Evaluation of "Empowering Public Libraries to Become Science Resource Centers for their Communities"

Final Report

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Table of Contents

I. INTRODUCTION

In 2015, the Maine State Library, working with Cornerstones of Science (Cornerstones), a Maine-based nonprofit organization, received a grant from the Institute of Museum and Library Services for a three-year initiative aimed at increasing the capacity of public libraries to serve as science resource centers for their communities. Building on lessons learned from more than a decade of work by Cornerstones, the initiative was designed to operate at both the state and local levels. At the state level, the initiative was designed to increase the capacity of state library agencies to support local library engagement in STEM (Science, Technology, Engineering, and Mathematics) through the establishment of a state-level STEM Liaison position and the development an online STEM Activity Clearinghouse that would provide information on how public libraries could integrate STEM into their daily operations. At the local level, the initiative would work with local pilot libraries build their capacity as a STEM resource center. Key activities included developing a local STEM planning process, providing technical assistance and professional development on STEM programming, working to integrate STEM into library operations, and implementing expanded STEM programming.[1] Ultimately, the goal of the initiative was to test an approach and develop resources that could then be shared and implemented in states interested in increasing the capacity of their public libraries in STEM. Two state library agencies, the Maine State Library (MSL) and the Massachusetts Board of Library Commissioners (MBLC) served as the initial state-level partners for the initiative working with ten pilot libraries in those two states. The Berkeley (California) Public Library, which was engaged in a parallel effort with Cornerstones through a foundation grant, joined the initiative as the 11th local library in mid-2016.[2]

Evaluation

As part of the grant, the initiative contracted with the Center for Youth and Communities at Brandeis University's Heller School for Social Policy and Management to serve as the initiative's evaluation partner. The goals of the evaluation were to document and provide formative feedback on the implementation of the demonstration and to assess the impact of the three-year initiative on the participating state and local libraries. Key questions guiding the evaluation effort included:

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[1] The initial proposal for the project identified four core elements: 1) Build Library Director and staff STEM capacity through toolkits, training, technical assistance and ongoing access to STEM activities and resources; 2) Build the state library capacity to support public libraries through the creation of a STEM Liaison position, Guide for how to facilitate STEM capacity building with public libraries, a framework with benchmarks to measure definitions of success; and, 3) Pilot libraries and state libraries apply, test and evaluate the replicability of the model and changes in library and SLA STEM capacities; and, 4) Create ongoing access and disseminate the STEM Capacity Building tools as well as high quality STEM activities through the STEM Activity Clearinghouse and stemlibraries.org websites

[2] State library agencies in Rhode Island and Vermont were also actively engaged in the planning for the initiative. The pilot libraries for the project were: Auburn Public Library (Auburn, ME), Jesup Memorial Library (Bar Harbor, ME), Portland Public Library (Portland, ME), Bellingham Public Library (Bellingham, MA), Nevins Memorial Library (Methuen, MA) and a consortium of small public libraries in western Massachusetts: M.N. Speer Public Library (Shutesbury, MA), Erving Public Library (Erving, MA), Leverett Public Library (Leverett, MA), New Salem Public Library (New Salem, MA) and Wendell Public Library (Wendell, MA). As noted, Berkeley Public Library (Berkeley, CA) joined the initiative during its second year.

1. **Were the major elements of the initiative implemented effectively?** Were the key support elements (STEM Liaison, Clearinghouse, professional development activities, etc.) put into place? Were the local libraries able to implement key STEM-related activities? What kinds of barriers or challenges were encountered in implementing the initiative, and how were they addressed?

2. **Was the initiative successful in building the capacity of the state library agencies to help local libraries become science resource centers?** Did participation in the initiative change the way in which state library agencies viewed their capacity and role in building STEM capacity at the local level? Was there increased support for STEM involvement among state library leadership? Was there increased awareness of STEM resources among key staff (particularly the STEM Liaison) and increased confidence in the delivery of STEM support to local libraries? Did the state libraries begin to build STEM support into state-level plans and reporting? Was a plan in place to sustain the Clearinghouse and STEM Liaison functions by the end of the project?

3. **Were the initiative's efforts successful in building the capacity of the pilot local libraries to serve as science resource centers in their communities?** By the end of the initiative, did local library leaders and staff see the value of STEM programming in serving their communities? Were library staff members more confident in using the new STEM resources and in delivering STEM-related programs and services in their community? Were those changes in attitudes reflected in the development of local STEM plans and an increase in STEM-related activities at the local libraries?

4. **Did the initiative's efforts have an impact on the STEM literacy of library users in the pilot communities and on support for the library as a STEM resource?** Did the activities at the pilot local libraries increase participation in library-sponsored STEM activities and increase use of STEM-related books and resources? Did the library programs result in increased STEM interest and understanding (i.e., STEM literacy) among program participants? As a result of the initiative, were community members more likely to recognize the library as a STEM resource for the community and to support expansion of that role?

5. **Finally, what lessons were learned through the initiative that can inform efforts to adopt the model in other states and communities?** What did the key stakeholders in the initiative learn about what worked well and what needed to be done differently? What recommendations would they make for changes in the Clearinghouse, professional development, and other key strategies as this effort moves forward?

To address these questions, Brandeis undertook a variety of data collection activities. Key strategies included:

- **Baseline and follow-up interviews with state and pilot library stakeholders.** Brandeis conducted baseline site visits in early 2016 and "end-of-program" site visits in Spring 2018, supplemented by additional telephone check-ins, discussions at cross-site initiative meetings, and participation in selected local planning meetings. Site visits generally included interviews with library leadership and staff, as well as trustees, local program partners and other key stakeholders. Brandeis also conducted interviews with state and initiative representatives.

- **Surveys of library staff, workshop participants, and community members/patrons**. The evaluation included baseline and end-of-program surveys of library staff and community members/patrons designed to assess changes in awareness of and support for the library's role

as a science resource center, as well as program feedback surveys collected from participants in STEM-related activities conducted by the pilot libraries under the grant. The baseline staff surveys were administered in mid-2016 as the libraries began to actively engage in local planning efforts; the end-of program surveys were administered in summer/fall 2018 at the end of the initiative. Surveys of library patrons/community members were conducted at the same time. Program feedback surveys were distributed to libraries as they began implementing local programming in 2016 and continued through early 2018. Both the library staff and patron surveys were distributed primarily as online surveys, with links distributed by the pilot libraries through email, newsletters and other public communications. The program feedback surveys were primarily paper surveys distributed at library events.[3]

- **Onsite Observations**. In addition to the site visits, Brandeis staff also participated in the major conferences and professional development events provided by the initiative to the pilot libraries and attended a sampling of local library STEM library events.

- **Activity Reporting Data**. Finally, the evaluation collected monthly activity reports from the Maine and Massachusetts libraries to track the numbers, types and estimated attendance at STEM-related program activities. The monthly reports were also used to track circulation of STEM-related resources (telescopes, resource kits, etc.)

Key Findings
Key findings for the evaluation included the following:

Context
- The pilot libraries involved in the initiative represented a diverse group of institutions, ranging from very small libraries serving rural communities to relatively large urban libraries. As such they provided an opportunity to develop the "Empowering Libraries" model in a variety of settings. Within the libraries, staff and leaders had limited experience in STEM at baseline. The majority were positive about the goal of increasing STEM capacity, but only moderately confident in their ability to serve effectively as facilitators of STEM information and learning. Library patrons, on the whole, were supportive of their libraries but did not view them as significant STEM resources for the community.

Implementation

- The initial planning process for the initiative was a major challenge for the pilot libraries. The self-assessment and planning process was slower to roll out than expected and proved to be difficult for pilot libraries to complete, even with a degree of support from the state liaisons. A revised, substantially simplified version of the planning process piloted at the Berkeley Public Library appeared to be more successful, actively engaging a wide array of stakeholders in the planning. Libraries also had concerns about the STEM planning tools that were developed. In general, most reported the need to revise and substantially simplify the local planning process.

- Within that context, however, most of the libraries found the effort to plan and focus their STEM work was beneficial. Despite its difficulties, the planning process was seen as "raising the

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[3] As discussed in more detail later in the report, 138 library staff completed the baseline survey and 85 completed the end-of-program survey; 723 patrons completed the initial patron survey and 383 completed the "post-program" version; 955 adults and young people completed the program feedback surveys. Berkeley Public Library participated in the staff and patron surveys but did not distribute the program feedback surveys as their program activities did not officially begin until early 2018.

bar" for the programming developed by the libraries, increasing the quality of the programs and providing a clearer understanding of the outcomes to be achieved.

- Despite the challenges and delays associated with the planning process, all but one of the libraries ultimately established STEM development plans for their libraries and all of the pilot libraries (including the one that did not complete a formal plan) began integrating an expanded program of STEM activities into their library programming. Based on the monthly reporting data the Maine and Massachusetts pilot libraries conducted 645 programs attended by nearly 9000 people between January 2017 and April 2018. Topics varied widely, and all of the libraries established partnerships with area companies, government agencies, and nonprofit organizations to help sponsor and provide expertise for the new STEM programming.

- The initiative also successfully created an online STEM resource clearinghouse and delivered planned workshops and technical assistance. While there was limited use of the clearinghouse among the pilot libraries, early data indicates active use of the website by the broader library community. Responses from the pilot libraries to both efforts were mixed. While libraries like the idea of a clearinghouse, pilot libraries found the clearinghouse resources of limited value and suggested a clearer focus on identifying organizations and programs that libraries could partner with for local programming (for example, clearinghouse information on local organizations) rather than on STEM activities for libraries to deliver directly. Similarly, while the conference workshops were seen as valuable, library representatives felt they were too basic and that more hands-on technical assistance and more sustained professional development on specific topics (for example, STEM collection development and the STEM planning process) were needed.

Increased Capacity

- Based on the end-of-program site visits and interviews with staff and leadership at the pilot libraries, and on the baseline and post-program surveys of library staff, the "Empowering Libraries" initiative was successful in building the capacity of participating libraries to provide science programming. At the local level, each of the pilot libraries identified ways in which their organizational capacity to serve as a STEM resource center had increased. These included an increased capacity for planning STEM programming, new partnerships, and increased staff knowledge of STEM resources. In turn, library leaders and staff reported an increased interest in STEM programming and an interest in increasing the quality of the programs that they provided. Through the interviews and staff surveys, staff and leaders at the pilot libraries reported an increased confidence in their ability to identify STEM issues of interest and relevance to their communities and to develop programming to meet that need. While none would claim to have become "science resource centers," all increased their interest and capacity to integrate science into their operations. All expect to continue to integrate science topics into their programming.

- 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. The Maine State Library converted the grant-funded STEM Liaison position into a permanent position, increasing their capacity to assist local libraries interested in STEM programming. MSL staff also pointed to increased STEM resources at the state library and an increased awareness of MSL as a STEM resource among other state agencies. 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 going forward with little

change. One conclusion is that the state-level impacts, as with local ones, depend in part on the starting point and context for the initiative, with those just beginning their engagement in STEM more likely to show significant changes in capacity and support than those who had already had substantial STEM programming in place.

Impact on Science Literacy/Interest within Community

- Data from the program feedback surveys and community-wide patron surveys also suggest that the STEM programming developed by the pilot libraries was having an impact on program participants and, to a lesser degree, on the broader community of library patrons. Program participants rated the quality of the new STEM library programming highly, with the large majority reporting that they had learned "a lot" about the STEM topics at the programs they attended and that they were interested in learning more. The broader community of library patrons, which included many who had not attended any library STEM programs in the past year, did report increased borrowing of STEM-related materials, increased us of the library in addressing STEM-related issues, and an increased interest in STEM-related programming for children. However, the overall familiarity of library patrons with the library's STEM capacity showed little change over the course of the initiative.   While patrons did indicate that they were more likely to use the library to learn about STEM, there was little change in the general familiarity with the libraries' STEM programs and little indication of a general change in perception of the library as a STEM center in the community.   It will likely take a longer, sustained effort by the pilot libraries for that change in awareness to percolate through the broader user base.

Lessons Learned

- A number of lessons learned and recommendations emerged from the experiences of the initiative partners and the pilot libraries that can help guide future efforts. At the initiative level, lessons included the need to better communicate goals and expectations of the initiative at the beginning and to provide better guidance/preparation for the state liaisons to better prepare them to assist the local libraries. At the same time, staff at both the state and local level agreed on the need to simplify the planning process to better match library resources. Local library recommendations included: increased professional development for library staff; better defining the balance between "planning" and "doing" and between "doing" the work and "organizing" partners to deliver programming; providing better access to resources, including identifying quality programs and creating databases of local/regional organizations; more help on marketing STEM for the libraries; and developing a separate strategy for smaller libraries.

The report is organized into seven major sections: this introduction; a discussion of the context and starting point for the initiative; implementation at the state level and in the pilot libraries; impacts on the pilot libraries in terms of increased capacity to develop and implement STEM-related programming; impacts at the state level; impacts on science literacy among library patrons; and lessons learned and conclusions.

II. CONTEXT/STARTING POINT FOR THE "EMPOWERING LIBRARIES" INITIATIVE

Background

The "Empowering Libraries" model was an effort to build the capacity of local libraries to serve as STEM resource centers for their communities and increase public access to STEM resources through efforts at both the state and local level.   At the state level, key elements included the identification of a state library STEM Liaison who could work with local libraries to build their skills and expertise and the creation of a set of library STEM toolkits that could be adopted by state library agencies nationally in their work with local libraries.

At the local level, the initiative called for the pilot libraries to undertake a detailed self-assessment process, with the assistance of the state library liaison, aimed at identifying STEM-related strengths and challenges. Each library was then expected to develop a library STEM work plan that would identify a specific area of focus for the initiative (for example, energy or health care) and build a set of programs and resources around that topic. As part of that plan libraries were also expected to identify ways to build STEM capacity at the organizational level, through strengthened planning, new partnerships, and staff professional development. In addition to the state library support, Cornerstones also provided assistance in the form of professional development workshops at each of several initiative-wide conferences, with topics ranging from specific STEM-related resources (technology, maker space, options) to evaluation and fundraising. MSL also contracted with the Space Science Institute to develop a clearinghouse of materials for use by the libraries in developing their local STEM programs.

The "Empowering Libraries" initiative grew out of more than a decade of work by Cornerstones with libraries in Maine and other states aimed at promoting STEM literacy and public access to STEM through public libraries. As outlined on its website, Cornerstones "acts as a catalyst, linking public libraries with scientists to bring science alive in communities. Its programs and resources help people gain direct experiences of science, technology, engineering and mathematics (STEM). Cornerstones of Science provides libraries with the tools and support they need to engage people in experiential learning, reawakening a sense of wonder about the natural and physical world."[4] Based on its experience, Cornerstones identified four key elements that needed to be in place for libraries to become active, engaging science resource center: (a) an innovative library Director; (b) staff with an interest or background in STEM; (c) community partnerships with STEM-related organizations, and (d) external funding to help the start-up process. Another important element of the Cornerstones model was the idea that science is ever-present in everyday life, and that libraries can build STEM interest by making the connection to the science/STEM associated with everyday issues (for example, recycling, water issues, climate change) and activities (cooking, gardening, crafting). The "Empowering Libraries" initiative was designed, in large part, to test how states and local libraries could put this model into operation.

Characteristics of Pilot Libraries

The pilot libraries selected for the initiative represented a diverse group of public libraries. As Exhibit 1 shows, the pilot libraries varied widely, from relatively large urban public libraries (Portland and Berkeley) to medium-sized institutions serving small cities or suburban communities (Auburn, Bellingham, Methuen), to small libraries serving smaller towns and/or rural communities (Bar Harbor, Western Massachusetts libraries). Library staffing ranged from a single full-time equivalent in each of the western Massachusetts libraries, to a staffs of 50 and 113 in the urban libraries in Portland and

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[4] See the Cornerstones of Science website: http://www.cornerstonesofscience.org.

Berkeley. Annual expenditures ranged from under $100,000 per year in several of the small Massachusetts libraries to over $16 million at the Berkeley Public Library. This diversity among the libraries was intentional, with the goal of testing the "Empowering Libraries" approach in a number of diverse contexts.

Exhibit 1: Pilot Libraries, Selected Characteristics

Library	Service Area Population	Registered Users	Total Circulation	Staff	Number of Programs	Annual Expenditures
Maine						
Auburn Public	25544	10197	228,770	16.3	1045	$1,341,011
Bar Harbor (Jesup Memorial)	5394	5948	61,538	7.23	392	$456,362
Portland Public	66937	96418	832,693	49.88	1236	$4,961,733
Massachusetts						
Bellingham Public	16675	8124	117,821	7.87	915	$631,211
Methuen (Nevins Memorial)	48514	25937	241,056	22.53	1059	$1,564,554
Western Massachusetts Consortium	7300	4578	143943	5.94	751	$390,474
Erving Public	1796	670	18,655	1.03	45	$66,224
Leverett Public	1861	1482	41,188	1.33	117	$110,572
New Salem Public	1002	573	14,514	1.05	92	$52,844
Shutesbury (M.N. Speer)	1773	1191	38,326	1.43	127	$90,509
Wendell Public	868	662	31,260	1.1	370	$70,325
California						
Berkeley Public	119915	115376	2,043,562	113	3176	$16,338,793

Source: Institute for Museum and Library Services, 2016 Public Library Survey: Library Systems (Administrative Entities), https://data.imls.gov/Public-Libraries-Survey/Public-Libraries-Survey-2016-Library-Systems-Admin/grpq-tgei.

Most of the libraries came to the initiative with at least some prior experience delivering STEM programming: the western Massachusetts libraries had collaborated on an earlier STEAM (Science, Technology, Engineering, Arts, Mathematics) library grant which supported a series of local science-related programs; Bellingham had purchased a seismograph and developed library and school programs in collaboration with the Weston Observatory under another grant; Jesup had a partnership with a local astronomy program and participated in an annual night sky festival. Ultimately, all of the other libraries noted that they had conducted a mix of STEM related programs over the years, most frequently aimed at young children. Most also noted a limited background in science among their staff. Only Portland had an established STEM "team" that looked at science programming across the library or had funds (though limited) to support science programming. In general, the libraries described their prior STEM experience as sporadic, "opportunistic" or "ad hoc." In most cases the libraries noted that their STEM

activities were often the result of individual staff interests or opportunities to access grant funds, rather than a response to clear community interests or the result of longer-term planning.

