box";
- Willing to learn and try new things;
- Feel safe and confident when they try new things. (The library's culture must see failure as an opportunity rather than a problem.); and
- Constantly learning. Continuing education and professional development must be a major part of a library's culture so that staff and administration are aware of trends and can assess which ones are important for their community

3. **Create public demand for STEM in the library**

Library staff and leadership embrace innovation, collaboration and risk-taking. They understand 1) their community's needs and interests, and 2) respond to those by creating programs, services and opportunities for the public to engage in STEM activities. The result is increased public demand and expectations of their public library for STEM programming.

4. **Build external community support**

Community support takes many forms. Often this can be monetary (e.g., annual budgets, donations, etc.) but it is often access to scientific expertise in the local area from academic and research institutions, corporations and/or local science 'clubs'. Library staff should not feel they must become experts in STEM topics. Instead, they should develop the skills to build long term partnerships with organizations that can deliver on local relevant STEM topics.

STEM Literacy Levels within a Public Library

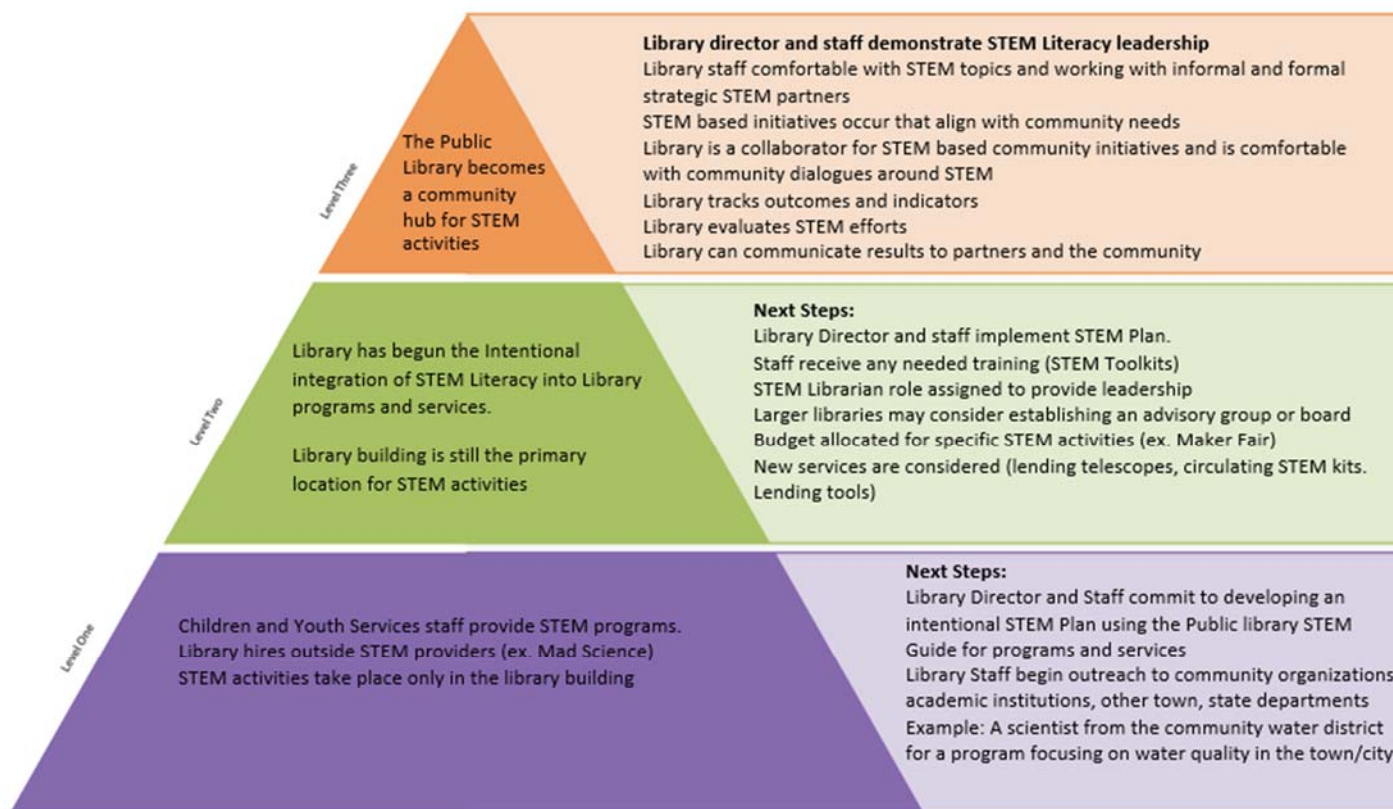
STEM literacy within a public library is often determined by:

- The levels of recognition and interest that STEM literacy is an essential literacy for the library;
- The corresponding competencies and capacities that reflect that cultural belief; and

- The intentional and purposeful vision and planning invested to provide ongoing public access to engaging programs, tools and services which are relevant to the community.

The *Public Library STEM Literacy Level* graphic below indicates these skills and competencies in the context of a public library. Further, it recognizes that there is a spectrum of “STEM Literacy” – ranging from beginning to advanced levels. Each level represents the type of STEM activities and reflects the current staff capacities and library commitment. The corresponding shaded box highlights “doable next steps” to further enhance both the library and staff competencies and capacities. State libraries can use this model to make a quick assessment of a public library’s current STEM literacy capacities and then develop specific strategies for further development and enhancement.

Public Library STEM Literacy Levels



STEM Continuing Education

There are numerous continuing education platforms that state library staff and public librarians can use to increase their skills, competencies and confidence in providing access to high quality STEM experiences, tools and resources. Described below are some professional development resources (e.g., websites, online STEM communities of practice, peer-to-peer networks, etc.). These include looking beyond traditional sources of professional development. When librarians have ongoing access to both online and in person training, the confidence and comfort levels of librarians increase dramatically. This is important because it is this “STEM confidence” that is promoted and communicated to the patrons.