While their prior experience with STEM was limited, the key stakeholders at the pilot libraries, library directors and lead staff involved in the initiative, were excited about the opportunity that the initiative offered. Across the board, library leaders indicated that they saw the expansion of STEM programming as an important step for the library and part of an ongoing effort to expand the library role in the community. As one library leader noted, STEM was seen as an important area to prioritize: "We want to build muscles around this." Another noted that expanding STEM was a way to help keep the library relevant as science and technology became increasing important in daily living. A third noted: "We see the library as place where people can come on an equal basis – people who would never walk into school, college or labs. In that regard, the Library has an important role as a democratic space to host science learning."
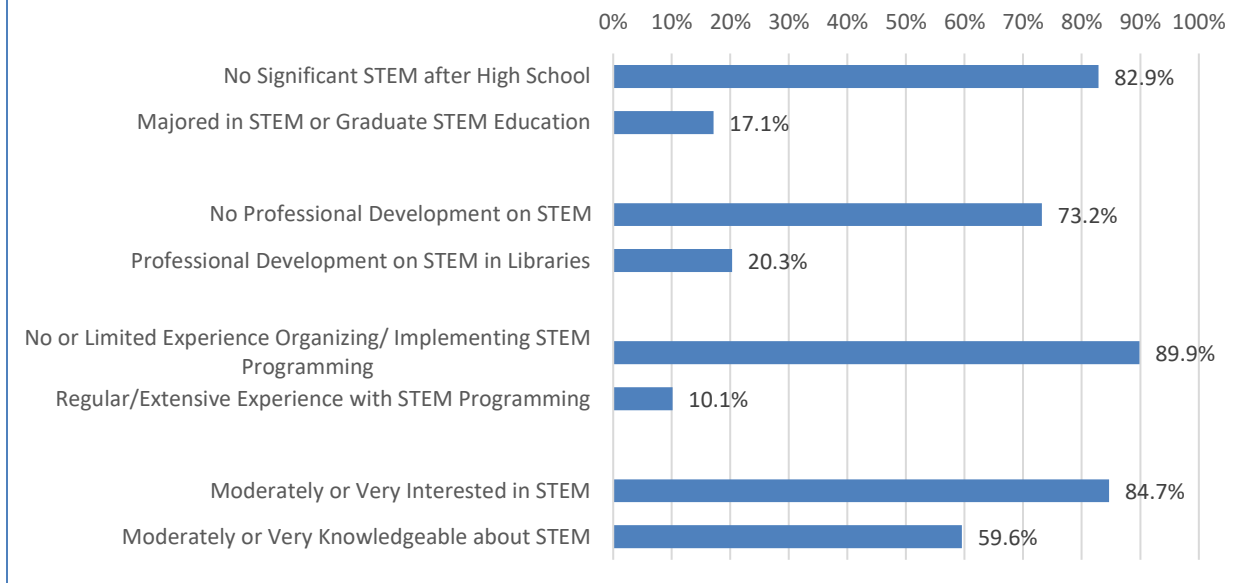
Baseline Staff Attitudes
Among library staffs as a whole, attitudes were somewhat more mixed. The baseline staff surveys indicated that across the libraries, library staff began the initiative with limited prior experience with STEM and only a moderate familiarity with their library's existing STEM resources and programs.   While they supported the expansion of STEM programming at the libraries, they were also only moderately confident about their ability to undertake new STEM-related initiatives.

Exhibit 2 below shows the responses by library staff to the baseline survey questions about their prior experience with STEM.[5] Overall, staff at the pilot libraries had relatively little involvement in STEM prior to this initiative. Roughly 83% of the staff reported that they had no significant STEM education after high school, with 17% reporting a college major in STEM, graduate-level work in a STEM-related field, or a focus on STEM in library school. Only 20% of the survey respondents reported any professional development related to STEM and only 10% reported regular or extensive experience with STEM-related library programming.   At the same time, a substantial proportion of the library staff indicated that they were at least moderately interested in STEM (85%), with 60% reporting that they were moderately or very STEM literate.

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[5] As noted earlier, baseline surveys were distributed to staff at the pilot libraries in mid-2016 as the libraries were engaging in the development of their STEM plans. Library leaders were given the link to the online staff survey, along with paper copies of the survey, and asked to encourage staff members to respond. 138 staff completed the baseline survey, representing approximately 45% of staff members at the pilot libraries.

Exhibit 2
Library Staff STEM Education and Experience
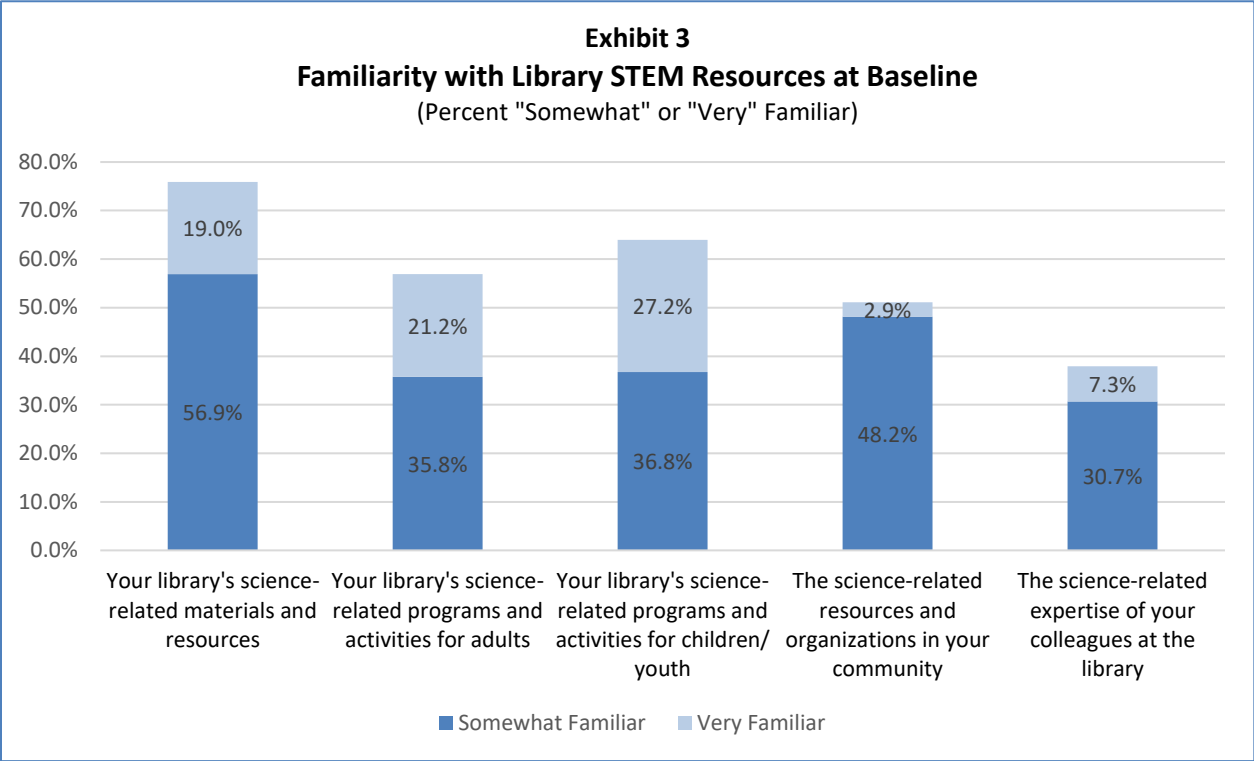**at Baseline**
(Percent)

Category	Percent
No Significant STEM after High School	82.9%
Majored in STEM or Graduate STEM Education	17.1%
No Professional Development on STEM	73.2%
Professional Development on STEM in Libraries	20.3%
No or Limited Experience Organizing/ Implementing STEM Programming	89.9%
Regular/Extensive Experience with STEM Programming	10.1%
Moderately or Very Interested in STEM	84.7%
Moderately or Very Knowledgeable about STEM	59.6%

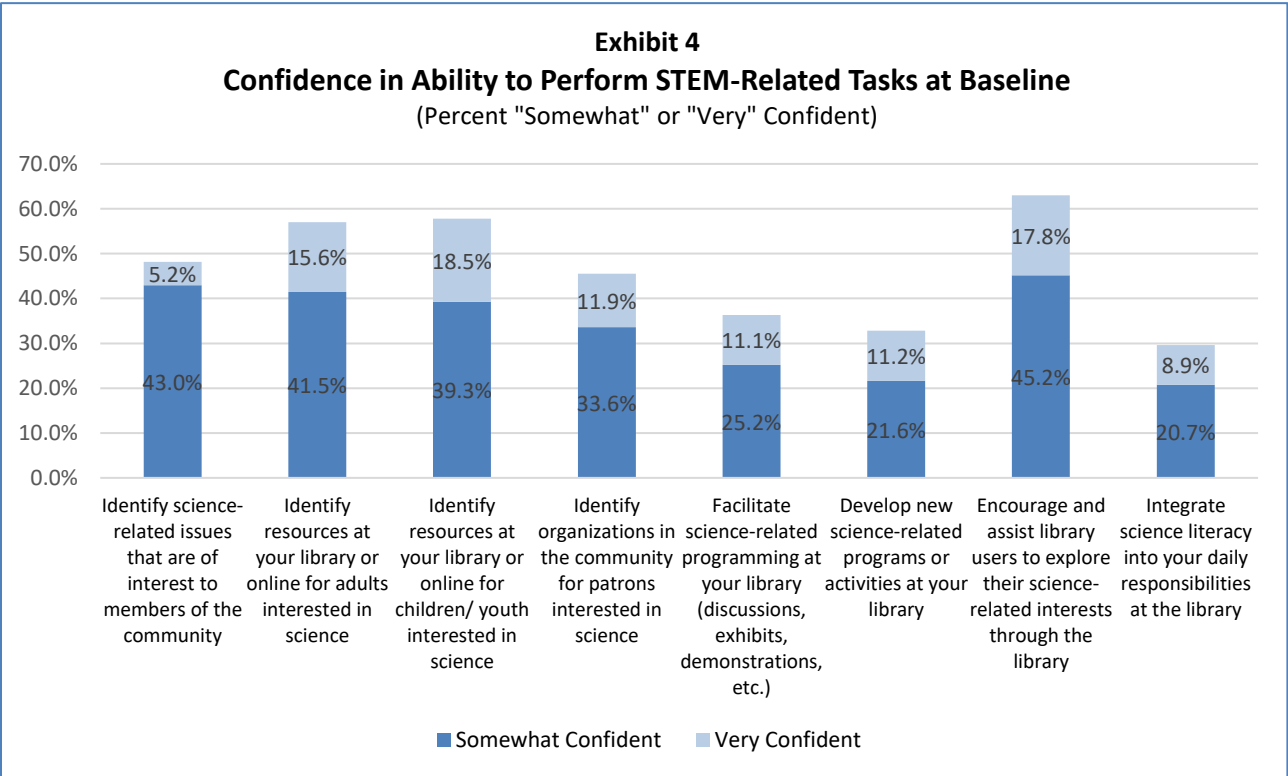*Source: Baseline staff survey, N=138.*

The mix of STEM backgrounds among library staff was reflected in the staff survey responses concerning their level of familiarity with library STEM resources and their confidence in their ability to undertake STEM programming at baseline. As Exhibit 3 shows, while approximately three-quarters (76%) of library staff were "somewhat" or "very" familiar with their libraries' science-related materials and resources and 64% were familiar with STEM-related children's programming, substantially smaller percentages were familiar with the library's science-related programs for adults (57%), the science-related resources and organizations in the community (51%), or the science-related expertise of their colleagues (38%).

Similarly, while more than half of the library staff surveyed at baseline were "somewhat" or "very" confident that they could identify resources at the library for adults (57%) or children (58%) interested in science, or assist library users in exploring science-related interests (63%), fewer than half were confident that they could identify science issues of interest to the community (48%) or identify science-related organizations in the community (46%), and fewer than 40% were confident that they could facilitate science-related programming (36%), develop new programs (33%), or integrate science literacy into their daily responsibilities (30%) (Exhibit 4). In sum, the majority of library staff approached the initiative with relatively modest expectations in terms of the current knowledge of library programming in science or their ability to deliver new programs in the future.[6]

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[6] It is important to note that while library staff expressed limited confidence in addressing science-related programming, they were substantially more comfortable when science-topics were translated into more everyday topics and activities – bees, animals, gardening, cooking, etc.

Exhibit 3
Familiarity with Library STEM Resources at Baseline
(Percent "Somewhat" or "Very" Familiar)

	Your library's science-related materials and resources	Your library's science-related programs and activities for adults	Your library's science-related programs and activities for children/youth	The science-related resources and organizations in your community	The science-related expertise of your colleagues at the library
Very Familiar	19.0%	21.2%	27.2%	2.9%	7.3%
Somewhat Familiar	56.9%	35.8%	36.8%	48.2%	30.7%

Legend: ■ Somewhat Familiar ■ Very Familiar

Source: Baseline staff survey, N=138.

Exhibit 4
Confidence in Ability to Perform STEM-Related Tasks at Baseline
(Percent "Somewhat" or "Very" Confident)

	Identify science-related issues that are of interest to members of the community	Identify resources at your library or online for adults interested in science	Identify resources at your library or online for children/youth interested in science	Identify organizations in the community for patrons interested in science	Facilitate science-related programming at your library (discussions, exhibits, demonstrations, etc.)	Develop new science-related programs or activities at your library	Encourage and assist library users to explore their science-related interests through the library	Integrate science literacy into your daily responsibilities at the library
Very Confident	5.2%	15.6%	18.5%	11.9%	11.1%	11.2%	17.8%	8.9%
Somewhat Confident	43.0%	41.5%	39.3%	33.6%	25.2%	21.6%	45.2%	20.7%

Legend: ■ Somewhat Confident ■ Very Confident

Source: Baseline staff survey, N=138.

Despite this limited knowledge and experience, the majority of library staff members were relatively enthusiastic about expanding the role of the library as a STEM resource center. As Exhibit 5 shows, over three-quarters of staff survey respondents (77%) indicated that they were interested in expanding the use of the public library as a science resource center; 77% agreed that it was important for the library to become a science resource center for the community, and 65% indicated they were excited about integrating science into daily operations. Similarly, three-quarters agreed that they were confident they could learn what they needed to provide science-related programs and services, and a similar percentage (74%) declared they were committed to doing what they could to help the library expand its role into STEM.

Exhibit 5
Staff Interest in Expanding STEM in the Public Library
(Percent "Agree" or "Strongly Agree")
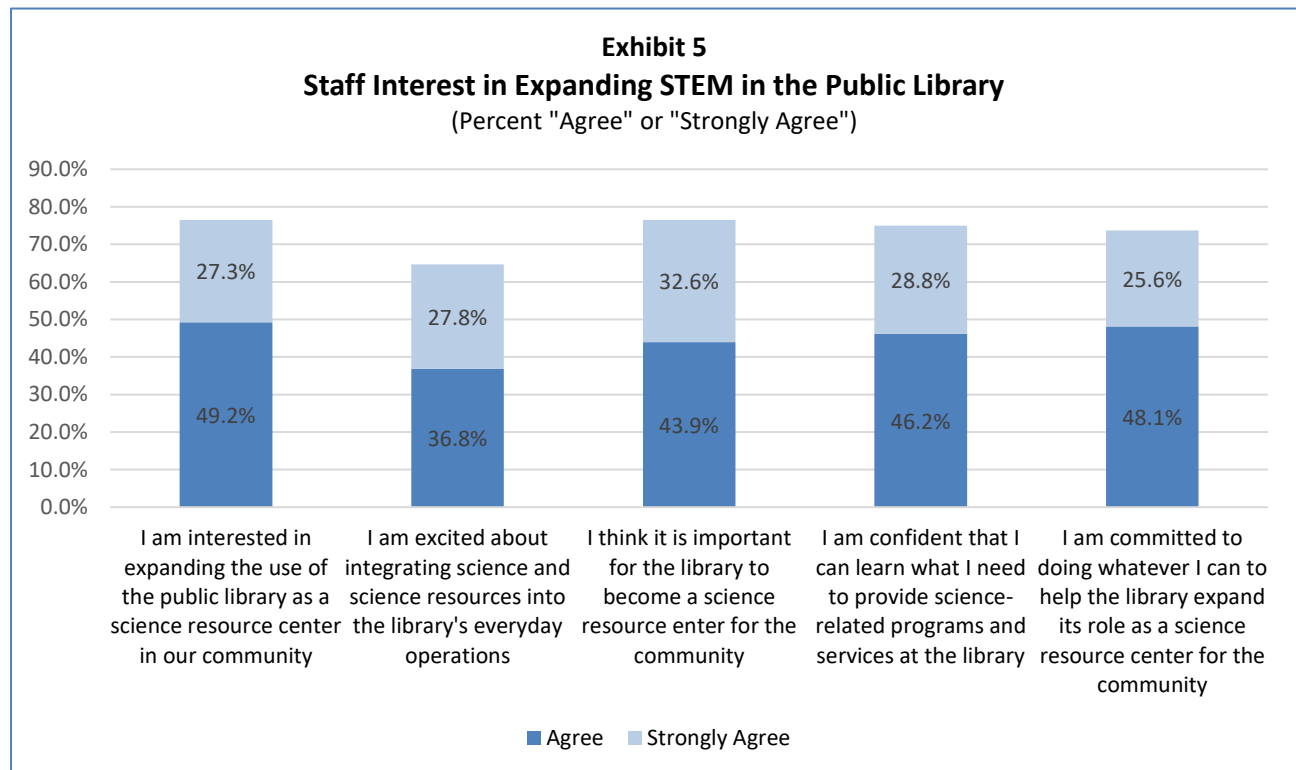
Source: Baseline staff survey, N=138.

For the majority of library staff responding to the baseline surveys, the core message was that they had limited background in STEM, were concerned about their ability to expand their portfolios to include substantial STEM responsibilities, but were willing to try. In large part, based on both the surveys and the initial site visits, most saw the value to their libraries of increasing their STEM footprint if they could figure out how to make it work.[7]

Library Patrons Perspectives at Baseline

For the most part, the broader community of library patrons had only a limited awareness of the STEM resources available through their library at baseline, and while they saw the library as a critical resource for the community, only a small percentage thought that it was seen as a resource for science-related

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[7] It is worth noting that this set of views is consistent with those found by John Baek in his exploratory study of the attitudes of librarians towards STEM: "The Accidental STEM Librarian: An Exploratory Interview Study with Eight Librarians." Boulder, CO: National Center for Interactive Learning, Space Science Institute. October 2013. Available at: http://ncil.spacescience.org/images/papers/Baek_The%20Accidental%20STEM%20Librarian.pdf.

information.   As Exhibit 6 shows, roughly 31% of the patrons responding to the baseline community survey for this initiative reported that they were "familiar" or "very familiar" with their library's science-related materials. Somewhat smaller percentages were familiar with the library's science-related programming for adults (22%) and children (29). Similarly, only 28% of respondents indicated they were familiar with local science-related organizations, and only 12% felt they were familiar with the science-related expertise of library staff.