Online Training: Live and/or archived training is the most cost-effective way for providing all public libraries access to STEM training. State Library Agencies and others provide an array of online training.

The list below represents a partial list of where one can find STEM programming and capacity training.

- WebJunction- [https://www.webjunction.org/search-results.html#g=STEM&f:@content_type_wj=\[Webinars,Courses\]](https://www.webjunction.org/search-results.html#g=STEM&f:@content_type_wj=[Webinars,Courses])
- American Library Association – <http://www.ala.org/educationcareers/elearning>
- NISENET – http://nisenet.org/search/product_type/professional-development-27
- Scistarter – www.scistarter.org
- StarNet – <https://www.starnetlibraries.org/>
- Cornerstones of Science – <https://www.cornerstonesofscience.org/resources/>

Online Community of Practice: An effective way to train around STEM is through peer-to-peer networks. There are several community of practice networks that state library staff and public librarians can access to increase knowledge around STEM. Examples of these include:

ALA – <http://www.ala.org/aboutala/currently-active-membership-initiative-groups>

STAR NET - <https://www.starnetlibraries.org/>

In person training provides librarians “learning by doing.” Many STEM programming trainings are also provided through:

- National conferences and state library association conferences;
- One-on-one Training_ facilitated by state library and/or STEM provider; and
- Cornerstones of Science provides STEM literacy training and builds STEM literacy capacity.
-

Participation in National STEM Efforts

Participating in national STEM efforts is a powerful way to build both state library and public libraries’ capacity.

Examples of resources and organizations to draw on include:

1. American Library Association and their associated groups - www.ala.org/tools/
2. Chief Officers of State Library Agencies – www.cosla.org
3. National Center on Interactive Learning/Space Science Institute – <https://www.starnetlibraries.org/>
4. Center for the Advancement of Informal Science Education (CAISE) – www.informalscience.org/projects/learn-experience/stem-learning-libraries
5. National Informal Science Education Network (NISENET) – www.nisenet.org

There are also state and federal agencies that understand the value of state and public libraries and will fund STEM projects. Examples of these include:

1. Institute of Museum and Library Services – www.imls.gov
2. NASA – www.nasa.gov
3. National Science Foundation (Advancement of Informal Science Learning)- www.nsf.gov
4. National Institutes of Health – www.nih.gov

Circulating STEM Kits, Tools and Resources to Public Libraries

Our research, prior to the *Empowering Libraries* project, indicated that while there are substantial science-based materials on the internet, librarians had difficulty locating high quality, reputable resources suitable for use in a library setting. Consequently, the project funded the creation of an online database for library staff that contains vetted and curated STEM activities that are appropriate for library use. Users can search by audience, content level, and difficulty, among other factors. Almost all the activities have pictures or videos of libraries doing these activities. For access to the STEM Activity Clearinghouse, please visit <http://clearinghouse.starnetlibraries.org/>

Many State Library budgets do not allow for focused science programming. In particular, SLAs may be constrained by staff time and resources to provide all that is necessary to our public libraries. To offset this situation, many state libraries are providing public libraries access to circulating, turnkey STEM kits, science tools and other resources. This makes it easier for public libraries to offer accessible youth, adult and family STEM programs. Loanable STEM kits can also be tailored to address specific science-based state issues. Kits can be simple or comprehensive and made suitable for small and large libraries with varying degrees of capacity. Public library staff find these kits to be very popular, helpful and in some instances, can serve as a gateway for them to build STEM capacity and nurture patron demand for STEM programming.

Many state libraries are currently circulating STEM kits to their libraries and have developed tested-approaches that others can draw on. Described in the table below are some best practices related to: 1) reservation systems; 2) kit creation and maintenance; 3) kit distribution; and 4) training for public librarians. An example is the Maine State Library's reservation system for Cornerstones Science Trunks.

https://www.maine.gov/msl/libs/cornerstones/trunk_options.shtml

Statewide Circulation of STEM Kits	Logistical Considerations	Other Considerations
Reservation System	Kit Keeper	Average costs \$475 annual subscription fee.
	Other Online Systems	State library has the capacity to build their own reservation system
	Call-in/Email Reservation	Time of staff member to take call/address email and confirm reservation with library. A Reservation log of date, time, library, library contact and name of kit
Creating and Maintaining STEM Kits	Create Your Own	Address State/Local issues where libraries can serve to increase awareness and disseminate information including replacing consumables Ruggedness of STEM tools and books
	Buy premade Library-appropriate STEM Kits	Facilitated Librarian Guide Number of Activities Size and weight of container, easy of handling
Distribution of Kits	Van Delivery System	Container Size and Durability
	Modified Van Delivery System	Some libraries may not be in the distribution network. In these instances, the science kit gets distributed to the nearest library that is on the van delivery system. The kit can then be picked up by the library that reserved the kit.
	Library Regional Hub	A van delivery system may not be available. In this instance, state library identifies and works with a library/ies that have space (to store kits) and can serve as a hub for all libraries within that geographical region. A variation of this approach is that the state library identifies a statewide partner interested in the theme/development of the kit and libraries can retrieve kits from partner offices.
	FedEx/UPS	Though not cost-effective, in the long-term, the use of circulating kits can also be used for special events, such as summer reading programs that have a short duration. In this instance, a partnership or sponsorship might be identified to support this approach.
Public Librarian Training or Direct Service	Public Library Training	Posting a series of videos or hosting webinars allows state library staff to reach many librarians, across the state, quickly. This strategy is successful because it allows public librarians to view the training on their own time.
	Direct Service	Some STEM Kits, particularly technology-based, may require state library staff to accompany the kit in order facilitate the public program or training of staff at the library.

Partnership Development

The project created *The STEM in Libraries: Community Partnerships Toolkit*. It provides resources to expand the capacity of public libraries by partnering with other organizations to offer high-quality, relevant science, technology, engineering, and math (STEM) programs. The concepts also scale to SLAs.

<https://stemlibraries.org/publication-types/toolkit/>

Partnerships are both personal and business endeavors, as they involve ongoing time, support, and cultivation by a library's senior leadership and staff. For some libraries, partnerships do not come easy, and the same is true for some science organizations. Your STEM partners, like your SLA, will have their own agendas, expectations, and limitations in financial and staff resources. Successful and sustainable partnerships will depend on your clarity of purpose, mutually defined roles and responsibilities, and regular, effective communication. A few tips include:

Do your homework - Do your research and find out what connections already exist in your state. It may be possible for your SLA to join an existing partnership rather than create a brand new one. This possibility might save you a lot of time and effort when it comes to identifying and recruiting partners, and even developing programs.

Clarify your purpose - A clear purpose and shared understanding of the project's goals, activities, benefits, and expected outcomes are essential to a successful partnership.

Define roles, responsibilities, and work processes - Establish a mutual understanding of each partner's roles and responsibilities, as well as a mutual recognition of the financial and time commitments. This understanding should include a clear work process that defines things like: How often will you meet? Who will represent each organization? What role will the organization's directors play? What resources will be needed and who will provide them? When do you expect to achieve the project's goals?

Communicate - Clear and regular communication among representatives of each organization is essential. Good communication recognizes the role of each partner in the success of the project, and gives you opportunities to discuss and resolve challenges as they arise.

Create win-win situations - It is fine—and entirely appropriate—to identify your SLA's interests and potential benefits when you propose a partnership. Potential partners will be doing the same thing when they consider your proposal. Be aware, though, that leading with how the collaboration will benefit the partner will resonate more with them—and generate more buy-in—than leading with how it will benefit the library. Partnerships are most successful when they are mutually beneficial. The more you are able to describe how the partnership will create a win-win situation, the more potential partners will be interested in building a relationship with your SLA.

Assess and reassess your partnerships - Like all relationships, partnerships can be nurtured, evaluated, and improved. Working with partners on periodic assessments can help sustain trust, build respect, and address any possible issues. These conversations can also help you understand how to deepen the relationship in meaningful ways.

Build momentum - It's OK to start small. When libraries in your state see tangible results of small, successful endeavors, their enthusiasm can help build momentum for your STEM programs. Initial successes can also create opportunities for you to deepen your collaborations or invite new partners to participate, and accomplish even more.

Partnering with Other State Agencies

As State Library Agencies, we are well-suited to create STEM partnerships with other state agencies. These are likely to be the most productive, efficient and effective, as both organizations already have a

statewide mandate and infrastructure to support initiatives. Governor, legislative – and/or agency-directed statewide initiatives will often define mutual shared goals and expectations of each partner. Most statewide STEM issues can be promoted through the network of public libraries, thus elevating public awareness quicker and more cost-effectively. If your state has a STEM Council or similar group, it may be advantageous to participate in their deliberations.

Partnering with Formal/Informal STEM Providers

The [Community Partnerships Toolkit](https://stemlibraries.org/) found at <https://stemlibraries.org/> is a great resource to draw on. Like the state library, formal and informal STEM providers (science museums, nature centers, science businesses, etc.) have capacity challenges and therefore they may not immediately say “yes” to the opportunity unless they see real benefits for their organization as well.

Models of State Library staffing support of STEM in public libraries

The *Empowering Libraries* project used two different state library strategies to support the eleven pilot libraries:

1. In Maine, a part-time STEM Liaison position was created and embedded within the organization.
2. In Massachusetts, an existing state library agency staff member assumed the role of the STEM Liaison.

Whatever approach a State Library Agency uses to support STEM in public libraries, we determined that there are key skills needed by SLA staff. These are most likely skills SLA staff already possess and are the same type of skills necessary for public library directors and staff to be successful with any library initiative. The only difference may be confidence and comfort levels with STEM topics as well as the recognition that STEM literacy, like other literacies, is considered important. In short, a champion of STEM literacy within the organization signifies its value.

SLA STEM Staff Skills

1. **STEM Leadership** – possess an interest, experience and skills in STEM; contain leadership experience and the ability to facilitate planning processes; have knowledge about the state’s public libraries and their staff so as to assess those that would have the buy-in, passion and leadership for enhancing STEM literacy programming.
2. **STEM Facilitation** – able to model effective, engaging STEM facilitation strategies and methods, and provide training to library staff; identify and/or develop high quality STEM facilitation training to encourage public libraries to integrate a variety of STEM programming, tools and resources for all ages.
3. **Fund Development** – experience with creating and accessing funding sources to support STEM; able to coordinate training on how to write STEM specific proposals (e.g., state/SLA funds, LSTA sub-grants, federal, foundations, etc.); create STEM fund development opportunities for public libraries. (The proposal process is an excellent way for library staff to become intentional and purposeful about the importance of STEM to their library, patrons and community. More specifically, library staff need to be succinct in their rationale, define the goals, activities and expectations, outline who their partners will be, how they will market and communicate to their

audiences, stick to a budget and timeline and finally develop an evaluation plan that measures impact and program quality.)

4. **Marketing and Communication** – able to model effective STEM marketing and communication methods to library staff (e.g., prepare a STEM literacy marketing and communication plan); articulate the role of libraries as a critical community/cultural institution for STEM literacy; help to expand public demand for STEM information and programs; increase awareness and support opportunities to enroll new library cardholders and greater community involvement.
5. **Community Partnership Development** – able to identify and engage potential partner organizations and individuals; guide development of a public library’s purposeful STEM plan with goals and activities;

The Maine State Library’s STEM Librarian Story

During the grant, the Maine State Library contracted with a part-time person to serve as the STEM Liaison. The contract was for 16 hours a week. It quickly became apparent that the wider library workforce wanted to consult with this STEM specialist so we secured several other sources of funding to double the hours/week. See <http://gizmogarden.org/gizmo-garden/about/maine-state-library-partnership/>

During the grant we worked with librarians to support their STEM ideas, grow their skills and provide hands-on experience when diving into STEM. We established a Hands-on STEM workshop that was held three times and attended by both public and school librarians. (After the grant ended the Maine State Library was able to secure state funding to continue this position.)