Exhibit 6
Library User Familiarity with Library STEM Resources
(Percent "Familiar" or "Very Familiar")
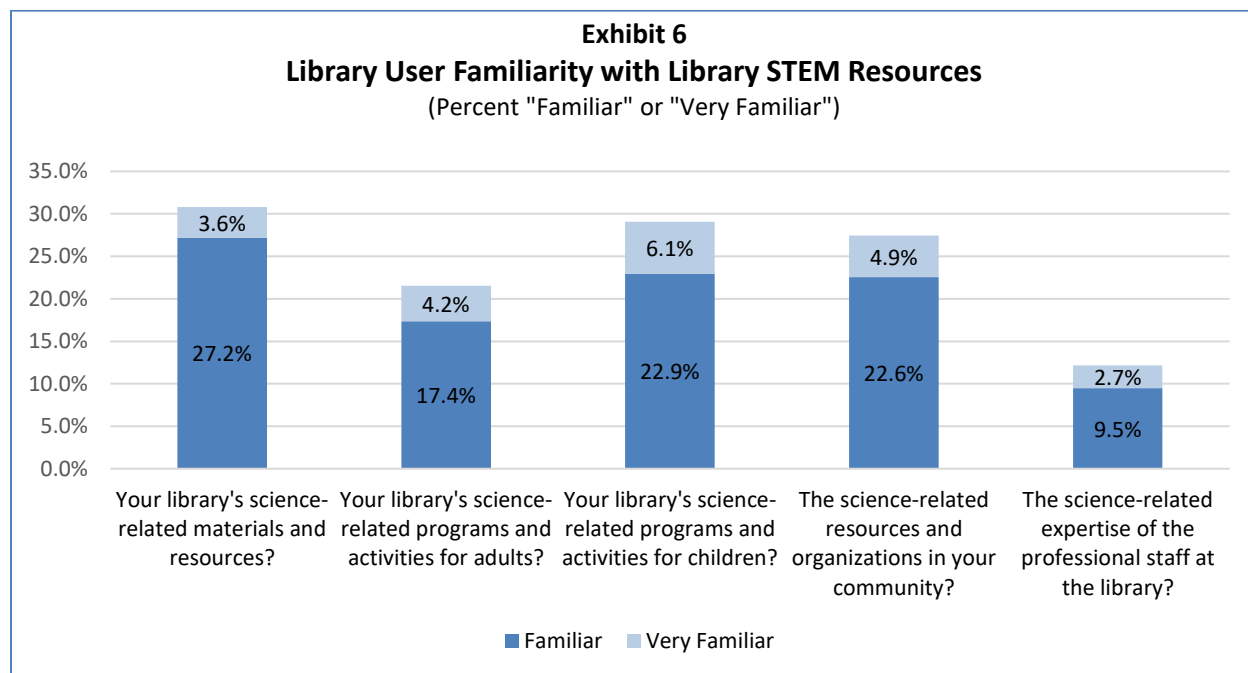
Source: Baseline patron survey, N=723.

As Exhibit 7 indicates, while the large majority of local library users (93%) saw the library as an important resource for the community, only 35% believed that the library was regularly seen as a resource for science-related information. Clearly one of the challenges for the pilot libraries in the initiative was to raise the visibility of the libraries as science resource centers among their patrons.

Taken together, the baseline data highlight the diversity of the libraries involved in the initiative, the limited STEM expertise among staff, offset by a general recognition that it was important to increase the library's engagement in STEM and to build awareness in the community of the library's role and capacity.

Exhibit 7
Library User Perceptions of the Library as Community Resource
(Percent "Agree" or "Strongly Agree")
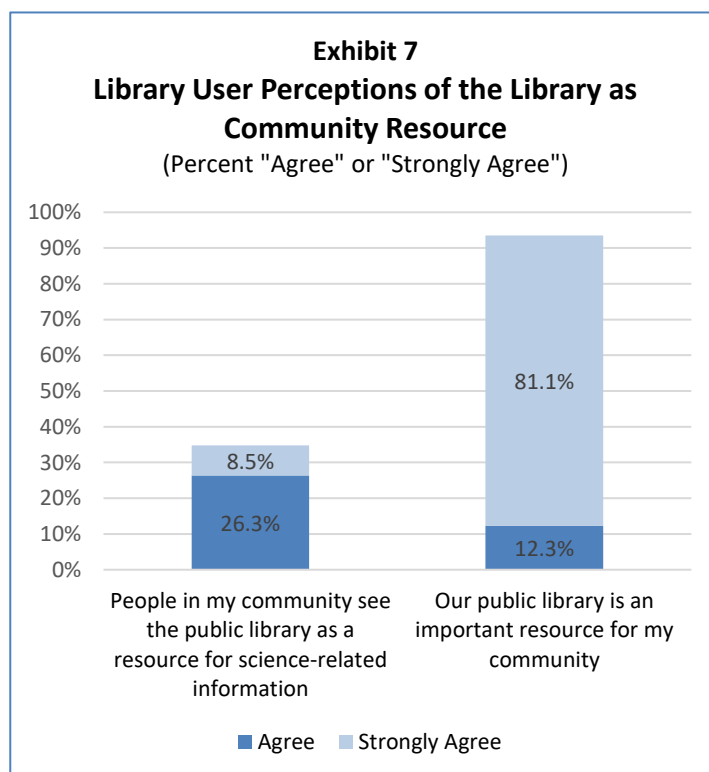
Source: Baseline patron survey, N=723.

III.   IMPLEMENTING THE "EMPOWERING LIBRARIES" INITIATIVE

The implementation of the "Empowering Libraries" initiative at the pilot libraries took place at several levels (initiative, state, and pilot library) and in two broad phases: an extended self-assessment and planning phase, followed by program implementation at the pilot libraries. At the state level, at the beginning of the initiative, both the Maine and Massachusetts state library agencies established STEM Liaison position as planned to provide ongoing support for the pilot libraries. Between the July 2015 start-up and mid-2016, the leadership team for the initiative (Cornerstones, Maine and Massachusetts library representatives, and outside consultants) then developed and implemented a library self-assessment process and a set of STEM planning tools for the pilot libraries. The self-assessment process was designed to help the pilot libraries identify their strengths and challenges, both in terms of STEM expertise and the capacity to lead and manage a shift in focus for the library. The self-assessment tools developed by the initiative were to be completed by library leadership, staff, trustees, and selected patrons with the goal of providing multiple perspectives on the library capacity. Once the assessments were completed, the libraries were expected to work with the STEM Liaisons from the state library agencies to develop a local library plan that would include strategies for introducing new programming around a major STEM topic, the recruitment of partners, and efforts to build the capacity of library staff for sustained STEM programming.   Designed as a pilot test, the lessons from that process would then be translated into a guide for state library agencies and local libraries that could be shared nationally. Finally, once the local plans were completed, libraries would receive supplemental funding and were expected to implement new programming in accordance with their plans.

A number of initiative-level activities in addition to the development of assessment and planning tools were designed to support the local planning and implementation process, including the development of an online clearinghouse of STEM-related activities and resources, a national assessment of the capacity of State Library Agencies to support STEM, and regular cross-site meetings and professional development workshops for the pilot libraries.[8]

State Level Implementation
Both the Maine State Library and the Massachusetts Board of Library Commissioners implemented the key element of the state strategy – establishing a state STEM Liaison position to work with local libraries – but in very different ways, reflecting each states' history of work with public libraries. In Maine, the MSL organized a team of two existing staff to work with the initiative, MSL's Director of Library Development, one of the state's experienced library Consultants, and brought in a third staff person with a STEM background to serve as the official STEM Liaison. Different members of the team took on different roles: the Director dealt with administrative issues related to the grant and was involved in developing and reviewing the various products being developed by the initiative. The Consultant and STEM Liaison worked more directly with the libraries, with the Consultant helping libraries with the assessment and planning process and the STEM Liaison focusing on bringing STEM-related programming to the libraries and demonstrating activities that the libraries could adopt. At the time, MSL was in the process of redefining the roles of the state library Consultants, and this division of labor reflected a somewhat new way of doing business.[9] As the Maine libraries struggled with the planning process

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[8] A key outcome at the initiative level (beyond the scope of this evaluation) was the development of a series of library guides and toolkits to make the strategies and lessons learned from the initiative available to other states and local libraries.

[9] MSL's library consulting staff had previously be organized by geographical regions, with each consultant serving libraries in a defined territory. The new approach gave consultants a topical focus.

(below), the state staff ultimately took on the responsibility of directly helping to draft the local plans in collaboration with the pilot libraries.

In Massachusetts, the state's Head of Library Advisory and Development and the state's Consultant for the Unserved (i.e., special libraries, adult literacy, etc.), both based at the Massachusetts Board of Library Commissioners, represented the initial team for the initiative. The Head of Library Advisory and Development dropped out of the project as a result of health issues and was never replaced, so the primary responsibility as STEM Liaison was taken on by the Consultant. In contrast to Maine, where the STEM Liaison was relatively inexperienced, the Massachusetts Liaison was a long-time practitioner with more than 30 years of experience working with libraries on an array of grant-funded programs. Her areas of responsibility already included management of an existing STEM grant program (using federal Library Services and Technology Act (LSTA) funding) and she had worked with all three of the Massachusetts libraries on prior grants. As such, both she and the libraries she worked with had prior experience doing grant-related planning and could use that experience in working through the "Empowering Libraries" planning process. At the same time, with multiple areas of responsibility, her time was limited: she was available to the libraries when they needed help, but limited in her ability to do regular outreach.[10]

Planning Process at the Pilot Libraries

The first phase of the initiative was focused on the initial assessment and planning process with the pilot libraries, and by all accounts, that process was challenging. The development of the initial set of assessment and planning tools took much longer than originally anticipated, so that libraries that entered the initiative in mid-2015 were still completing their assessments into mid-2016. In most cases, libraries were not able to develop or implement their local plans until late 2016 and early 2017. Moreover, from the libraries' perspective, the assessment process and planning tools themselves proved to be more complex and time-consuming to follow than anticipated. Libraries complained that the goals and expectations for the initiative had not been clearly communicated and that plans and deadlines regularly changed. Though the assessment process was ultimately revised in response to the library feedback, the local libraries in many cases had become increasingly frustrated with the process. In varying degrees, the libraries reported that the time involved in the planning as originally conceived was too great, that the initial tools were too abstract, "academic," and difficult to use, and the degree of support provided for their local planning was less than needed. Once they began developing their local plans, libraries expressed mixed feelings about the instruction to focus on a single STEM topic; some were also particularly frustrated by the effort to frame their plans within a logic model format with limited help or instruction. Exhibit 8 provides a sampling of some of the feedback collected through interviews and focus groups with the pilot library planning teams.

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[10] The STEM Liaison noted that she did bring the Massachusetts pilot libraries together to talk through the project and the planning process and organized meetings for the group at state library conferences; she also visited each of the libraries at least once each year as part of the project.

Exhibit 8

Confusion about process.
- "Project wasn't clear about the demands of the planning process at first. We didn't know what we were getting into."
- "Timeline and emphasis kept changing." "Felt like a moving target." "We were never clear if we were on deadline or not."
- "The critique of the draft plans did not feel helpful. We know what we are doing – this said all we knew was wrong."

Lack of clarity about goals
- "We felt like the message was that we should become a science library, that this should be the 'be all and end all' – that just didn't fit."
- "The project was different from what we expected. We thought it would be a pilot for a newly developed set of programs. It turned into an effort to create new programs from scratch – a whole different ballgame."

Out of scale for small libraries (and large)
- "I had real concerns about the pre-assessment. Too cumbersome. If the question is how best to get community input, the answer is not a questionnaire."
- "30 page plans don't work for small libraries – it is out of scale. You need less complicated paperwork, 1 page reports, money for administration."
- "We spent hours working on this – wasn't clear why, or whether it was worth the time – disheartening."

Single topic focus felt too rigid
- "Small libraries have to be opportunistic and responsive to community. There needs to be room for that."
- "I would have preferred one topic per quarter. One topic per year, even a broad one, felt restrictive."
- "Single topic was OK, but don't underestimate what libraries are already doing. The big shift was to think of science in every day life. But there wasn't appreciation that we were doing a lot already."

Logic model was difficult without help
- "We put huge time and energy into it, but never felt comfortable. Lots of information on line, but hard to figure out what is 'right'."
- "This is alien to public libraries. We needed help figuring out what was good enough."
- "We struggled with the logic model – it was not my thing. Felt it was jargon and over my head. Needed something simpler, more like a flow chart."
- "This would have been easier if someone facilitated the process or the libraries worked on it together."

Timeframe too short
- "For small libraries, it always takes longer than you think."

While the experience with the planning process at the initial pilot sites was difficult, by the time the Berkeley Library joined the initiative in mid-2016, the assessment and planning process had been substantially revised and streamlined, leading to a much more positive experience. While the original process involved having library directors, staff, trustees and a sampling of patrons complete a relatively rigorous set of assessment questionnaires which were analyzed by the initiative's leadership team, the Berkeley process brought together a working group of library staff who developed a data collection process that involved conducting interviews with key library stakeholders and jointly reviewing the findings. The result was a strong sense of engagement among participating library staff and a sense of shared ownership of the results. Among the initiative leadership, but Berkeley experience was seen as

helping to validate the importance of some form of assessment while pointing to the benefits of a more hands-on, user-friendly approach.

While all of the libraries found the process to be challenging (and often frustrating), they also acknowledge that the self-assessment and planning process, once simplified, provided an important opportunity for self-reflection and focus. As highlighted by the quotations in Exhibit 9, the pilot libraries recognized that they often developed programs on an *ad hoc* basis, responding to short-term opportunities or staff interests, rather than working to identify a specific community interest or issue as a point of focus. The planning process encouraged them to take a more intentional, less opportunistic approach to programming. They also noted that, despite its challenges, the use of a logic model helped to focus their planning on intended outcomes and not simply on planned activities. In that regard, the libraries reported that the planning process, while challenging, had helped them to move towards a planning process that would serve them well in the long run.

Exhibit 9

Improved program quality
- "Being made to think through a plan was a plus. We had [planning experience], but we hadn't taken this kind of intentionality – putting how and why on paper was new. It led to better, higher quality programming."
- "The planning forced us to go back and look at objectives – be clearer about what our goals were. The logic model was particularly helpful."
- "The library field is moving to do this kind of pre-planning, so this project coincided with the need to invest in planning."

Logic model emphasis on audience, assumptions, and outcomes
- "The time we spent talking about outcomes has informed our work. We want to do more thoughtful planning. Discussion of outcomes is hugely important."
- "For us, the overall logic model was more useful than individual program ones. That really guided our planning and the question we ask users: 'What did you learn?'"
- "Liked the 'assumptions' part of logic model – brought to the fore assumptions about values and priorities: for example, are we promoting the library or impacting the community?"

Focus on single topic
- "Single topic was OK, but should have known earlier; started with broader idea of STEM."

Implementing STEM Programs

Despite the challenges and delays associated with the planning process, all but one of the libraries ultimately established STEM development plans for their libraries and all of the pilot libraries (including the one that did not complete a formal plan) began integrating an expanded program of STEM activities into their library programming. Based on monthly activity reporting data provided by the libraries, the Maine and Massachusetts pilot libraries conducted 645 programs attended by nearly 9000 people between January 2017 and April 2018 (Exhibits 10 and 11). Every library introduced a regular program of STEM activities during the grant period, with libraries averaging 7 programs/activities per month with an average of 100 participants per month.[11]

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[11] Berkeley, which entered the initiative in mid-2016, had not started its programming in 2017 and did not participate in the monthly reporting.

The programs and activities varied widely among libraries, reflecting the different topics that each library had selected for its primary focus:

- Auburn Public Library focused its efforts on activities relating STEM to economic development, including "Tech Tuesdays" and a summer engineering program for young people.

- Bar Harbor's Jesup Memorial Library developed a program focused on genetics, building on a new partnership with the Bar Harbor-based Jackson Labs, one of the nation's largest genetics research organizations. Bar Harbor also adopted a second focus on astronomy, partnering with the regional astronomy association and sponsoring a major "Night Sky" festival.

- Bellingham Public Library focused on issues related to energy and sustainability, organizing programs on recycling, alternative energy, tiny houses among other energy-related topics.

- Berkeley, which began is planning later than the Maine and Massachusetts libraries, kicked off its activities in early 2018 with a range of "Launch week" activities including science cafes, virtual reality demonstrations, and STEAM activities (arts integrated into STEM) in the main library and its branches.

Exhibit 10
Total Program Activities by Library

Exhibit 11
Total Program Attendance by Library

- Methuen's Nevins Memorial Library adopted "Air, Sea, and Sky" as its theme and produced an array of programs and activities ranging from a star party to a display and presentation on water quality in partnership with a regional watershed protection organization.

- Portland Public Library created a workshop series on sustainability with films and presentations, established a seed library (also with a focus on sustainability) and organized an annual "Makers Fair."

- The Western Massachusetts libraries, focused on health and nutrition, created programs on mindful eating, strength training for seniors, yoga, and nutrition, among others.
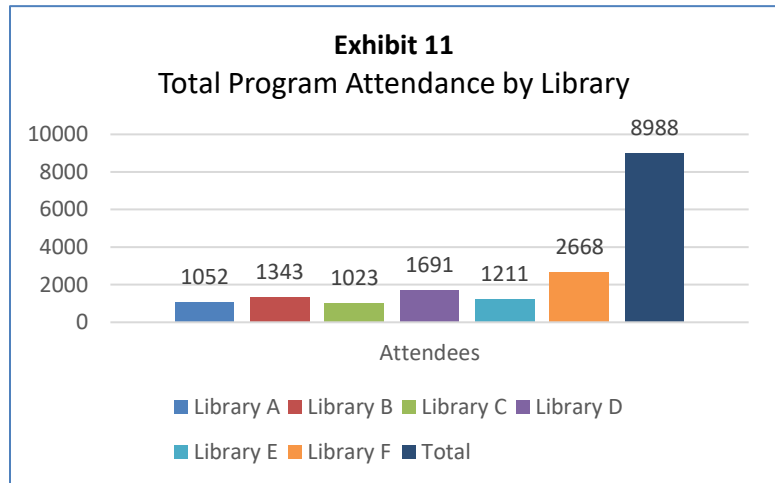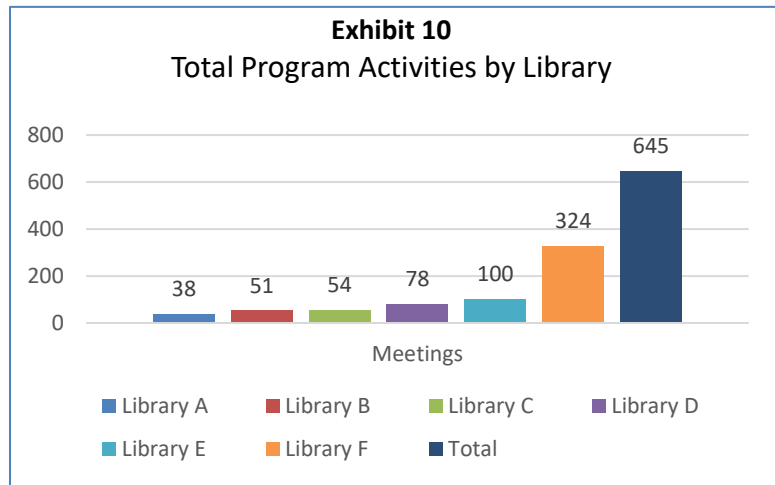
Exhibit 12 lists examples from each library.