Conclusions

For state library staff, it is important to understand the power of informal STEM learning and how public libraries can play a central role in furthering STEM learning in their communities. It is important to remember that state and public libraries can draw from a deep well of their own expertise as well as activities, exhibits, science tools, kits, and training already available through the informal science provider realms.

Section 2 - Best Practices: Assisting Public Libraries Develop a STEM Plan

Overview

State library staff that work to build the STEM literacy of their public libraries can facilitate this process by:

1. **Promoting or distributing the Empowering Public Library STEM Guide and Workbook** via meetings, through email listservs, or other means to reach public library directors and staff.
2. **Hosting or promoting a series of workshops**, webinars, or a session at your state's library conferences to facilitate STEM development planning.
3. **Working with individual libraries or groups of libraries** to create a STEM Development Plan.

This section of the report offers best practices for state library staff to use while assisting their public libraries in the creation of an output and outcome-based STEM Development Plan (see pages 26-28 in the [Public Library STEM Guide and Workbook](https://stemlibraries.org/site/assets/files/1908/publiclibrarystemguideandworkbook2019.pdf) <https://stemlibraries.org/site/assets/files/1908/publiclibrarystemguideandworkbook2019.pdf>) and corresponding work plan, schedule and budget. A STEM Development Plan provides a framework for a library to determine how it will begin or expand on the library's STEM programs and services. The library's resulting plan will:

1. Strategically incorporate STEM literacy into a library's vision, mission and planning;
2. Identify locally relevant STEM-based issues or topics that patrons are interested in;
3. Create mutually beneficial partnerships to address these issues and to position the library in a leadership role;
4. Identify methods to provide patrons sustained access to science experiences, resources and the scientific community; and
5. Promote a community-based problem-solving approach to the issue they want to address.

State Library staff can assist the library director and staff in their STEM Development Plan process to:

1. Visualize and clearly state the library's STEM aspirations and what they want to accomplish over a specified time frame (example: 6 months to a year);
2. Clarify library staff STEM interests, buy-in, roles and responsibilities;
3. Identify locally relevant science-based topics or issues based on patron and community interests and needs; and
4. Develop a road map (logic model) of the specific STEM activities, resources and community partners needed to achieve the vision (see the Evaluation and Logic Model Toolkits)

Helping Public Libraries Build STEM Literacy

The [Public Library STEM Guide and Workbook](#) is designed to be used by librarians on their own or to be facilitated by a State Library Agency to create a STEM Development Plan. The Guide's worksheets are the major building blocks of the STEM Development Plan. The Guide and Workbook, as well as toolkits and resources, are available at <https://stemlibraries.org>. The Guide contains completed examples of each worksheet (pages 28-31) drawn from the pilot libraries to illustrate the process.

We have learned the following:

1. Most libraries have not considered integrating STEM literacy as part of their vision, mission or long-range plan. SLA staff may need to help the librarians think beyond STEM programming to

the wider need for STEM literacy in their community and how a commitment to STEM literacy will impact library services and programs.

2. Librarians need to think about the STEM literacy aspirations of the community. How can STEM literacy efforts benefit both the library and the community? How can the library serve in a leadership role in this effort? Who are the likely community partners?
3. The library director and staff need to describe how they may develop or enhance capacity prior to designing or implementing their plans. They can decide what professional development may be needed.
4. SLA staff may use different facilitation techniques for creating productive, substantive discussions around the locally relevant STEM issues their plan will address.
5. Public library director and staff buy-in and interest are critically important for successful STEM literacy implementation. SLA staff will want to work with those public libraries that have self-identified as being interested in STEM and demonstrate a willingness to engage in community partnerships and conversations.
6. SLA staff should retain a final copy of each Public Library Guide worksheet as it is completed. This will make it easier for staff to plan subsequent meetings and guide the library's process.
7. This process can be undertaken with individual libraries or with a group of libraries. Some of the pilot libraries did find value in going through the worksheets with their peers and drawing from each other's ideas and experiences. Librarians who are familiar with planning and outcome measurement are good candidates for a workshop setting. If the SLA works with a group of libraries, ensure that the librarians who attend group workshops are communicating clearly and promptly with the pertinent staff in their library that did not attend.
8. Meetings should be no longer than 2 hours.
9. Completion of a Plan will take 3-4 meetings over a 4-6 month period.

Lessons Learned from Working with the Grant Pilot Libraries

1. Size and capacity of a public library may not be the best indicator for success in creating and implementing a STEM Development Plan. Library directors who had a real vision for using STEM literacy to connect with their patrons and communities around an issue or cause of local interest were most successful.
2. Libraries that have already demonstrated a strong interest in STEM have more buy-in and commitment to the process.
3. Requiring libraries to submit a 'Letter of Interest' that outlines their level of commitment and willingness to participate fully in the process enhances the library's success.

Approaches for Assisting Libraries with STEM Development Planning

Initial Contact

SLA staff may call or meet with the library director. They can provide an overview of the entire process. They can describe the length of time as well as the goals and expectations for the library's participation. A next step is then scheduling an initial face-to-face meeting with the director and key staff to begin the process.

Setting the Stage - STEM Readiness and Library Capacity

The first meeting with the director and staff allows the group to get a sense of their existing STEM Literacy capacity and their interests and goals for wanting to integrate STEM Literacy into their daily

operations. It's also a chance for the SLA staff to establish or strengthen their relationship with the library staff.