Exhibit 12

Auburn
- Eclipse Presentation/Party
- LEGO Club
- Family Math Literacy
- Tech Tuesday
- Summer of Science - Engineering

Bar Harbor
- Dogs of MDI – DNA Series
- "True Science" presentation
- Acadia Astronomical Society Meetings
- Night Sky Festival
- Girls Who Code Club

Berkeley (Launch Week)
- Planetarium Show
- LEGO in the Library
- Virtual Reality Demonstration
- STEAMBreakers (Arts and Science)
- Popping the Science Bubble: Conversations with CAL Scientists

Bellingham
- Tiny Houses/Sustainability Presentation
- Electric Car Presentation/Car Show
- Community Science Fair
- Alternative Energy Fair
- Recycling Workshop

Methuen
- Star Party
- Solar Eclipse Party
- Great White Sharks Presentation
- Weather Presentation
- Merrimack River Watershed Display/Presentation

Portland
- LEGOs Clubs
- Makers Fair
- Sustainability Series – Films, Presentations
- Technology Tutoring
- Seed Library/Presentations

Western Mass
- Mindful Eating
- Strength Training for Seniors
- Healthy Cooking for Kids
- Nutrition – Gut Bacteria
- Technology Workshops

In addition to their regular programs, most of the libraries took advantage of the solar eclipse that took place in August, 2017 to organize special events. Methuen and Auburn, as examples, organized Solar Eclipse parties at the libraries, and a number of the libraries reported giving away hundreds of pairs of shaded glasses for use in viewing the eclipse.

In developing these programs, all of the libraries established partnerships with area companies, government agencies, and/or nonprofit organizations who helped sponsor and carry out the new STEM-related programming. Bellingham, for example, partnered with the town public works department for its workshop on recycling, found an area architect with a specialization in tiny house design for its program on tiny houses, and partnered with the New England Electric Automobile Association for its car show and presentations. Bar Harbor established a significant partnership with leadership at Jackson Labs, who not only provided scientists and support for library programs on genetics, but also joined the library board. Methuen developed a partnership with the Merrimack River Watershed Council to create a series of displays and a presentation on water quality on the Merrimack River and worked through the regional community college to identify expert speakers for other programs. Plans called for the watershed exhibits to be shared with other libraries up and down the Merrimack River. Portland worked with a number of conservation organizations on its sustainability-related programs, including the Southern Maine Conservation Collaborative and the Scatterseed Project. The western Massachusetts libraries partnered with local Councils on Aging and a regional health and nutrition expert for its programs.

Libraries also reported expanded circulation of STEM-related (non-book) resources, including telescopes, microscopes, science kits, technology kits (such as Makey Makey and snap circuit electronics kits), and wireless hot spots.   Reporting from the Maine/Massachusetts pilot libraries indicated that STEM-related tools and kits were borrowed over 425 times during 2017 and early 2018, with an average of 5.7 resources borrowed per month per library.[12]

As discussed further below, across the board the pilot libraries reported an expanded focus on STEM-related programs as a result of the initiative and a substantially more intentional and consistent approach to building STEM-related programming into their operations. The result was a substantial increase in the amount of STEM-related programming among all of the libraries and an increased awareness of how STEM could be integrated into the library programming.

Clearinghouse Implementation

One of the other major elements of the "Empowering Libraries" model was the creation of an online clearinghouse that would link libraries to STEM-related activities and resources. The Clearinghouse was designed and implemented by staff at the Space Science Institute in conjunction with its national programs aimed at bringing STEM resources to public libraries. When completed at the end of 2017, the Clearinghouse had compiled a collection of just under 200 indexed activities ranging from engineering-related activities (rocket cars, levers, building projects, wind turbines, etc.) to projects exploring earth science (clouds, oceans, planting, etc.) and astronomy. Perhaps reflecting the origins of the clearinghouse at the Space Science institute, roughly half of the activities in the clearinghouse were related to astronomy and space.

Use of the Clearinghouse by the pilot libraries during the course of the initiative was limited. As of late 2017, usage statistics from the clearinghouse indicated that the pilot libraries had accessed the clearinghouse only occasionally, with the heaviest activity in preparation for the August 2017 solar eclipse (libraries looked up instructions for viewing the eclipse and suggestions for eclipse-related activities). In the interviews at the end of the initiative, library staff noted that they had accessed at the Clearinghouse, but had not made regular use of it. One librarian noted that they found the resources limited, with a heavy emphasis on activities for young children. Several others also felt that the heavy emphasis on children's activities was limiting, that there were a lot of redundant resources, and little focused on adults. A third set of comments expressed the need for the clearinghouse to focus less on activities and more on identifying organizations that could serve as partners for local programming. As one library representative noted, the focus of the clearinghouse was on teaching STEM directly (through activities) while what the libraries needed were connections to outside resources and organizations that they could bring into the library to produce programs. In the end, the idea of a clearinghouse was viewed positively, but most of the pilot libraries advocated for more of a focus on identifying resources that could be accessed on a regional or local basis.[13]

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[12] As noted earlier, Berkeley was still in its planning phase during this time period and was not included in the monthly reporting. One other library reported on its STEM-related program activities but did not report circulation of STEM resources.

[13] While use of the Clearinghouse by the pilot libraries was limited, there was more active use by the library community nationally. According to the Space Science Institute report on Clearinghouse development, in 2017 the Clearinghouse had 125,027 page views, with 69,199 unique users and 80,603 unique sessions (visits). See Holland, A. (n.d.). "STAR Net and Cornerstones of Science STEM Activity Clearinghouse IMLS Final Report." Prepared by the Space Science Institute. Available from Cornerstones of Science.

Technical Assistance Activities

In addition to developing the Clearinghouse, the initiative plans called for technical assistance to the pilot libraries through two sources, the state STEM Liaisons, who were expected to work directly with the pilot libraries, particularly in support of the self-assessment and planning process, and workshops at regular cross-site meetings and/or regional conferences. As with the Clearinghouse, feedback on the technical assistance support was mixed, with the general response that more hands-on support was needed by the pilot libraries in both planning and implementing their programs. While the libraries were appreciative of the efforts of the state STEM Liaisons (one site noted that their liaison "came and talked us off the ledge" during the difficult planning process), all felt that they could have benefited from more instruction and support in developing their local plans. State and initiative staff also noted that more training in advance on both the planning process and STEM literacy might have made the assistance available through the STEM Liaisons more effective. Similarly, while the conference workshops were seen as valuable, several of the library representatives felt that the workshops were too basic for an experienced group of librarians. Others saw the need for more sustained professional development on specific topics, including STEM collection development, integrating technology into library programming, and strategies for building STEM into small libraries with limited staff. One librarian also argued for more regular, face-to-face professional development across different categories of library staff (children's, adult, technical staff, etc.): "I want a regular program, four or five workshops over six months, that gets librarians out of their silos." Though the specifics varied from library to library, the broad conclusion was that more professional development help was needed to help the libraries take full advantage of the initiative opportunity.

Summary

As noted at the beginning of this section, the implementation of the "Empowering Libraries" initiative was challenging, but ultimately succeeded on most fronts. While the self-assessment and planning process initially developed for the pilot libraries proved more difficult than expected, and was substantially revised, the value of engaging the pilot libraries in an organized planning process was recognized by all involved. All of the libraries then successfully implemented new and expanded efforts to integrate STEM into their programs and operations: developing and delivering new programs addressing STEM-related topics, building new partnerships, and ultimately drawing in new audiences. In that regard, the goals of the initiative in terms of an expanded focus on STEM were largely met, and as discussed further below, the implementation of these programs changed the ways in which the pilot libraries saw their roles as STEM resources in the community.

IV.   IMPACTS ON THE PILOT LIBRARIES

A key goal for the initiative was to build the capacity of the pilot libraries to serve as STEM resources for their communities. Based on the end-of-program site visits and interviews with staff and leadership at the pilot libraries, the state agencies, and initiative leadership, and on the baseline and post-program surveys of library staff, the "Empowering Libraries" initiative was successful in building the capacity of participating libraries to integrate science programming into their ongoing operations. While none of the libraries felt ready to declare themselves "science resource centers" for their communities, all identified an increased commitment to STEM-related programming and an increased capacity to plan and deliver STEM-related programming. Library leadership and staff voiced increased confidence in their ability to bring STEM-related programming into the library and believed that the initiative had increased the quality of the programming they provided. The initiative also prompted the formation of new partnerships, encouraging the libraries to reach out to local organizations, and had broadened participation in library programs within the community. Surveys of library staff reflected these changes, showing an increased awareness of the library's STEM capacity and increased confidence in the capacity of the library to deliver STEM programming. Finally, a number of the libraries noted that the initiative helped enhance their position in the community, raising awareness of their value as a resource and broadening their support and engagement in the community.

Increased Interest in STEM Programming

The most evident impact of the initiative, based on the interviews with library leadership and staff, was to increase the interest of the pilot libraries in producing STEM program: in the words of several, "putting STEM on the library agenda."   As the quotations in Exhibit 13 indicate, the initiative helped the pilot libraries think about STEM in new ways, broadening their understanding of what kinds of topics STEM included and how science could be framed in ways that were attractive to local users.

The initiative also helped the libraries realize that there was an audience for STEM in their communities. As one observer noted, "this reinforced that there is an appetite in the community for STEM." Another commented, "We saw people at the library at STEM events that we had never seen before. Turns out there was an interest in science!"

Exhibit 13

- "This planted science-thinking and got us thinking about science in other areas, other programs. The idea of upping the ante in terms of science programming – with additional support – was pretty cool. This helped us focus and make it happen."

- "As a group, our libraries did expand science capacity and connected with community in new ways."

- "I am excited about making science more accessible: science for girls, people of color, seeing science as a theme. This has pushed me out of my comfort zone."

- "We opened up to STEM, learned a lot, tried a lot. Making the library a STEM center was a reach, but we have more interest in STEM than when we started. We know we can do STEM programming now."

- "Declaring ourselves to be about STEM literacy made us strong to pursue bigger projects – it helps position the library as a model. At the Board level, we are having conversations about building energy efficiency into library operations. In short, we are having a conversation about what a library should be. We knew we wanted to position staff more on STEM, this made it happen quicker."

- Overall, the grant served as a catalyst for work that had already begun – it helped us do it faster, better able to work across the organization. It built momentum for us on science."

- "We went from an *ad hoc* approach to STEM to one that is more organized. Without this project, we would not have done partnerships, reached out and made connections."

The initiative also prompted libraries to take a more organized, intentional approach to STEM programming and to build their planning capacity. Several of the libraries, including Berkeley, Methuen, and Bellingham, pulled together staff teams to develop their STEM plans and conduct organization-wide planning for their STEM efforts. Those teams were often the first time that this kind of collaborative planning effort had taken place within the library. Several of the libraries, including Berkeley and Portland, took to heart the use of logic models as a planning tool for this initiative and have expanded their use to other library initiatives. Staff at Portland noted that "the logic model was particularly helpful in getting us to go back and look at objectives – be clearer about what our goals were." Staff at the Berkeley library noted that, while they were still learning their way around the process, they were using the logic model framework to generate systems-level outcomes, "just to help people be more reflective generally." A member of the Berkeley planning team noted, "The overall logic model for the organization has really helped guide us in planning. That framework has become the template for what we ask users when we want to know, 'what did you learn?'"[14]

In short, what had previously been a relatively *ad hoc* approach to science (based on the interests of a particular librarian or an external event such as an eclipse, became a much more intentional planning process. As one librarian noted, "we've always done some planning, but we hadn't taken it to this level of intentionality – putting how and why on paper was new for our library programming." As a result, the pilot libraries were more likely to see STEM as part of an ongoing series of activities and/or tied into a variety of library events (reading groups, children's programs, workshops or presentations, etc.) and to see the value in a more planful and integrated approach to STEM.

One result, according to a number of those interviewed, was an improvement in the quality of science programming provided through the libraries. As one librarian commented:

> *The big advantage of this program was the focus. It is not about an ad hoc program, but a program series. It allowed us to elevate our programs: more focused, better value. We could have done some of this before, but not as well.*

Another librarian commented:

> *The funding let us experiment, try new things. One example was using funds for a keynote speaker – it led to a larger than expected crowd. People responded to the big name and we had a full house.*

Better programming, several noted, raised expectations for the future: "We have set the bar higher for programming," noted one library representative. Another observed, "We impressed some of our patrons with what we are offering – we picked it up a notch. That's always good!"

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[14] Staff applying for funding for STEM initiatives at the Berkeley Public Library are also now required to provide a completed logic model for their proposed program as part of the funding process.

Increased Confidence in Offering STEM Programming

Another major impact of the initiative was increased confidence among participating staff around STEM programming. In particular, for those most directly involved in the initiative – the library directors and the STEM Liaison or "STEM team" at the pilot libraries – the initiative not only raised an awareness of STEM as having everyday relevance for library patrons, but increased their confidence that they could apply their training and skills to building STEM programs at the library. As the quotations in Exhibit 14 indicate, library staff learned that they did not have to be "a science geek" in order to identify relevant STEM topics or to develop partnerships with STEM-related organizations.   As one noted, "it stretched the staff" and in the words of another, "I am more confident going out to find new partners in science…. Yes! We can do math and science."

In a number of cases, the increased confidence was the result of an investment in staff professional development. In Auburn, as one example, the children's staff reported attending a variety of online and in-person professional development workshops around STEM programming. "We went to webinars on STEM programs. Anytime we heard about programs or workshops, we looking into it, talked out how it would work. The result is that we opened up to STEM, learned a lot, tried a lot. We know we can do STEM programming now."

> **Exhibit 14**
> - "I learned that I can do STEM programming, even if I'm not a science geek. I can be open to STEM, to science, and I will think about science when I do my program planning."
> - "We realized that we don't have to be experts – just make good partnerships. We are moving away from content expertise to expertise in making connections."
> - "This gave us the opportunity to do great programming; gave staff confidence we could do programming on unfamiliar topics – it stretched the staff."
> - "I am more confident going out to find new partners in science. My focus has always been on literature and history, culture. This expanded my thinking to "Yes! We can do math and science."

New Partners

Another result of the increased focus on STEM, as noted above, was the development of new partnerships. In developing their plans, the pilot libraries reached out to town departments, local experts, area businesses, and regional nonprofits to bring new programming into the library. Almost every library offered examples: In Bar Harbor, as described earlier, Jackson Labs helped design and produce a series of programs on genetics; a scientist from Jackson Labs joined the library board, and at the time of the final interviews for the evaluation, the library and lab representatives were working on another year of genetics-related programming at the library. In Portland, the public library partnered with a number of local organizations, including the Southern Maine Conservation Collaborative and the Scatterseed Project for its sustainability initiatives. Bellingham worked with the town Department of Public Works, an architect specializing in Tiny House design, and with groups like the New England Electric Automobile Association for events related to recycling and sustainability. The western Massachusetts libraries partnered with their local Councils on Aging as co-sponsors of programs on senior health and nutrition and worked closely a locally-based profession of exercise physiology to develop yoga classes and other health and exercise related programs. Methuen partnered with a variety of groups for its programs, including the Merrimack Valley Watershed Association on the development of a series of displays and presentations on water-related issues in the Merrimack Valley. Auburn worked with an area university professor and the NASA-funded StarNet Network to develop STEM-related programs.

In some cases, the new partnerships were a continuation of existing library efforts to reach out to local organizations. In most cases, however, the partnerships reflected new outreach efforts. One result was a new sense of confidence in the ability to develop partnerships (noted above) and a new willingness to reach out to area organizations and experts to increase the capacity of the library to address STEM

issues. As one library Director noted, "I valued the emphasis on partnering – getting partners was a good idea. I was intimidated, out of my comfort zone, but being 'nudged' to partner worked – we got good results."
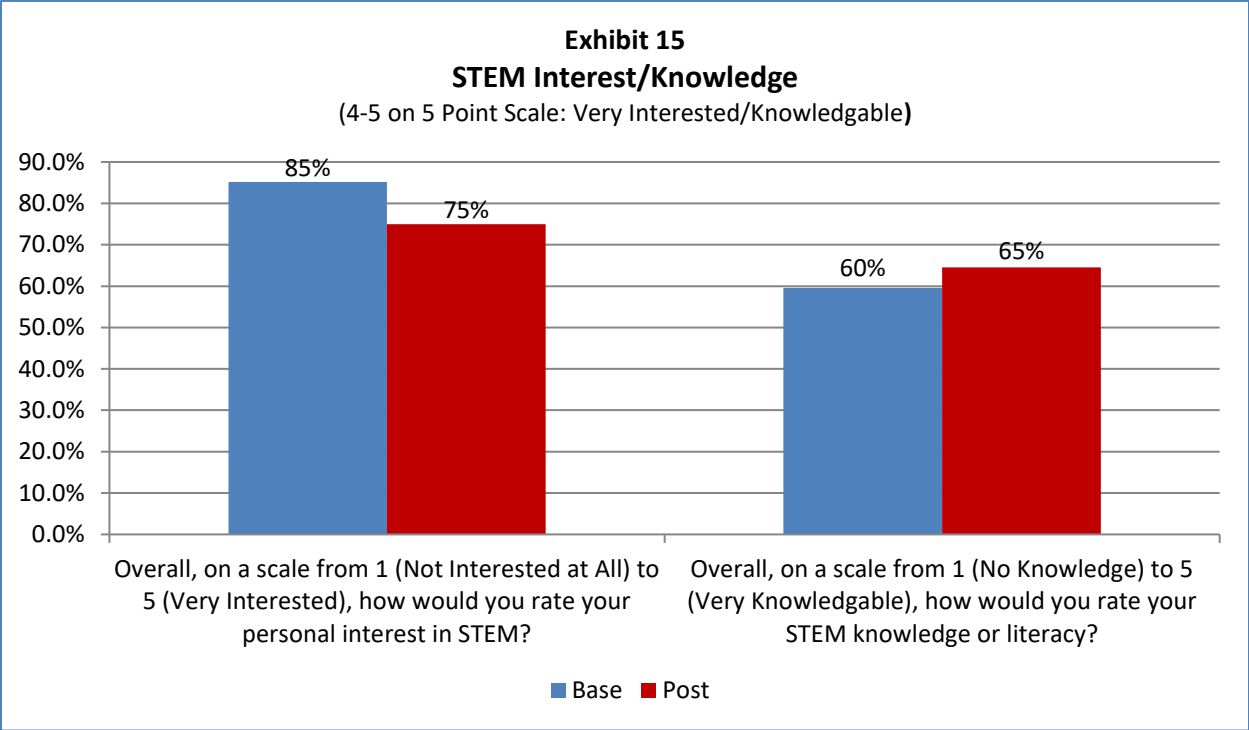
New Visibility in the Community
Finally, a number of the libraries noted that the initiative helped enhance their position in the community, raising awareness of their value as a resource and broadening the support and engagement in the community. As several libraries noted, the ability to offer new programs raised the visibility of the library and attracted new patrons: "our attendance went up"; "we got people we hadn't seen before." At the same time, several library directors observed that the new emphasis on STEM changed how the library was seen in the community. One Director noted, "This has shifted the library in the mindset of the community – reinforced the message that a lot is going on at the library." Another noted that "We were visible before, but this elevates it. We are now seen more as a library of things – telescopes, wifi. People now look more at library programming as a resource." A third observed that "The library was an incubator for community engagement through these programs. There is a new appreciation for what a library can provide." The trustees for this last library agreed: "The library is seen now as a place for learning, access to science and technology. Everyone knows about the telescopes!" Finally, several Directors noted that involvement in the initiative gave the library new status in the community. One noted that being selected to participate in a federal grant impressed community members: "The library must be good to get a grant like this!" Another noted that, "saying we are doing STEM catches the attention of the local government and community leaders. The STEM grant gave us a little credibility. Getting on the STEM train help reposition the library in the community."