1. Describe the goals of the STEM Development Plan process and what the difference is between STEM programming and STEM literacy. One of the goals of the STEM Plan is to integrate STEM literacy into library operations much like early literacy is integrated into long range plans, budgets, and staff allocations.
2. Have library staff discuss why they are interested in integrating STEM into their daily operations. Possible discussion topics include:
 - What does the library hope to achieve?
 - What type of help, support and/or guidance would/does the library want from the state library agency now and after the project that will allow the library to sustain a STEM literacy library culture?
 - What issues are currently important to the community? What are the leading STEM aspects of those issues? What are the inter-generational aspects of these issues? What issue would your library like to focus on during the next 12 months? Why?
 - What factors led the Director/staff to participate in the STEM Plan development process? This might be the first time that staff will hear the library director's point of view or belief about the process.
3. Using the [Public Library STEM Guide and Workbook](#) complete and discuss Worksheet 1 (STEM Readiness – Page 14) and Worksheet 2 (Library Capacity Chart - 16). This can be accomplished either as a group brainstorming session or, depending on the size of the group, you might want to send these worksheets ahead of the meeting for library staff to complete and send back to you for compilation. Then, you would present the compiled results for discussion. Someone should record the group's work on these worksheets for use in the next meeting
4. Establish a date and time for the next meeting. Try to schedule this meeting within a month of the initial meeting to keep momentum going. Ask the staff to use the time between these two meetings to talk with their patrons about their STEM literacy needs and interests and to monitor local news outlets for relevant topics or issues. This information will be used in the next meeting.

An alternative also exists – taking smaller steps

If the State Library perceives a public library is receptive but a bit overwhelmed a less formal approach to the planning process that focuses on one aspect at a time may be pursued. A series of incremental steps can, over time, add up to a full STEM Development Plan. For example,

- A library is embarking on an overall strategic planning process and they explore how a STEM literacy plan can be part of that including a discussion of why should it be included?
- A community recently had a natural disaster. The library explores how can STEM literacies be incorporated into the library's plan to helping the community, including prevention/preparation for future natural disasters?
- A library is holding community conversations about an important community event that includes STEM (fracking, drought, broadband access, drug addiction, etc.). The library assists with how STEM literacies can be incorporated into the planning for the ongoing series.

SOAR Analysis and STEM Purpose/Selecting an Issue or Topic

The second face to face meeting is to talk about the library's strengths, opportunities, aspirations and results (SOAR). By the end of the meeting, the STEM liaison and the library staff should understand what they hope to achieve and have a better understanding of: 1) the library's needs; 2) resources; 3) the STEM topic's importance and relevance to the community; and, 4) potential community partners

Completing the SOAR Analysis (Public Library STEM Guide and Workbook - Worksheet 3 – pages 18-21)

1. Use the results of Worksheets 1 and 2 to start the discussion of the library's strengths.
2. Use staff knowledge and patron feedback to discuss opportunities.
3. The discussion of aspirations and results will need facilitation. We observed that the pilot libraries had a difficult time thinking in terms of vision and outcomes for both the library and the community. SLA staff may need to explain and give examples of what a vision is and what outcomes are. The Public Library STEM Guide has definitions for these key terms. SLA staff can also look over the guidelines for Worksheet 6 for examples of outcomes although, at this stage, the outcomes being written don't have to be quite so specific. You are looking for statements about the changes in skills, knowledge, attitude or behavior that patrons or library staff will demonstrate because of these library services or programs.
4. If there is time after the SOAR analysis, move on to Worksheet 4. If not, take a few minutes to schedule the next working meeting - again within a month to maintain momentum.
5. Worksheet 4 – STEM Purpose – Selecting an Issue (pages 22-24) will include the information from patron feedback and staff knowledge that was used in the SOAR analysis under opportunities. This worksheet allows library staff to focus on one issue or topic.

STEM Development Plan

Library staff will begin writing their plan at this meeting using the information discussed described in worksheets 1-4.

1. Review worksheets 1-4. Does the library's staff need to make any changes to these?
2. Begin Worksheet 5 transposing information from previous worksheets. SLA staff may need to help the library staff make the connection between the information on worksheets 1-4 and how that information translates into a vision and goals.
3. After the goals have been identified, this becomes a straightforward planning process with the library identifying strategies to meet the goals and activities to meet the strategies.
4. Library staff will identify the staff responsible for each strategy and the budget appropriated for it.

The STEM Development Plan Road Map/Logic Model

The road map/ logic model in Worksheet 6 (page 32) is a visual representation of how the library's STEM Development Plan will work and highlights the expectations of success. SLA staff will help the library leadership and staff ensure there is alignment between the goals, strategies, activities, outcomes, and impacts. Both the STEM Development Plan and the Logic Model are valuable communication tools to use with prospective community leaders, partners, and funders.

During this meeting, library staff will decide how they will measure success in terms of outcomes and indicators. The SOAR Analysis (Worksheet 3) contains a section where staff began to think about results.

Completing the Road Map/Logic Model

Review the SOAR analysis section on results. Be sure that library staff understands outcomes and indicators. Use the examples in the guidelines for Worksheet 6. Use the notes from the previous meetings, the completed worksheets, and the draft STEM Development Plan to complete Worksheet #6.

Evaluation of the STEM Plan

As with any long-range plan, the STEM Plan is a living one and can't just be written and then shelved and forgotten about. The road map/logic model has built into it the evaluation measures for the library but the library must then take the time to look at their data and think about it. The SLA should consider scheduling two meetings around evaluation.

1. Meet around 6 months into the project to ensure that the library is gathering the necessary statistics and to review them for possible mid-course corrections
2. Meet again at the end to assess the results of the initiative for the library and its community
3. SLA staff should also assess the changes in organizational capacity the library identified to enhance through the plan. Ask the library director what the ramifications of those changes have been on staff and if additional professional development resources for staff and/or other support might be required.

Appendix A

Overview of Grant Research – Role of State Library Agencies

Overview

The *Empowering Libraries* project conducted a *State Library Agency Treetop Assessment* to identify the operational characteristics and categories of the nation's State Library Agencies (SLA). In 2015, the project conducted the following:

1. **Fall 2015 Survey:** A national survey of state library agencies was released to determine the current landscape regarding collaboration, communication and state library agency roles in support of STEM. Indicators of state libraries' capacity to support STEM in their libraries included questions about funding, staffing and interest in STEM. The survey also asked state libraries how they envision a guide that would help them support STEM in their public libraries. (85% response rate)
2. **An Analysis of 22 existing LSTA Plans** submitted to the Institute of Museum and Library Services (IMLS) by state library agencies for the 2013-2017 funding period. The aim was to determine the extent of project intentions and priorities of state library agencies and the strategies they use to promote and support STEM initiatives in their public libraries.
3. A focus group of eight state library agency advisors to the *Empowering Libraries* project provided data about their preferences for the content, format, and promotion of a training guide for State library agencies.
4. Literature review and other relevant and recent research studies.
5. Chart of some examples of STEM projects and initiatives by SLAs and public libraries

Based on this research the *Empowering State Library Agencies to Support Science Literacy in their Public Libraries: A Tree-top Assessment of the Nation's State Library Agencies* was prepared. Outlined below are the highlights of this report. The full report, *A Tree-Top Assessment of the Nation's State Library Agencies: Empowering State Library Agencies to Support Science Literacy in their Public Libraries* is downloadable as a PDF in the Grant Information section on the <https://stemlibraries.org> website.

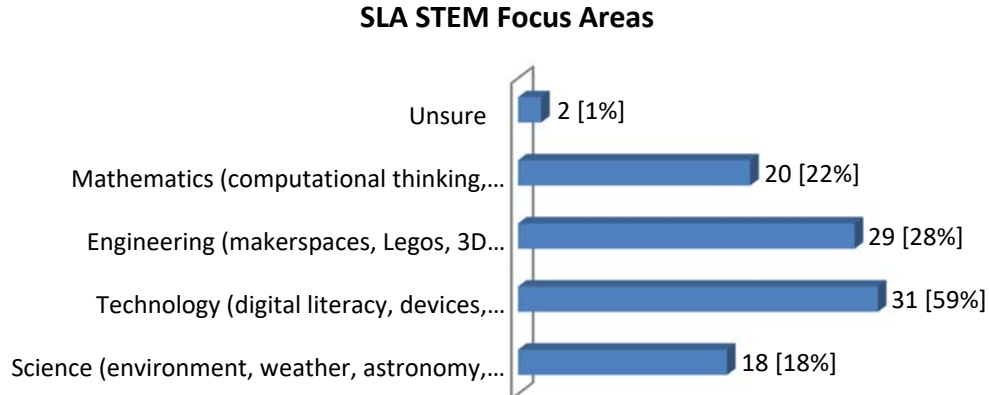
State Library Agency Interest in STEM Literacy – Survey Results

The *Empowering Libraries* project conducted a nationwide State Library Agency survey on current STEM initiatives, capacity, and the areas where more support is needed. A total of 44 (85%) state libraries responded to the surveys. Outlined below are the results of that survey and a picture of the current position of state library agencies around STEM literacy in 2015.

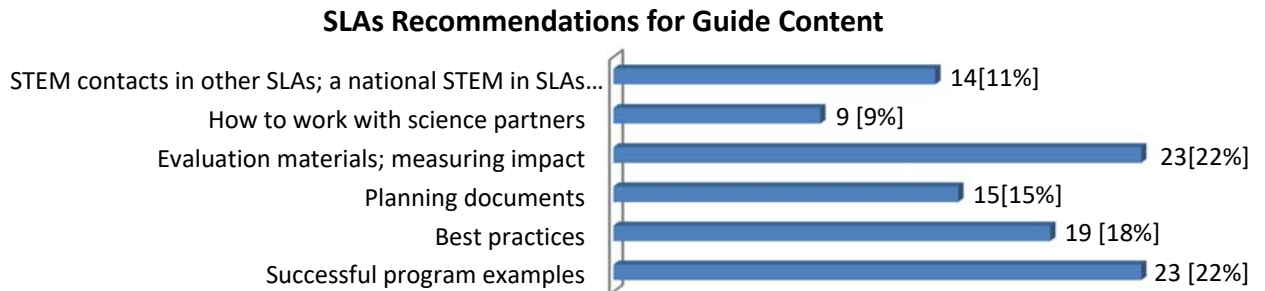
- State library agencies reported that their staff was very interested (51%) or extremely interested (44%) in STEM programming.
- Interest and capacity in STEM across state library agencies is emerging, similar to what the project saw with public libraries.
- For many state library staff and public librarians, the term "science" has different meanings. They may be providing science activities and resources and not realize it. Transitioning to the acronym STEM, defining it as Science, Technology, Engineering and Math, begins to both clarify and widen the understanding and therefore interest levels in STEM training and building STEM literacy capacity.

- Leveraging the libraries’ firm grasp on literacy programming, informal learning, K-12 educational goals, and IMLS focus areas (e.g., workforce development, employment, economic development, lifelong learning, and educational attainment.), public libraries can embed science with existing state library agency and local library initiatives.

Below is the survey’s breakdown of state library agency STEM focus areas:



Other feedback from the survey highlighted where state library agencies would like to have additional support and services to better build their capacities to assist public libraries.



Based on SLA recommendations the following were developed:

1. **Evaluation materials:** The *Evaluation Toolkit and the Logic Model Toolkit*, at <https://stemlibraries.org>, are great resources for understanding the essentials of planning, implementing evaluations, measuring impacts and why it matters, particularly for science, technology, engineering, and math (STEM) programs. Included are samples of surveys and logic models.