Staff Survey Results
The increased interest in STEM programming and the increased confidence among library staff in their capacity to conduct STEM programs is reflected in the staff surveys completed for the evaluation. As noted in the introduction, pilot library staff were asked to complete surveys early in the initiative ("baseline") and at the end of the initiative in mid-2018 ("Post") to assess changes in staff attitudes towards STEM and the expansion of STEM programming in the libraries. 138 staff completed surveys at baseline and 85 at post-program. It is important to note that the surveys are not individually matched pre- and post-surveys, but rather samples of library staff at two points in time. As such they do not assess the average change in the attitudes of individual staff members, but rather the difference in attitudes among staff members as a group at two points in time. The results need to be treated with some caution, since they may reflect differences in who responded to the survey at the two points in time as well as changes in personnel at the libraries. That said, however, the surveys can be seen as reflecting the prevailing attitudes or cultures in the pilot libraries at the beginning and end of the "Empowering Libraries" process.

Within that context, the survey data point towards two major conclusions. First, among the library staffs as a whole (including those not directly involved in the initiative), the data suggest that the initiative did little to change the basic levels of interest in STEM or science literacy. As Exhibits 15 shows, the percentage of staff reporting that they were very interested in STEM showed a slight drop between the early stages of the initiative and the end (from 85% to 75%), while the percentage of staff that characterized themselves as very knowledgeable about STEM rose slightly (from 60% to 65%). Neither of these changes was statistically significant, suggesting that they reflect random variations rather than a real shift in attitudes. Similarly, as Exhibit 16 shows, there was little change over time in the involvement of library staff in STEM-related activities outside of work. In simple terms, the general level of interest in STEM among library staff did not change dramatically as a result of their libraries participating in the initiative.
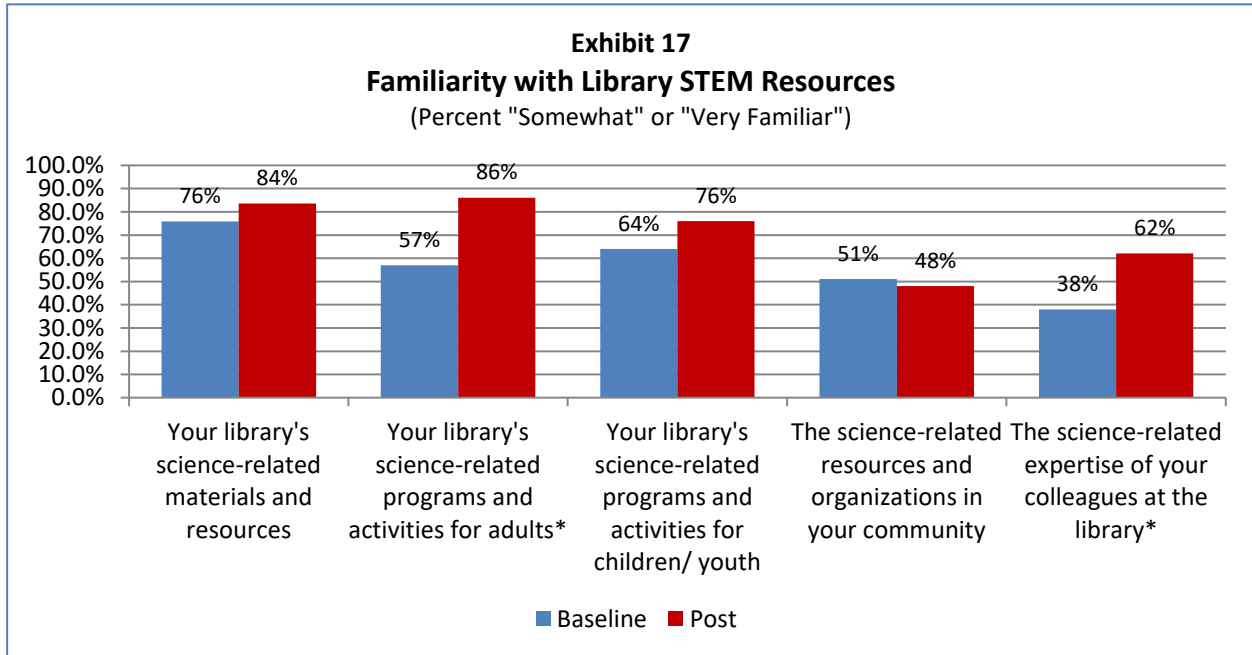
Exhibit 15
STEM Interest/Knowledge
(4-5 on 5 Point Scale: Very Interested/Knowledgable**)**

Legend: ■ Base ■ Post

Overall, on a scale from 1 (Not Interested at All) to 5 (Very Interested), how would you rate your personal interest in STEM? — Base 85%, Post 75%

Overall, on a scale from 1 (No Knowledge) to 5 (Very Knowledgable), how would you rate your STEM knowledge or literacy? — Base 60%, Post 65%

Source: Baseline and End-of-Program (Post) Staff Surveys. N=138 Baseline/85 Post.

Exhibit 16
STEM Activities
(Percent "Likely" or "Highly Likely")

Legend: ■ Baseline ■ Post

Read books or magazines about science — Baseline 71%, Post 69%

Talk with family, friends or colleagues about science and technology — Baseline 82%, Post 83%

Look into news about science, innovation or new technologies — Baseline 79%, Post 76%

Watch programs on science and techynology on television (for example, Science Channel, National Geographic, Discovery Channel) — Baseline 74%, Post 69%

Attend a science-related museum or science-related program/activity — Baseline 57%, Post 58%

Source: Baseline and End-of-Program (Post) Staff Surveys. N=138 Baseline/85 Post.

At the same time, the data do show some important differences in staff awareness of the library's role as a STEM resource and confidence in their ability to support that effort. Exhibit 17 shows the responses to questions about how familiar library staff were with different aspects of the library's STEM programs and resources. In all but one case (science-related resources and organizations in the community), library staff were more likely to indicate that they were familiar with programs and expertise at the end of the initiative than at the beginning, and on two of the items – familiarity with the library's science-related programs for adults and the science-related expertise of colleagues at the library – the change from baseline to post was statistically significant (that is, unlikely to be just a random variation).

Exhibit 17
Familiarity with Library STEM Resources
(Percent "Somewhat" or "Very Familiar")

Source: Baseline and End-of-Program (Post) Staff Surveys. N=138 Baseline/85 Post.

Staff confidence in their capacity to address STEM issues also showed gains from the beginning to the end of the initiative. As Exhibit 18 shows, staff were more confident in their ability to identify science-related issues, resources for adults and children, and organizations in the community for patrons interested in science. All of those differences were statistically significant. Staff also reported gains (though smaller and not statistically significant) in their confidence in facilitating science-related programming, developing new science-related programs, encouraging library users in exploring science-related interests, and integrating science literacy into daily responsibilities. While not all of the differences were statistically significant, there is a clear pattern across the items that suggests an overall gain in confidence among staff in addressing STEM-related tasks at the library.

Exhibit 18
Confidence in Ability to Perform STEM-Related Tasks
(Percent "Somewhat" or "Very" Confident)
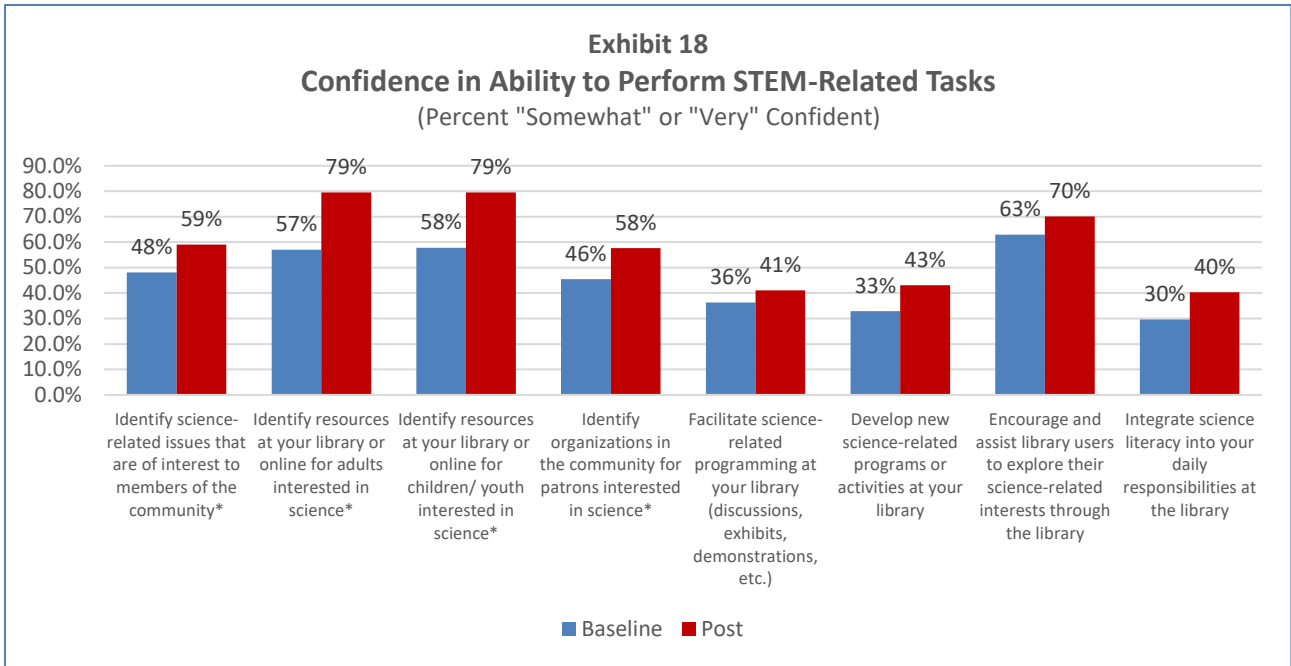
Source: Baseline and End-of-Program (Post) Staff Surveys. N=138 Baseline/85 Post.

Finally, staff interest in supporting the expansion of library involvement in STEM, which was relatively high at baseline, remained high at the end of the initiative. As Exhibit 19 shows, rough 70% of library staff at baseline and post were interested in expanding the use of the public library as a science resource center, and similar proportions were committed to doing what they could to help the library expand that role. Overall, more than three-quarters thought that it was important for the library to become a science resource center, and 60% reported that they were still excited about integrating STEM into everyday operations. While there were small differences from baseline to post, the key message from the data was that support for the STEM mission, which was relative strong at baseline, continued through the initiative.

Exhibit 19
Staff Interest in Expanding STEM in the Public Library
(Percent "Agree" or "Strongly Agree")
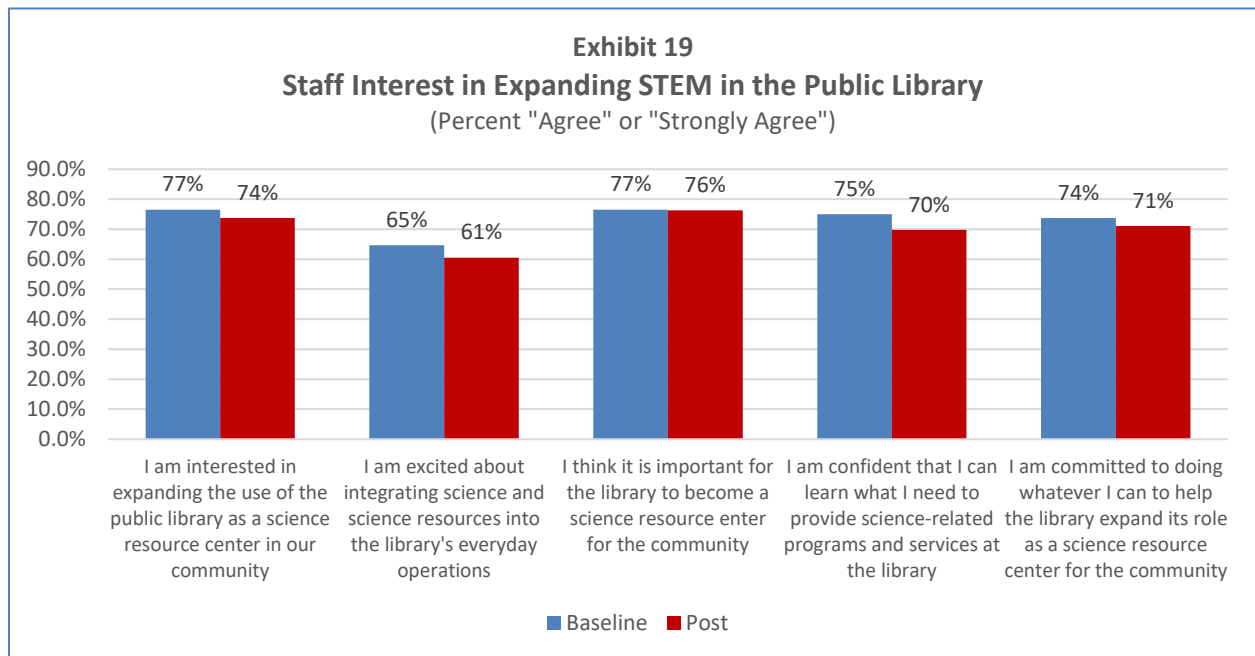
Source: Baseline and End-of-Program (Post) Staff Surveys. N=138 Baseline/85 Post.

Taken together, the interview and staff survey data suggest that the "Empowering Libraries" initiative was successful in building the capacity of the pilot libraries to serve as STEM resources (if not STEM Resource Centers) in their communities. Library leaders and staff reported an increased interest in STEM programming and an interest in increasing the quality of the programs that they provided. Libraries developed new capacity to plan and develop programs through the creation of staff teams, use of tools like logic models for planning, professional development and the formation of new partnerships with a variety of organizations in the community. Staff and leaders at the pilot libraries reported an increased confidence in their ability to identify STEM issues of interest and relevance to their communities and to develop programming to meet that need. Ultimately, all of the libraries reported that the initiative had "raised the bar" while increasing their ability to integrated STEM into the library, and all involved expected to continue to draw on the "Empowering Libraries" experience to provide increased STEM programming at their libraries in the future.

V.   IMPACTS AT THE STATE LEVEL

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 earlier, 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: "I wanted to show that hands-on STEM did not need to be hard, that you could do something simple to start. Everything I showed was bought at the dollar store!"

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. As 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 MSL 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.). MSL's involvement in the initiative "pushed more of a collaboration with the state museum," which looked to MSL 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.

In the end, however, the impacts in Massachusetts were more limited than those in Maine. With a longer history of work on STEM and an established tradition of STEM-related grantmaking, there were fewer opportunities for impacts on interest and capacity in Massachusetts. The conclusion here is that those state-level impacts, as with local ones, depend in part on the starting point and context for the initiative, with those just beginning their engagement in STEM more likely to show significant changes in capacity and support than those who had already had substantial STEM programming in place.

VI.   IMPACTS ON LIBRARY PATRONS/PROGRAM PARTICIPANTS

Data from the program feedback surveys and community-wide patron surveys suggest that the STEM programming developed by the pilot libraries was having an impact on program participants and, to a lesser degree, on the broader community of library patrons. As discussed below, program participants rated the quality of the new STEM library programming highly, with the large majority reporting that they had learned "a lot" about the STEM topics at the programs they attended and that they were interested in learning more. The broader community of library patrons, which included many who had not attended any library STEM programs in the past year, did report increased borrowing of STEM-related materials, increased use of the library in addressing STEM-related issues, and an increased interest in STEM-related programming for children. However, the overall familiarity of library patrons with the library's STEM capacity showed little change over the course of the initiative.

Program Feedback Surveys
The most direct impact of the expanded STEM programs at the pilot libraries was on the children, youth and adults who participated in the new programs. As part of the evaluation, pilot libraries distributed brief program feedback surveys to participants in the various STEM-related library events. The surveys were designed to gather basic satisfaction information from program participants and to assess the effectiveness of library programming in fostering science interest and science literacy. Over the course of the 15 months of program activities, 955 surveys were returned, representing a mix of responses by parents, teen participants, and adult respondents.[15]

Based on the feedback surveys, program participants were highly satisfied with the quality of the programming provided. Overall, 96% of the survey respondents reported that the programs were well-presented and engaging, and 97% agreed that the programs were informative (Exhibit 20). The results were consistently positive across all age groups.

The programs also appeared to generate positive outcomes for participants in terms of increased interest in the STEM topics being presented and an increased appreciation for the role that the public libraries could play as a science resource in the community. As shown in Exhibit 21:

- 81% of the survey respondents indicated that they or their children were interested in learning more about the particular topic of the presentation they attended, and a similar percent (79%) were interested in learning more about science-related topics in general.

- 87% of the respondents indicated that they or their children were interested in attending other science-related programs and activities.

- 63% of program participants indicated that they wanted to look at or borrow materials related to the presentation topic, and

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[15] Libraries were given three versions of the program feedback surveys to distribute at STEM-related events: one for parents of young children, a second "children's" version to be completed by young people in 4th-6th grades, and an "adult" version for older teens and adults. In total, 519 adult surveys, 270 parent surveys, and 166 children's surveys were completed and returned.

Exhibit 20
Program Satisfaction
(Percent 'Agree')
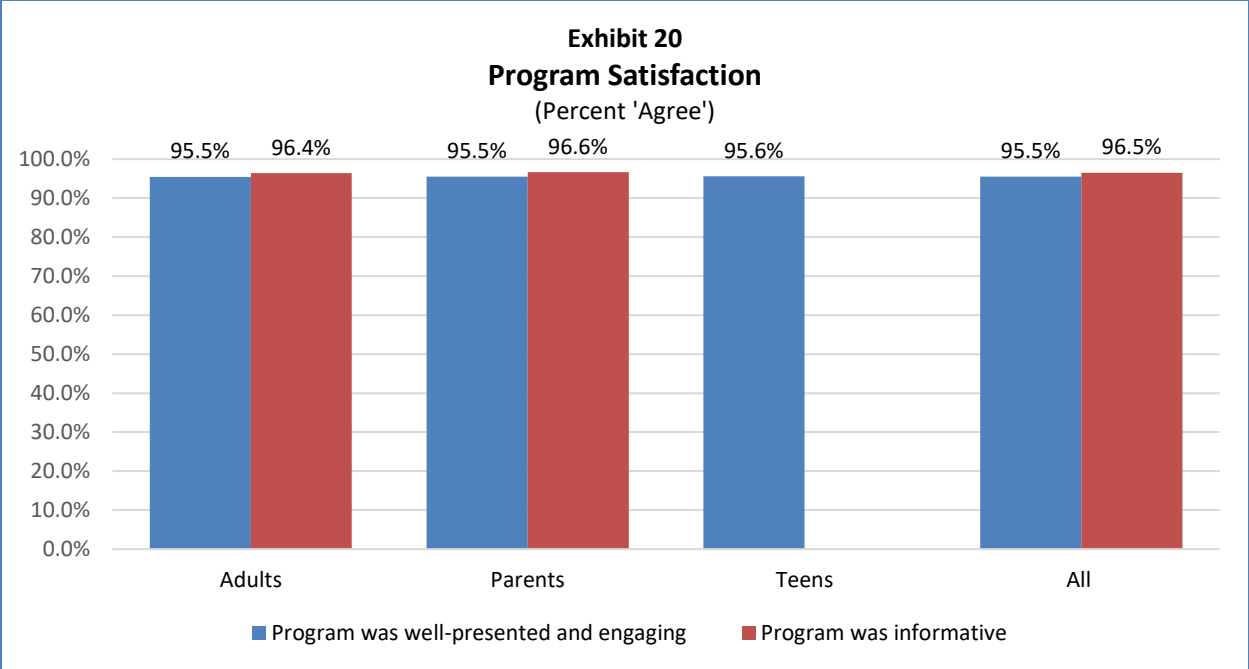
Source: Program Feedback Surveys, N=955.

- 72% of the survey respondents agreed that they were more likely to look for science-related materials at their library.

- Finally, 95% of the survey respondents agree that they had a greater appreciation for the role that the public library could play as a science resource center for the community.

Exhibit 21
Program Impact on Patrons
(Percent "Agree")
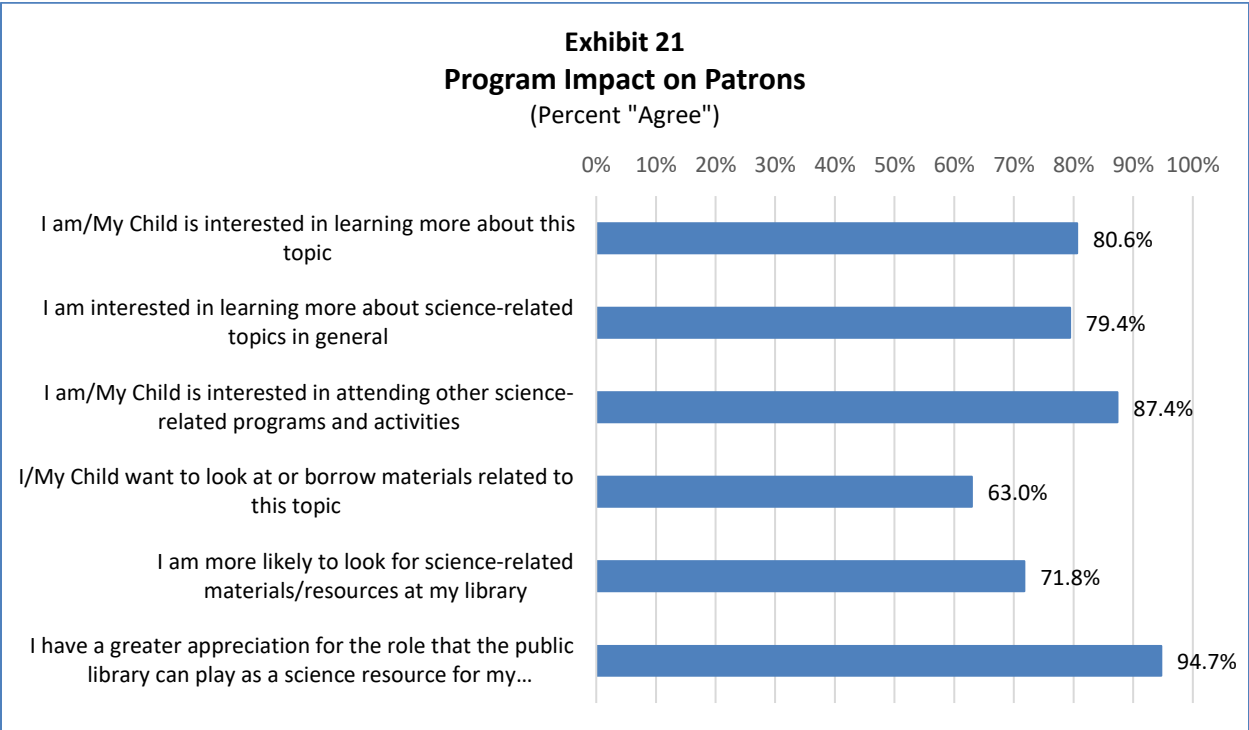
Source: Program Feedback Surveys, N=955.

Overall, as Exhibit 22 shows, 80% of the survey respondents indicated that they had learned "a lot" from the library program they attended; 71% of the parents and adults who responded agreed that these types of programs were "Very Important," and 85% of the teens who answered their survey reported that they wanted their libraries to have more programs like these.

Exhibit 22
Program Value
(Percent "Agree")
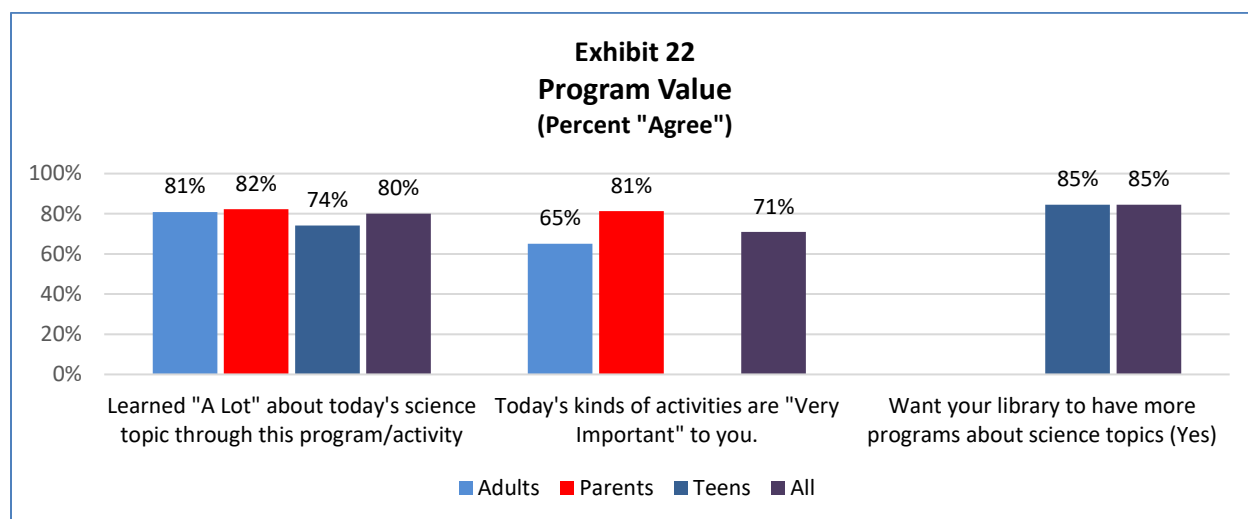
Source: Program Feedback Surveys, N=955.

Impacts on the Broader Library Patron Community

Based on patron surveys, the impacts on the broader library community were less clear and direct. At the same time, the survey data do suggest some greater appreciation among patrons for the role that the library could play in promoting STEM literacy in the community.

As noted earlier, patron surveys were distributed as online surveys by the pilot libraries early in the initiative, before active STEM programming began, and at the end of the initiative in late summer/early fall 2018. Links to the surveys were distributed through the library websites, newsletters, and emails to patrons, as well as through notices distributed at the libraries.[16] Ultimately, 723 patrons responded to the baseline version of the survey and 383 responded to the end-of-program survey. As was the case with the library staff surveys, it is important to recognize that the patron surveys represent snapshots or samples of the patron community at two points in time rather than individually-linked pre- and post-program surveys. As such, the results need to be treated with some caution. In general, they represent a relatively small percentage of the user population of the pilot libraries (less than 1%), so differences in patterns of response may simply reflect the fact that different groups of people responded to the baseline and end-of-program survey. At the same time, where the differences are large enough to be statistically significant (i.e., not likely to be random), they can be seen as reflecting differences in the broader population of library patrons at the two points in time. In that regard, while far from conclusive, the results of the patron survey can be seen as indicative of the types of impacts that the initiative had on the libraries' patrons.

As Exhibit 23 shows, both the baseline and end-of-program surveys show that roughly a quarter of the survey respondents attended STEM-related events in the prior 12 months, and between 40-50%

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[16] Several libraries, for example, distributed bookmarks at the circulation desk with the link to the patron surveys.

borrowed STEM-related materials, including science-related books, science kits, telescopes, microscopes, etc. There was a slight, non-significant drop in the percentage reporting that they had attended a program or activity in the prior 12 months, but there was a larger, statistically significant increase (from 42% to 49%) in the percentage reporting that they had borrowed science-related materials. One possibility is that this reflects the increased emphasis on STEM materials and programming in the various newsletters and other promotional materials distributed by the libraries.

Exhibit 23
STEM-Related Library Activities
(Percent "Yes")
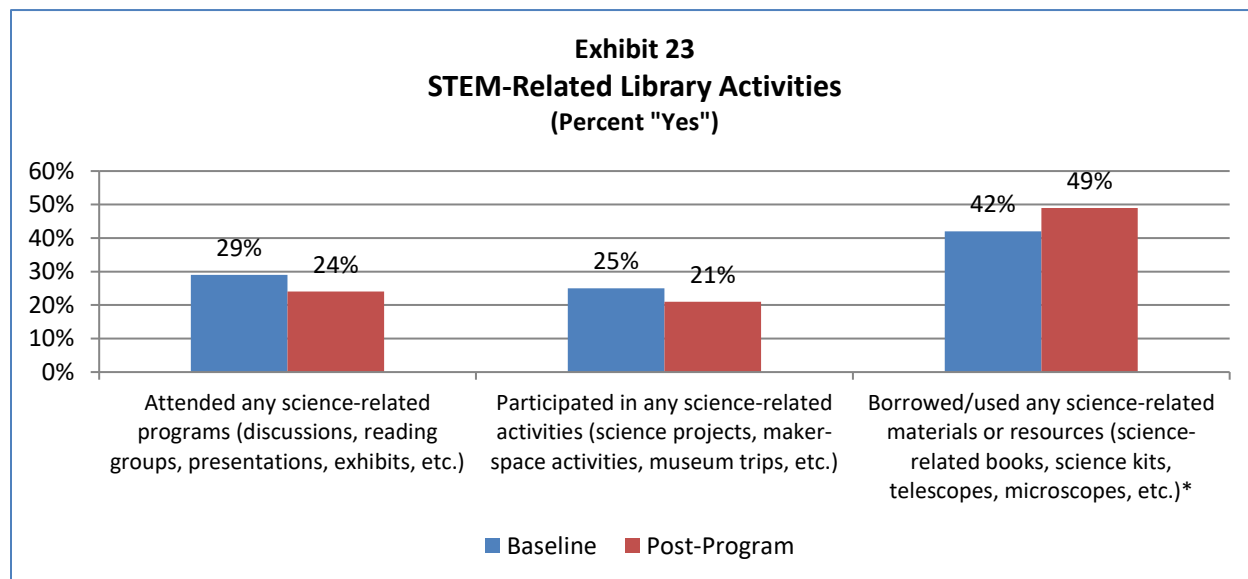
Source: Baseline and End-of-Program (Post) Patron Surveys. N=723 Baseline/383 Post.

The library patron data also suggest that patrons were more likely to turn to their local library as a starting point for learning about science, though not as a reference source on new technologies (Exhibit 24). Over the course of the initiative, the patron data indicate that library patrons were significantly more likely to report that they had used the library to decide what science information they could trust, discover new interests and ideas based on science, and engage their families in discovering new ideas and interests based on science. In some cases, the change was substantial: at baseline, just over 30% of patrons reported using the library to discover new interests and ideas based on science; by the end of the initiative that figure had risen to just under 50%. The percentage of patrons reported that they used the library to learn about science-related issues in the community rose, but only slightly (non-significant), while the percentage reporting that they used the library to learn about new technologies actually fell from 36% to 27%, perhaps reflecting the ready availability of information on technology through other, online sources. Overall, however, it seems clear that, by the end of the initiative, library patrons were more likely to look to the library for information on science-related issues by the end of the initiative than they had been prior to the initiative's start.

Exhibit 24
Library Assistance
(Percent "Occassionally" or "Often")

Chart showing Baseline and Post percentages:
- Learn to use new technologies*: Baseline 36%, Post 27%
- Learn about science-related issues affecting your community: Baseline 30%, Post 33%
- Decide what science information you can trust*: Baseline 23%, Post 27%
- Discover new interests and ideas based on science*: Baseline 31%, Post 49%
- Engage your family in discovering new ideas and interests based on science.*: Baseline 32%, Post 42%

Source: Baseline and End-of-Program (Post) Patron Surveys. N=723 Baseline/383 Post.

Library patrons were also slightly more likely at the end of the initiative than at the beginning to agree on the importance of STEM programming at the library. As Exhibit 25 shows, library patrons were slightly more likely to rate a variety of library programs as "Somewhat" or "Very" Important: children's and adult science programs, community reads, STEM activity areas, and science materials on loans. Only children's science programs showed a statistically significant increase, but the smaller increases across the board suggest at least slightly increased support for science-related programming at the library.

Exhibit 25
Importance of Library Services
(Percent "Somewhat" or "Very" Important)

Chart showing Baseline and Post percentages:
- Children's science programs (presentations, activities)*: Baseline 84%, Post 90%
- Adult science programs (presentations, discussions, activities): Baseline 78%, Post 84%
- Community reads and/or book clubs where science is a theme: Baseline 69%, Post 74%
- Activity areas related to science (computers, 3D printers, science kits, etc.): Baseline 81%, Post 83%
- Science kits/materials on loan (telescopes, microscopes, table computers, etc.): Baseline 78%, Post 84%

Source: Baseline and End-of-Program (Post) Patron Surveys. N=723 Baseline/383 Post.

At the same time, it is important to recognize that the impacts on the broader library user population were limited, as might be expected after only a single year of expanded STEM programming. As noted above, only a quarter of the patrons responding to the survey reported participating in STEM programs during the previous year, which means that many library patrons had not yet had substantial direct exposure to the libraries' STEM activities. For those patrons, increased interest or awareness may have come from the library website or newsletters, but likely not from a direct, hands-on experience.

The limits of the broad public impact are reflected in the patron survey questions about familiarity with library STEM capacity and patron awareness of the STEM-related services taking place in the pilot libraries (Exhibits 26 and 27). In both cases, there was little or no change between the baseline and end-of-program surveys. When asked about their familiarity with their library's STEM programming, roughly the same proportion responded that they were "familiar" or "very familiar" at the end of the initiative as at baseline (Exhibit 26). Similarly, when asked if they agreed with statements about the library's value as a resource for science and technology, about STEM-related programs and activities, or about the degree to which people in the community viewed the library as a resource, roughly the same percentage of patrons agreed at the end of the initiative as at the beginning (Exhibit 27). While the library's visibility as a STEM resources did not change much overall, it is worth noting that general approval of the library as a resource for the community remained very high, with 93% of patrons agreeing or strongly agreeing that the library was an important resource in the community.
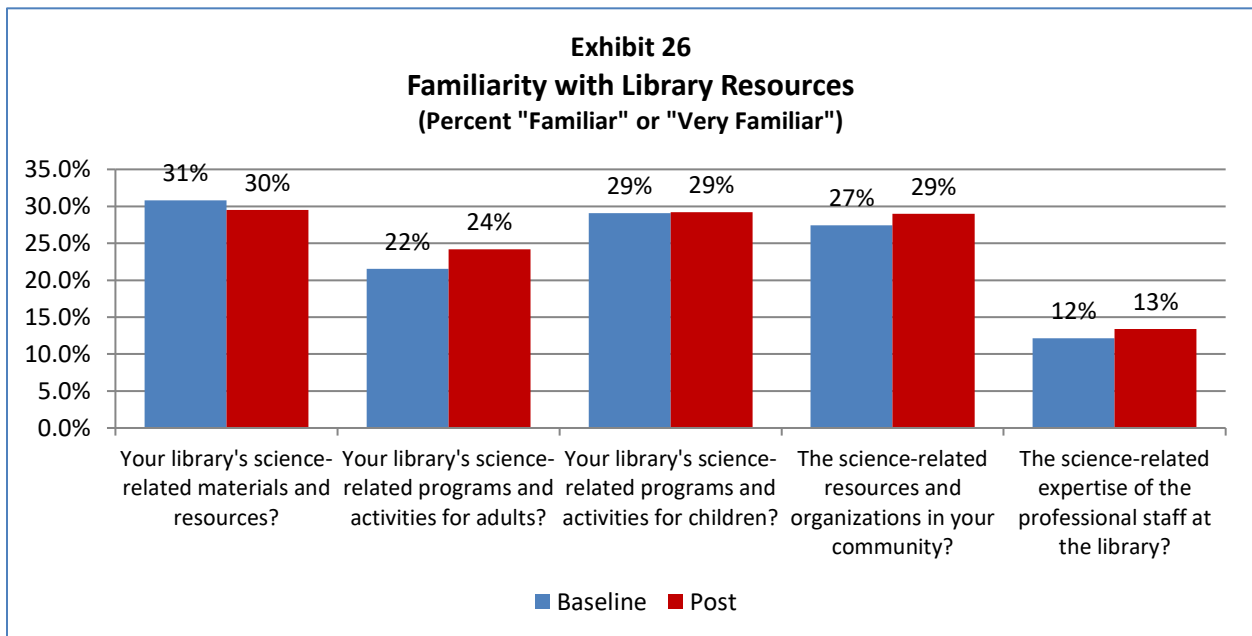
Exhibit 26
Familiarity with Library Resources
(Percent "Familiar" or "Very Familiar")

Source: Baseline and End-of-Program (Post) Patron Surveys. N=723 Baseline/383 Post.