2. **Successful programs and Best practices:** A list of the State Library Agency successful programs is included in the appendix of *Empowering STEM in Public Libraries: A Guide for State Library Agencies*. They are examples of past state library activities around STEM literacy.
3. **Planning documents:** Both the *Public Library STEM Guide and Workbook* and the *State Library Agency Guide* include examples and templates. Section 2 of this report is a facilitation guide for state library staff to assist public libraries in the creation of a STEM Development Plan.
4. **Responses to STEM contacts in other State library agencies:** The survey feedback indicated that many state library agencies have STEM-related initiatives underway. For example, SLAs have created interest groups for LSTA, Continuing Education and Library development.
5. **How to work with science partners:** The *Empowering Libraries Community Partnership Toolkit* <https://stemlibraries.org> is a great resource on best practices, lessons learned and strategies to expand your state library's capacity by partnering with other organizations to offer high-quality, relevant science, technology, engineering, and math (STEM) programs.

State Library LSTA Plan Review

The *Empowering Libraries* project analyzed 22 state library agency LSTA Plans (2013-2017) to assess current (2015) STEM capacity and interest levels. The LSTA plans included themes that were STEM literacy friendly. Many had STEM projects already in progress, often in collaboration with community and/or private sector entities. The areas noted below illustrate the variety of contexts for STEM literacy programming included in the reports.

Literacy. Reading literacy initiatives were planned or expanded in all 22 state plans.

Information Literacy. Most state library agencies included the delivery of improved, high tech library services as the primary way to meet the information and technology needs of their patrons and communities.

Science Literacy. This area included computational skills, financial literacy, health literacy, and life sciences in science literacy programming.

Digital Literacy, Technology Skills, and 21st Century Skills. These terms cut across all 22 state plans. Some LSTA plans connected the provision of technology and digital services with training and education of patrons and library staff to maximize the benefits of information access through digital technology.

Workforce/economic development and employment. 19 out of 22 State library agencies include workforce development and economic development/employment initiatives. This category presents additional opportunity for programming and services in STEM careers.

Lifelong learning and educational attainment. These terms were used in the goals and program descriptions in many of the plans. Some State Library Agencies identified financial literacy and health literacy with lifelong learning and education.

SLA Focus Group – Overview and Project Responses

A focus group of representatives of State Library Agencies was convened via phone in October 2016. Three questions were posed to the group:

- Question 1:** Based on the draft of the Table of Contents for the SLA Guide, what suggestions do you have to improve the content of the guide?
- Question 2:** What do you believe are the impediments and barriers for SLAs work on STEM with their public libraries? How can we design the Guide to best address them?
- Question 3:** How can SLAs develop and sustain momentum to support STEM programming in public libraries?

Discussion included the following comments and suggestions:

- Public Libraries and SLAs often don't label what they do (projects, programs, initiatives, partnerships) as science or STEM. How can that be changed? How do we communicate and market it differently?
- For SLAs embedded in Department of Education – alignment with national and/or state science standards is important. Can you relate public library programs to curriculum standards?
- Webinars and/or PowerPoint as the best way to learn for librarians
- SLAs need to have something to push rather than get involved in. SLA staff time is a factor.
- Tie to LSTA sub grants
- Website Model – look at *Every Child Ready to Read*
- Peer to peer – useful for libraries to learn in this way
- Mix of libraries in samples – different sizes so scalable.
- STEM is stuck in Children's and Youth Services. Need to involve community and outside organizations to address adults STEM literacy.
- How do we motivate librarians to work on STEM with their patrons?

Literature Review

The literature review provided important background and understanding for Cornerstones of Science, the researcher and evaluator, about State Library Agencies.

The literature review included:

The Institute of Museum and Library Services State Library Administrative Survey Fiscal Year, 2014 [IMLS, 2016]. The objective of the study was to provide state and federal policymakers and other interested users with information about SLAs. The study created three statistically similar groups of SLAs to characterize and examine three sets of indicators in the context of the national recession [December 2007 to June 2009].

State Library Agency Organizations: Roles, Structures, & Services [Bertot & White, 2014]. The following was explored for background purposes for the grant.

1. The organizational structure and location within the state government of the nation's SLAs.
2. An overview of services and allied operations provided by SLAS; Selected key mandates, and functions
3. Relationships between SLAs and core state information functions, such as archives, preservation, records management

Pushing the Limits: Making Sense of Science. Summative Evaluation. [Goodman Research Group, Inc. [GRG], Gareis, K. C., Lukasiewicz, E. & Goodman, I. F. 2014.] This NSF-funded program builds the capacity of rural and small libraries to provide programming that enhances public understanding of science and math. It provides professional support, technical assistance, video segments, and funding for library professionals and their local science partners to co-facilitate a series of science café-style public discussions with adult patrons. An external evaluation, conducted by GRG examined 20 rural and small libraries that piloted the program in Phase 1 and Phase 2, which was later scaled up to 74 additional libraries.

Conclusions from the Survey, LSTA Plans, Literature Review

State Library Agencies exhibit a **culture of collaboration**. SLAs are highly communicative and highly collaborative. They prefer to work directly with their libraries through email and social media.

The **dominant methods that SLAs use** to support their libraries include provision of resources, consulting, continuing education, evaluating resources, organizing events, and providing funding and grant information.

SLA interest in STEM is found across most SLAs and growing. SLA staff and public librarians do not always see science outside “the box.” By leveraging the libraries’ firm grasp on literacy STEM/science can be embedded with existing SLA and library initiatives.