Exhibit 27
Assessments of Library Capacity
(Percent "Agree" or "Strongly Agree")
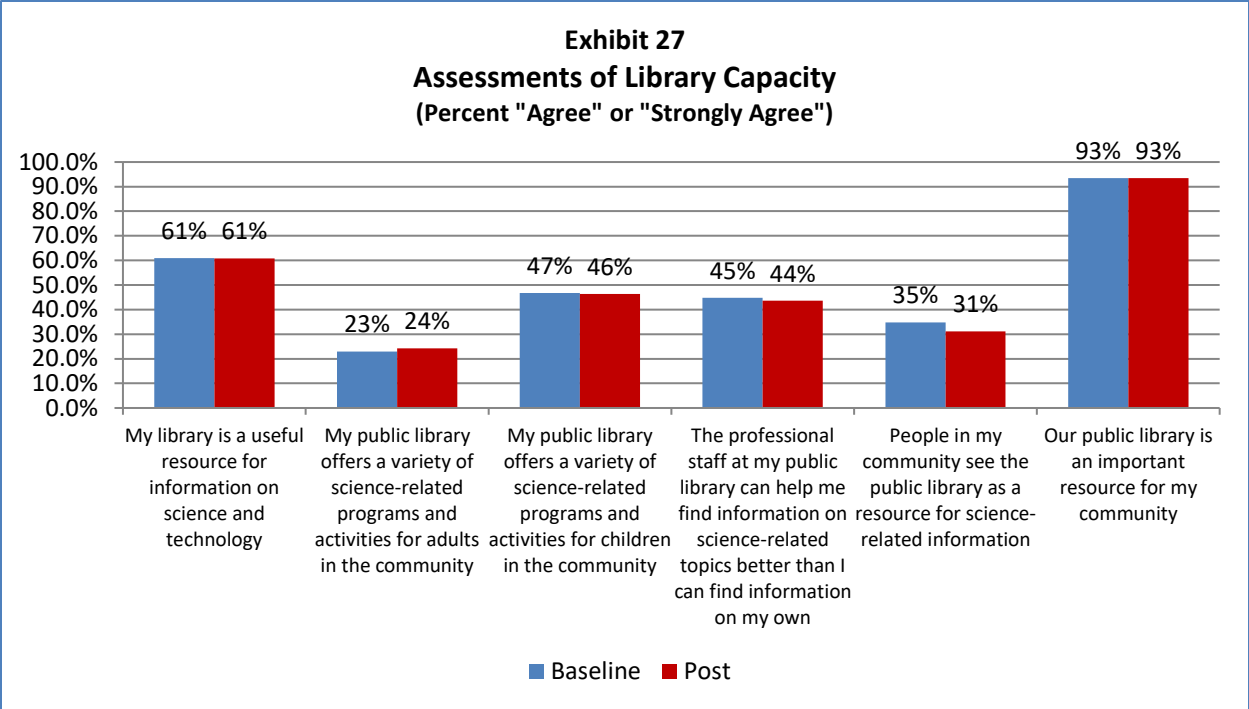
Source: Baseline and End-of-Program (Post) Patron Surveys. N=723 Baseline/383 Post.

Did the initiative have an impact on the science literacy of library patrons and increase support for the library as a science resource in the community? Based on the program feedback surveys and patron survey data the answer is mixed. Clearly, those who participated in the new STEM programming at the pilot libraries gained a valuable STEM learning experience and came away feeling more knowledgeable and more interested in continuing to learn. It is less clear that the libraries were able to build awareness of their new STEM capacity among the libraries' broader user base. While patrons did indicate that they were more likely to use the library to learn about STEM, there was little change in the general familiarity with the libraries' STEM programs and little indication of a general change in perception of the library as a STEM center in the community. It will likely take a longer, sustained effort by the pilot libraries for that change in awareness to percolate through the broader user base.

VII. CHALLENGES, RECOMMENDATIONS AND CONCLUSIONS

The "Empowering Libraries" initiative provided an important opportunity to learn about the kinds of strategies needed to help libraries expand their involvement in STEM and move towards becoming STEM resource centers for their communities. In large part, the initiative was successful, with all of the pilot libraries ultimately developing substantially expanded STEM programs and building library capacity to develop additional programming in the futures. Within that context, the initiative also generated a number of lessons and recommendations, as well as overall findings.

Challenges and Recommendations

The "Empowering Libraries" effort was not without its challenges, which is where much of the learning takes place. In addition to the basic challenges experienced with the self-assessment and planning process, the libraries involved in the initiative identified a number of additional constraints that can inform efforts to move the "Empowering Libraries" approach to additional states and libraries. Among the challenges identified by the libraries were:

- **Space is an issue**. Smaller libraries were limited by space constraints. "I could only do activities that I could set up and break down in a single day," noted the director of one of the smaller libraries. Larger libraries had more flexibility, though few made major changes in space allocations to create space for STEM activities.
- **Staffing was also a huge issue, particularly for the smaller libraries**. Small libraries were very constrained by limited staff size (often only 1 or 2 full-time professionals) and staff time. With limited staff hours, smaller libraries had to limit involvement of library staff so that other work would get done. Even in the mid-sized libraries, finding staff time to explore new programs and resources could be difficult.
- **Staff expertise was also a concern**. Most library staff had limited science backgrounds. As such, they were reluctant to claim expertise: "I told folks early on, I'm happy to do programs, but I'm not a scientist. I want to make sure I have it right." While staff gained confidence in their ability to operate outside their "comfort zones" and to find needed expertise, they were also clear that they felt the need for much more professional development if they were to work on STEM issues as a major focus of their work.
- **In larger libraries, engaging the broader library staff was also a challenge**. Several of the libraries had staff teams that brought together representatives from different departments or branches, but outreach to other staff and volunteers was limited. As the staff survey data suggested, getting the word out to staff that were not directly involved in the initiative remained an issue throughout the initiative.
- **Time for outreach, marketing, and partnership development was also limited**, even in larger libraries. Because of this, one of the more regular requests was for more help in identifying potential partners and making those initial connections. While the Clearinghouse provided information on activities, the perceived need was for better connections to organizations, particularly local organizations, that could help libraries develop and deliver programs.

While there were multiple challenges, the libraries also pointed to the inclusion of grant funds in the project as a positive contributor to the initiative. While the dollar amounts were not large ($6000 in implementation funding), all of the libraries noted that the availability of funding made it easier to explore new programming and bring new partners to the table. As one library Director noted, "It made a difference. This is a place where a $500 gift is a big deal. This allowed us to bring programming that

we could not have done. It allowed us to do this better." For the smaller libraries in particular, the grant funds were critical. One of the smaller libraries noted, "The grant really made a difference. We have very little money for programming; we are always scrambling." Another commented, "The money made a difference – we don't get program dollars from the town." Finally, even while noting that in some cases the grant was more than needed (a number of partners did not charge for their programs), was seen as helping the libraries get started and provide better quality programming: "We could have done this without the grants, but this made it happen faster and with better quality."

Out of these observations came a number of recommendations from the pilot libraries:

1. **Simplify the assessment and planning process.** Perhaps the most consistent recommendation was to simplify the self-assessment and planning process and to find a balance between the emphasis on advanced planning and the ability to experiment.

   • *"You can die by planning too much. It was good to focus, but you need to be willing to try stuff. It might not be a winner, but will get folks interested."*

   For the Maine and Massachusetts libraries, as noted earlier, the initial assessment and planning process was seen as overly complex and burdensome; at the Berkeley Public Library, which used a revised process that was simpler and engaged staff more directly, the initial assessment was seen as a positive exercise that brought useful information about community needs and interests.

2. **Find/define balance between "doing" and "organizing" STEM programs.** Libraries also called for finding a balance between asking libraries to deliver programming themselves and finding external partners to develop and deliver programs for the libraries. While children's library staff were often comfortable as program presenters, libraries were generally much more comfortable finding outside presents for adult programming.

3. **Broaden/increase professional development for library staff.** Library staff asked for more sustained professional development workshops, more hands-on assistance with the planning process, and more opportunities to work together, across libraries.

   • *"This made me more aware of the skill needs on my staff. We need more sustained technical assistance and professional development. I'd like to see a regular program of workshops – 4 sessions over a six-month period – to get staff out of silos and thinking about what they can do around science."*
   • *"We need more professional development help. We wanted help on collection development (around popular science) and could not find anyone to deliver."*
   • *"It would have been helpful to have a workshop on planning, instead of going off on our own. It might have also been easier to work on this together (across libraries). It was hard to do this alone."*
   • *It would be good to have more meetings across libraries. "Meeting colleagues is always a good thing."*

4. **Provide Better access to resources.** Librarians had a number of suggestions for providing libraries with better access to program resources, rather than asking libraries to identify programs or resources on their own.

- *"Do annual science grants or develop a cadre of people who do quality programs. When you bring in high caliber people, it really gets points for the library – it is easy to do a packed house."*
- *"Create a travelling collection of materials that libraries can look at and evaluate, or have someone at the state libraries identify recommended science materials.*
- *Identify 'pre-packaged' programs that library staff can adapt and implement with limited prior experience.*
- *Identify locally-based program resources – speakers bureaus, local and regional organizations.*

5. **Help on Marketing.** While all of the libraries had regular channels of communications into the community, all were interested in help on how to market their STEM programs – different types of outreach and help on messaging to make STEM attractive.

   - *"One big challenge was marketing – we could use some help and training on options for outreach (Facebook, etc.), especially where Internet access is limited."*

6. **A separate strategy for smaller libraries.** All of the leaders at the smaller libraries were clear that there needs to be a separate set of strategies for small libraries with a focus on how to build STEM capacity when overall capacity (staff, funding, space, etc.) is limited.

   - *"In Massachusetts, there are 100 libraries in towns of 1,000 or less – means everything is done by one person."*
   - *"You need to right-size this for who you are and where you are on the library spectrum."*
   - *"You need to do this at bigger libraries – I can't see it working as currently designed in small rural libraries with 1-2 staff."*

At the initiative level, two additional recommendations were identified.

7. **Improve communications at the beginning**. A number of participants in the initiative noted that some of the later communications issues and concerns could have been avoided by more time spent up-front on making sure that goals of the initiative were clear and in defining and discussing the expectations for both project staff and the libraries. Time spent talking about what it meant to be a science resource center and the nature of STEM literacy likely would have reduced some of the confusion and anxiety that libraries encountered in the self-assessment and planning process. As one observer noted, "I don't think we did a great job setting the foundation. It was intimidating." Others agreed, more time getting everyone on board would have made the start-up easier.

8. **Better preparation for state liaisons.** A related recommendation is to invest more time in helping prepare the STEM Liaisons for their roles as the primary sources of assistance and support to the pilot libraries. While the state staff (liaisons and others) brought a variety of skills and experience to the initiative, it would make sense to ensure that all involved had a common understanding of the tools and processes and an opportunity to better prepare to work with the local libraries on planning and implementation.

Conclusions
As suggested throughout this report, the key finding for the evaluation is that the "Empowering Libraries" initiative met many if not most of its key goals. Established as a demonstration to test and refine strategies for helping libraries expand their involvement in STEM and move towards becoming STEM resource center, the initiative was ultimately successful in helping a group of pilot libraries move

through a local planning process that resulted in the development and delivery of substantially expanded STEM programming. Through that process, the pilot libraries discovered new ways to integrate STEM into their regular operations and increased their confidence that they had the capacity to include STEM in their library plans. Participants in the local programs clearly benefited from the new STEM programming, rating the new programs highly and reporting an increased interest in learning more about STEM in the future. While public awareness and support for the library as a science resource center was limited, there were indications of some increased awareness among patrons and a strong sense of ongoing support for the libraries in general. While none of the pilot libraries were ready to announce themselves as "Science Resource Centers" all ultimately expect STEM to play a larger role in their programming as a result of this initiative.

Specific findings from the evaluation include the following:

Context
- The pilot libraries involved in the initiative represented a diverse group of institutions, ranging from very small libraries serving rural communities to relatively large urban libraries. As such they provided an opportunity to develop the "Empowering Libraries" model in a variety of settings. Within the libraries, staff and leaders had limited experience in STEM at baseline. The majority were positive about the goal of increasing STEM capacity, but only moderately confident in their ability to serve effectively as facilitators of STEM information and learning. Library patrons, on the whole, were supportive of their libraries but did not view them as significant STEM resources for the community.

Implementation

- The initial planning process for the initiative was a major challenge for the pilot libraries. The self-assessment and planning process was slower to roll out than expected and proved to be difficult for pilot libraries to complete, even with a degree of support from the state liaisons. A revised, substantially simplified version of the planning process piloted at the Berkeley Public Library appeared to be more successful, actively engaging a wide array of stakeholders in the planning. Libraries also had concerns about the STEM planning tools that were developed. In general, most reported the need to revise and substantially simplify the local planning process.

- Within that context, however, most of the libraries found the effort to plan and focus their STEM work was beneficial. Despite its difficulties, the planning process was seen as "raising the bar" for the programming developed by the libraries, increasing the quality of the programs and providing a clearer understanding of the outcomes to be achieved.

- Despite the challenges and delays associated with the planning process, all but one of the libraries ultimately established STEM development plans for their libraries and all of the pilot libraries (including the one that did not complete a formal plan) began integrating an expanded program of STEM activities into their library programming. Based on the monthly reporting data the Maine and Massachusetts pilot libraries conducted 645 programs attended by nearly 9000 people between January 2017 and April 2018. Topics varied widely, and all of the libraries established partnerships with area companies, government agencies, and nonprofit organizations to help sponsor and provide expertise for the new STEM programming.

- The initiative also successfully created an online STEM resource clearinghouse and delivered planned workshops and technical assistance. Responses from the pilot libraries to both efforts were mixed. While libraries like the idea of a clearinghouse, pilot libraries found the clearinghouse

resources of limited value and suggested a clearer focus on identifying organizations and programs that libraries could partner with for local programming (for example, clearinghouse information on local organizations) rather than on STEM activities for libraries to deliver directly. Similarly, while the conference workshops were seen as valuable, library representatives felt they were too basic and that more hands-on technical assistance and more sustained professional development on specific topics (for example, STEM collection development and the STEM planning process) were needed.

Increased Capacity

- Based on the end-of-program site visits and interviews with staff and leadership at the pilot libraries, and on the baseline and post-program surveys of library staff, the "Empowering Libraries" initiative was successful in building the capacity of participating libraries to provide science programming. At the local level, each of the pilot libraries identified ways in which their organizational capacity to serve as a STEM resource center had increased. These included an increased capacity for planning STEM programming, new partnerships, and increased staff knowledge of STEM resources. In turn, library leaders and staff reported an increased interest in STEM programming and an interest in increasing the quality of the programs that they provided. Through the interviews and staff surveys, staff and leaders at the pilot libraries reported an increased confidence in their ability to identify STEM issues of interest and relevance to their communities and to develop programming to meet that need.   While none would claim to have become "science resource centers," all increased their interest and capacity to integrate science into their operations. All expect to continue to integrate science topics into their programming.

- 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. The Maine State Library converted the grant-funded STEM Liaison position into a permanent position, increasing their capacity to assist local libraries interested in STEM programming. MSL staff also pointed to increased STEM resources at the state library and an increased awareness of MSL as a STEM resource among other state agencies. 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 going forward with little change. One conclusion is that the state-level impacts, as with local ones, depend in part on the starting point and context for the initiative, with those just beginning their engagement in STEM more likely to show significant changes in capacity and support than those who had already had substantial STEM programming in place.

Impact on Science Literacy/Interest within Community

- Data from the program feedback surveys and community-wide patron surveys also suggest that the STEM programming developed by the pilot libraries was having an impact on program participants and, to a lesser degree, on the broader community of library patrons. Program participants rated the quality of the new STEM library programming highly, with the large majority reporting that they had learned "a lot" about the STEM topics at the programs they attended and that they were interested in learning more. The broader community of library patrons, which included many who had not attended any library STEM programs in the past year, did report increased borrowing of STEM-related materials, increased us of the library in addressing STEM-related issues, and an increased interest in STEM-related programming for children. However, the overall familiarity of library patrons with the library's STEM capacity showed little change over the course of the initiative.   While patrons did indicate that they were more likely to use the library to learn about

STEM, there was little change in the general familiarity with the libraries' STEM programs and little indication of a general change in perception of the library as a STEM center in the community.   It will likely take a longer, sustained effort by the pilot libraries for that change in awareness to percolate through the broader user base.

Lessons Learned/Recommendations

- A number of lessons learned and recommendations emerged from the experiences of the initiative partners and the pilot libraries that can help guide future efforts. At the initiative level, lessons included the need to better communicate goals and expectations of the initiative at the beginning and to provide better guidance/preparation for the state liaisons to better prepare them to assist the local libraries. At the same time, staff at both the state and local level agreed on the need to simplify the planning process to better match library resources. Local library recommendations included: increased professional development for library staff; better defining the balance between "planning" and "doing" and between "doing" the work and "organizing" partners to deliver programming; providing better access to resources, including identifying quality programs and creating databases of local/regional organizations; more help on marketing STEM for the libraries; and developing a separate strategy for smaller libraries.

APPENDIX

Baseline and Post Staff Surveys

Baseline and Post Patron Surveys

Program Feedback Surveys

Library Site Visit Interview Guides

Library Staff Survey
(Online at: http://cyc.brandeis.edu/librarystaff.html)
Center for Youth and Communities
Brandeis University

Your library is participating in a federally-funded initiative aimed at increasing the role of public libraries as a science resource center. The initiative is being led by a partnership that includes the Maine State Library, Cornerstones of Science, and the Massachusetts Board of Library Commissioners.