State	Examples of Promising Practices
Oklahoma	<p>STEM Grants -Oklahoma State Library</p> <p>http://wiki.cya.oklibshare.org/index.php?title=STEM_Grants</p>
Oklahoma	<p>STEM – Oklahoma State Library</p> <p>http://wiki.cya.oklibshare.org/index.php?title=STEM</p>
Pennsylvania	<p>Advancing Customized /services to Communities (ACA – 2014) – Pennsylvania State Library</p> <p>http://www.webjunction.org/news/webjunction/state-library-of-pa-advancing-customized-services-to-communities.html</p>
Massachusetts	<p>Science is Everywhere: In and Out of the Library (2015) - Massachusetts Board of Library Commissioners</p> <p>http://sched.ws/hosted_files/massachusettsstemsummit2015/3a/StatewideSTEM%20Summit%20DCU.pdf</p>
Massachusetts	<p>STEM Summer Reading – Marion Public Library</p> <p>http://www.marionpubliclibrary.org/teens/teen-reads/stem-summer-reading</p>
Massachusetts	<p>Shaking Up STEM – Bellingham Public Library</p> <p>http://www.bellinghamlibrary.org/home/shaking-up-stem/</p>
Maryland State Library	<p>Maryland STEM Festival - Creating a Culture of STEM</p> <p>http://marylandstemfestival.org/</p>
Maine	<p>Acadia Night Sky Festival - - Jesup Memorial Library</p> <p>http://www.acadianightskyfestival.org/</p>
New Jersey	<p>NJ Library Maker-spaces: The Leading Edge (2014)</p> <p>http://librarylinknj.org/projects/makerspaces</p>
Maine	<p>Sustainability Series - -Portland Public Library</p> <p>https://www.portlandlibrary.com/series/portlands-sustainability-series/</p>
Wisconsin	<p>Coding Initiative in Wisconsin Public Libraries - Public Library Development</p> <p>http://dpi.wi.gov/pld/technology/coding-initiative</p>
New Mexico	<p>STEM to READ - New Mexico State Library</p> <p>http://nmstatelibrary.org/services-for-nm-libraries/programs-services/youth-services/stem-to-read</p>

Appendix B

Overview of Evaluation – Impact on State Library Agencies

Evaluation Overview

Using grant funds, Cornerstones of Science contracted with the Center for Youth and Communities at Brandeis University's Heller School for Social Policy and Management to serve as the project's evaluation partner. The goals of the evaluation were to document and provide formative feedback on project implementation and to assess the impact of the project on the participating state and local libraries. The full report is available at <https://stemlibraries.org>

Increased Capacity for State Library Agencies

The impact of the initiative at the state level in Maine and Massachusetts was mixed, reflecting the different histories and contexts for the state library agencies in the two states. As noted in the full evaluation report, the Maine State Library began the initiative with relatively little experience in STEM and brought in new staff to serve as the STEM Liaison for the initiative. The Massachusetts Board of Library Commissioners already had an established STEM grant program using federal library funding and assigned an experienced library practitioner, with experience running STEM grant programs, as the state's STEM Liaison.

The impacts of the initiative at the state level reflected the different starting points. In Maine, according to the members of the state team, interest in STEM had been slowly building prior to the initiative, but the state did not have any significant experience with STEM programming or staff with substantial expertise in STEM. In that regard, the addition of the STEM Liaison position represented a major change in capacity at the state level. The STEM Liaison largely defined her role as promoting the value of STEM programming and serving as a resource for new ideas and in demonstrating to somewhat hesitant libraries that STEM programming did not need to be expensive or complicated. As a result, much of her work throughout the initiative took the form of modeling practical, do-able STEM activities.

As described by the state team, as word about what the STEM Liaison was doing "leaked out," more libraries became interested in meeting with her, talking with her, and having demonstrations at their libraries or meetings. Ultimately, the state library decided to dedicate additional resources to the position and, at the end of the initiative, made the position permanent, giving the state library an ongoing capacity to assist local libraries interested in STEM programming.

From the state's perspective, the increased STEM interest and capacity at the state level had an impact both at the state level and among the local libraries. At the state level, the creation of the STEM Liaison position and the development of STEM-related tools at the state library (for example, creation of a maker space at the State Library) led to a new recognition of the Maine State Library as a STEM resources for state-level agencies. One result was the addition of the state Librarian to the state's STEM council which is charged with developing strategies for enhancing STEM education from prekindergarten through postsecondary education; another was formation of a new collaboration with State Museum, with the State Library now actively involved in working with the Museum on major science-related events (Earth Science Day, etc.). The State Library's involvement in the initiative "pushed more of a

collaboration with the state museum,” which looked to Maine State Library to help make their events less “academic” and more accessible to a family audience.

The state-level support for STEM was also seen as influencing local libraries across the state. The STEM Liaison position was seen as providing a champion for STEM available to work with interested local libraries. The liaison was seen as providing “support and comfort,” serving as someone “libraries could bounce ideas off of.” The result from MSL’s perspective was a substantial increase in the awareness of STEM throughout the state’s library system and the sense that libraries could make STEM part of their portfolios. Ultimately, state team members argued, “this project really influenced how we work with libraries. To the degree that MSL embraces a topic, it filters out. This grant forced us to focus on this topic, to plan, think about what we want to do. We are thrilled at the outcomes for the state library.”

The impact of the initiative at the state level in Massachusetts was more limited: the STEM Liaison position and a STEM grant program for libraries existed prior to the initiative and were expected to continue with little change. As one state representative noted, “We’ve been at this for a while, promoting and making STEM a priority. We are going to continue with STEM programming as long as libraries are interested.”

That said, there were benefits and lessons from the state perspective. The initiative was seen as reinforcing the idea that there was an appetite for STEM in the local communities, making it more likely that local efforts in the pilot communities would continue. The grants, though small, were also seen as beneficial, prompting the pilot libraries to engage in new kinds of programming. The cross-site meetings were also seen as positive, conveying the lesson that these types of cross-site meetings would be valuable for a wide variety of library projects.

Appendix C

Project Website - Stemlibraries.org

The <https://stemlibraries.org> website will continue to grow and add content. Core elements of the site are:

Two guides:

1. *Empowering STEM in Public Libraries: A Guide for State Library Agencies*
2. *Public Library STEM Guide and Workbook*

Six STEM in Libraries Toolkits:

1. Logic Model Toolkit
2. Evaluation Toolkit
3. Facilitation Toolkit
4. Community Partnerships Toolkit
5. Fund Development Toolkit
6. Marketing Communications Toolkit

Additional Resources

Videos

Downloads

Grant documents and information