As part of the evaluation of the initiative, Brandeis University is conducting a survey of **staff** and **volunteers** at the participating libraries. The goal of the survey is to learn about your experiences and interests related to STEM (Science, Technology, Engineering, and Math) and the degree to which you feel prepared to take an active role in integrating science literacy into your library. A second, follow-up survey will be administered at the end of the initiative in 2017.

We hope you will take a few minutes to respond to this survey – the information you provide will inform the library's planning and help to document the impact of the initiative. *The survey should take about 10 minutes to complete.*

Please note that the survey is *confidential.* While we ask for some identifying information at the end (so we can link this and the later survey), *no one at your library or any of the sponsoring institutions will see any individual survey responses*. We hope that you will be candid in your answers to the survey questions. The survey is *voluntary* – you are not required to complete the survey (and whether or not you complete the survey will not affect you job status at the library) -- but we hope that you will take the time to respond.

Thank you for your help!

1. At which library do you work:

    O Auburn Public Library (Auburn, ME)

    O Jesup Memorial Library (Bar Harbor, ME)

    O Portland Public Library (Portland, ME)

    O Bellingham Public Library (Bellingham, MA)

    O Nevins Memorial Library (Methuen, MA

    O Erving Public Library (Erving, MA)

    O Leverett Public Library (Leverett, MA)

    O New Salem Public Library (New Salem, MA)

    O M.N. Spear Memorial Library (Shutesbury, MA)

    O Wendell Free Library (Wendell, MA)

2. Are you a paid staff member or volunteer?

    O Staff member

    O Volunteer

3. How long have you worked/volunteered in libraries:

    O At this library? _____ Years (including this one)

    O In total? _____ Years (at this and other libraries)

4. Before this project began, how much formal education have you had in fields related to science, technology, engineering and/or mathematics (STEM)? (Check all that apply)

    O I have little or no STEM-related education beyond high school

    O I took one or more courses in college or graduate school in STEM-related topics, but did not major in a STEM-related field.

    O I majored in a STEM-related field in college

    O I did graduate work in a STEM-related field

    O I took courses/specialized in STEM-related fields at library school

    O Other (please describe) _____

5. Before this project began, had you participated in any training or professional development programs (workshops, webinars, college or university classes, etc.) aimed at building your skills to develop and implement STEM programming in public libraries?

    O Yes

    O No

    O Not sure

6. Before this project began, how much practical experience did you have in organizing, implementing or facilitating STEM-related projects at this or another library?

- O No prior experience implementing STEM-related programs
- O Occasional experience (up to one or two STEM-related programs or events over the course of a year)
- O Regular experience (involvement in STEM-related programming was a regular, ongoing responsibility at one or more of my jobs/volunteer positions)
- O Extensive experience (development and leadership of STEM-related programming has been a major element of my work over an extended period of time).

7. If you have prior experience with STEM-related programs, please briefly describe one STEM-related program or project that you have been involved in. What was the topic? What kinds of activities took place? What role did you play in developing and implementing the program?

_____

_____

_____

_____

_____

8. Overall, how would you rate your personal *interest* in STEM (Science, Technology, Engineering, and Mathematics), using a scale from 1 (Not Interest at All) to 5 (Very Interested)

Not Interested at All (1)	(2)	(3)	(4)	Very Interested (5)
O	O	O	O	O

9. Overall, how would you rate your STEM *knowledge* or *literacy*, using a scale from 1 (No knowledge/Not Literate) to 5 (Very Knowledgeable/Very STEM literate)

No Knowledge (1)	(2)	(3)	(4)	Very Knowledgeable (5)
O	O	O	O	O

10. How likely is it that you will do any of the following in the next six (6) months?

	Highly Unlikely	Unlikely	Unsure	Likely	Highly Likely
Read books or magazines about science?	O	O	O	O	O
Talk with family, friends or colleagues about science and technology?	O	O	O	O	O
Look into news about science, innovation or new technologies?	O	O	O	O	O
Watch programs on science and technology on television (for example, Science Channel, National Geographic, Discover Channel)?	O	O	O	O	O
Attend a science-related museum or a science-relate program/activity?	O	O	O	O	O

11. How familiar are you with the following?

	Not Familiar at All	Not Very Familiar	Unsure	Familiar	Very Familiar
Your library's science-related materials and resources?	O	O	O	O	O
Your library's science-related programs and activities for adults?	O	O	O	O	O
Your library's science-related programs and activities for children/youth?	O	O	O	O	O
The science-related resources and organizations in your community?	O	O	O	O	O
The science-related expertise of your colleagues at the library?	O	O	O	O	O

12. How confident are you about your ability to do the following at your library today?

	Not Confident at All	Not Very Confident	Neutral – Neither Confident nor Unconfident	Confident	Very Confident
Identify science-related issues that are of interest to members of the community?	O	O	O	O	O
Identify resources at your library or online for adults interested in science?	O	O	O	O	O
Identify resources at your library or online for children/youth interested in science?	O	O	O	O	O
Identify organizations in the community for patrons interested in science?	O	O	O	O	O
Facilitate science-related programming at your library (discussions, exhibits, demonstrations, etc.)?	O	O	O	O	O
Develop new science-related programs or activities at your library?	O	O	O	O	O
Encourage and assist library users to explore their science-related interests through the library?	O	O	O	O	O
Integrate science literacy into your daily responsibilities at the library?	O	O	O	O	O

13. Please tell us how strongly you *agree* or *disagree* with each of the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree (5)
I am interested in expanding the use of the public library as a science resource center in our community.	O	O	O	O	O
I am excited about integrating science and science resources into the library's everyday operations	O	O	O	O	O
I think it is important for the library to become a science resource center for the community	O	O	O	O	O
I am confident that I can learn what I need to provide science-related programs and services at the library.	O	O	O	O	O
I am committed to doing whatever I can to help the library expand its role as a science resource center for the community.	O	O	O	O	O

14. What do you see as the major challenges to your library expanding its role as a science resource center in your community?

15. What kinds of knowledge and skills do you need to develop (through professional development and other supports) in order to contribute to the expansion of your library's role as a center for science learning in the community?

16. From your perspective, what do you think your library needs (in terms of resources, training or support, staffing or leadership, etc.) in order to become an effective science resource center for the community.

17. Do you have any other comments or thoughts on the effort to expand the library's role as a science resource center?

18. Please give us your initials and month/day of your birthdate so we can link your responses on this survey with the follow-up survey we plan for the end of the project in 2017. Please note that this information will only be used to link the two surveys. No identifying information will be shared with library or project staff. If you do not want to share this information, just leave this question blank.

    First Name Initial _____

    Last Name Initial _____

    Birth Month _____ (dropdown menu)

    Birth Date _____ (dropdown menu)

Thank you for your help with this survey.

When you done, please seal the survey in an envelope

(to protect the confidentiality of your answers)

and return it to your library Director.

Library Staff Survey
(Online at: http://cyc.brandeis.edu/librarystaff.html)
Center for Youth and Communities
Brandeis University

Over the past few years, your library has been participating in a federally-funded initiative aimed at increasing the role of public libraries as science resource centers in their communities. The initiative has been led by a partnership that includes the Maine State Library, the Massachusetts Board of Library Commissioners, and Cornerstones of Science.

As part of the initiative evaluation, Brandeis University conducted a survey of **staff** and **volunteers** at the participating libraries early in the initiative (in 2016). The goal of that survey was to learn about staff experiences and interests related to STEM (Science, Technology, Engineering, and Math) early in the initiative. This follow-up survey is designed to see whether and how those experience and interests have changed since that original survey.

We hope you will take a few minutes to respond to this survey – the information you provide will help to document the impact of the initiative and inform future efforts. ***The survey should take about 5 minutes to complete.***

Please note that the survey is ***confidential.*** While we ask for some identifying information at the end (so we can link this to the earlier survey), ***no one at your library or any of the sponsoring institutions will see any individual survey responses***. We hope that you will be candid in your answers to the survey questions. The survey is ***voluntary*** – you are not required to complete the survey (and whether or not you complete the survey will not affect you job status at the library) -- but we hope that you will take the time to respond.

Thank you for your help!

1. At which library do you work:
   - Auburn Public Library (Auburn, ME)
   - Jesup Memorial Library (Bar Harbor, ME)
   - Portland Public Library (Portland, ME)
   - Bellingham Public Library (Bellingham, MA)
   - Nevins Memorial Library (Methuen, MA
   - Erving Public Library (Erving, MA)
   - Leverett Public Library (Leverett, MA)
   - New Salem Public Library (New Salem, MA)
   - M.N. Spear Memorial Library (Shutesbury, MA)
   - Wendell Free Library (Wendell, MA)

2. Are you a paid staff member or volunteer?
   - Staff member
   - Volunteer

3. In the past two years (i.e., since this initiative began), have you participated in any training or professional development programs (workshops, webinars, college or university classes, etc.) aimed at building your skills to develop and implement STEM programming in public libraries?

   - ○ Yes
   - ○ No
   - ○ Not sure

4. If yes, please briefly describe or give examples of the types of training you participated in.

   _____

   _____

5. Overall, on a scale from 1 (Not Interest at All) to 5 (Very Interested), how would you rate your personal *interest* in STEM (Science, Technology, Engineering, and Mathematics)?

Not Interested at All (1)	(2)	(3)	(4)	Very Interested (5)
O	O	O	O	O

6. Overall, on a scale from 1 (No knowledge/Not Literate) to 5 (Very Knowledgeable/Very STEM literate), how would you rate your STEM *knowledge* or *literacy*?

No Knowledge (1)	(2)	(3)	(4)	Very Knowledgeable (5)
O	O	O	O	O

7. How likely is it that you will do any of the following in the next six (6) months?

	Highly Unlikely	Unlikely	Unsure	Likely	Highly Likely
Read books or magazines about science?	O	O	O	O	O
Talk with family, friends or colleagues about science and technology?	O	O	O	O	O
Look into news about science, innovation or new technologies?	O	O	O	O	O
Watch programs on science and technology on television (for example, Science Channel, National Geographic, Discover Channel)?	O	O	O	O	O
Attend a science-related museum or a science-relate program/activity?	O	O	O	O	O

8. How familiar are you with the following?

	Not Familiar at All	Not Very Familiar	Unsure	Familiar	Very Familiar
Your library's science-related materials and resources?	O	O	O	O	O
Your library's science-related programs and activities for adults?	O	O	O	O	O
Your library's science-related programs and activities for children/youth?	O	O	O	O	O
The science-related resources and organizations in your community?	O	O	O	O	O
The science-related expertise of your colleagues at the library?	O	O	O	O	O

9. How confident are you about your ability to do the following at your library today?

	Not Confident at All	Not Very Confident	Neutral – Neither Confident nor Unconfident	Confident	Very Confident
Identify science-related issues that are of interest to members of the community?	O	O	O	O	O
Identify resources at your library or online for adults interested in science?	O	O	O	O	O
Identify resources at your library or online for children/youth interested in science?	O	O	O	O	O
Identify organizations in the community for patrons interested in science?	O	O	O	O	O
Facilitate science-related programming at your library (discussions, exhibits, demonstrations, etc.)?	O	O	O	O	O
Develop new science-related programs or activities at your library?	O	O	O	O	O
Encourage and assist library users to explore their science-related interests through the library?	O	O	O	O	O
Integrate science literacy into your daily responsibilities at the library?	O	O	O	O	O

10. Please tell us how strongly you *agree* or *disagree* with each of the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree (5)
I am interested in expanding the use of the public library as a science resource center in our community.	O	O	O	O	O
I am excited about integrating science and science resources into the library's everyday operations	O	O	O	O	O
I think it is important for the library to become a science resource center for the community	O	O	O	O	O
I am confident that I can learn what I need to provide science-related programs and services at the library.	O	O	O	O	O
I am committed to doing whatever I can to help the library expand its role as a science resource center for the community.	O	O	O	O	O

11. Looking back over the past two years, would you say that your *interest in learning about science* has increased or decreased as a result of your library's involvement in this STEM initiative?

   O   Decreased a lot

   O   Decreased a little

   O   No change

   O   Increased a little

   O   Increased a lot

12. Looking back over the past two years, would you say that your *interest in integrating science-related programming into your library's programs and services* has increased or decreased as a result of your library's involvement in this STEM initiative?

   O   Decreased a lot

   O   Decreased a little

   O   No change

   O   Increased a little

   O   Increased a lot

13. Overall, how has your library's involvement in this STEM initiative changed the way you think about the role of science in your library's programs and services? Please briefly explain how your views have changed.

_____

_____

_____

14. Please give us your initials and month/day of your birthdate so we can link your responses on this survey with the earlier staff survey (June 2016). Please note that this information will **only** be used to link the two surveys. No identifying information will be shared with library or project staff. If you do not want to share this information, just leave this question blank.

First Name Initial _____

Last Name Initial _____

Birth Month _____ (dropdown menu)

Birth Date _____ (dropdown menu)

Thank you for your help with this survey.

When you are done, please seal the survey in an envelope

(to protect the confidentiality of your answers)

and return it to your library Director.

WHAT IS THIS SURVEY and WHY IS IT IMPORTANT?

Our Library is participating in a federal grant entitled *Empowering Libraries to Become Science Resource Centers for their Community*. With the assistance of Brandeis University, the Library is surveying our patrons to better understand how you use the library and to gain your perspective on how the Library can support for *science literacy* on a daily basis. The word "science" is used interchangeably with "STEM," which includes the fields of science, technology, engineering and math. The results of this survey will:

(1) Be used in the development, implementation, and evaluation of your library's STEM programming and services;
(2) Focus your library's efforts to build its capacity through staff training and acquisition of STEM resources;
(3) Inform the library's community partners, library friends, and the State Library of planned activities and expected outcomes; and,
(4) Help the library to connect its patrons and communities to science experiences in an effective, engaging manner.

We hope you will take a few minutes to respond to this survey. The survey should take about 5 minutes to complete.

If you prefer to complete the survey online, you can find a copy at the following link:
http://cyc.brandeis.edu/patronsurvey.html

Thank for your assistance!

1. **Which of the following public libraries do you use most regularly?** Please check one and answer the rest of the survey in terms of your experience with that library.

   ○ Auburn Public Library (Auburn, ME)
   ○ Jesup Memorial Library (Bar Harbor, ME)
   ○ Portland Public Library (Portland, ME)
   ○ Bellingham Public Library (Bellingham, MA)
   ○ Nevins Memorial Library (Methuen, MA)

   ○ Erving Public Library (Erving, MA)
   ○ Leverett Public Library (Leverett, MA)
   ○ New Salem Public Library (New Salem, MA)
   ○ M.N. Spear Memorial Library (Shutesbury, MA)
   ○ Wendell Free Library (Wendell, MA)

2. **How often do you visit the public library you have listed, and with whom**? Please respond based on your most typical activity.

	Never	Once or Twice per Year	3-4 times per year	At least once per month	At least once per week
By yourself	O	O	O	O	O
With children and/or grandchildren	O	O	O	O	O
With spouse, partner, or friend	O	O	O	O	O

3. On average how much time do you spend per visit?
- ○ Less than one hour
- ○ 1-2 hours
- ○ 3-4 hours
- ○ More than 4 hours
- ○ Not applicable (never visit)

4. **How often do you access library resources on-line** (use the online catalog, look up materials through the library website, etc.)? Please give your best estimate.

- ○ At least once per week
- ○ At least once per month
- ○ 3-4 times per year
- ○ Once or twice per year
- ○ Never

5. In the past 12-months have you done ***any of the following*** at the library, and ***with whom***? (Please check all that apply.)

	By yourself	With children and/or grandchildren	With spouse, partner, or friend	Have not done this in past 12 months
Attended any science-related *programs* (discussions, reading groups, presentations, exhibits, etc.)	O	O	O	O
Participated in any science-related *activities* (science projects, maker-space activities, museum trips, etc.)	O	O	O	O
Borrowed/used any science-related *materials or resources* (science-related books, science kits, telescopes, microscopes, etc.)	O	O	O	O

6. In the past 12 months, **to what extent has library staff helped you do the following**? (Check all that apply.)

	Often	Occasionally	Rarely	Never	Don't Know/Not Applicable
Learn to use new technologies.	O	O	O	O	O
Learn about science-related issues affecting your community (e.g. health, water quality, removal of plastic/styrene, etc.).	O	O	O	O	O
Learn about local science experiences, events and resources that are available in the library and/or community.	O	O	O	O	O
Decide what science information you can trust.	O	O	O	O	O
Discover new interests and ideas based on science.	O	O	O	O	O
Engage your family in discovering new ideas and interests based on science.	O	O	O	O	O

7. **Where do you and your family go to find the latest scientific information?** Please rate how important each of the following resources are for you and your family, from "Not Important at All" to "Very Important."

	Not Important at All	Not Very Important	Neutral/Neither Important nor Unimportant	Somewhat Important	Very Important
Websites	O	O	O	O	O
Newspapers	O	O	O	O	O
Science Magazines	O	O	O	O	O
Public Library	O	O	O	O	O
School/College Library	O	O	O	O	O
TV and Radio	O	O	O	O	O
Books from sources other than libraries (e.g. local bookstore, Amazon, Barnes & Noble)	O	O	O	O	O
Other Sources (describe):	O	O	O	O	O

8. How familiar are you with the following?

	Not Familiar at All	Not Very Familiar	Unsure	Familiar	Very Familiar
Your library's science-related materials and resources?	O	O	O	O	O
Your library's science-related programs and activities for adults?	O	O	O	O	O
Your library's science-related programs and activities for children?	O	O	O	O	O
The science-related resources and organizations in your community?	O	O	O	O	O
The science-related expertise of the professional staff at the library?	O	O	O	O	O

9. **To what extent do you agree or disagree with the following statements?**

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My library is a useful resource for information on science and technology.	O	O	O	O	O
My public library offers a variety of science-related programs and activities **for adults** in the community.	O	O	O	O	O
My public library offers a variety of science-related programs and activities **for children** and youth in the community.	O	O	O	O	O
The professional staff at my public library can help me find information on science-related topics better than I can find information on my own.	O	O	O	O	O
People in my community see the public library as a resource for science-related information.	O	O	O	O	O
Our public library is an important resource for my community.	O	O	O	O	O

10. **How important is it for your library to offer more of the following kinds of science-related programs and resources?**

Type of Activity	Not important at all	Not Very Important	Neutral/ Neither Important nor Unimportant	Somewhat Important	Very Important
Children's science programs (presentations, activities, etc.)	O	O	O	O	O
Adult science programs (science presentations, discussions, activities)	O	O	O	O	O
Community reads and/or book clubs where science is a theme	O	O	O	O	O
Activity areas related to science (computers, 3D printers, science kits, etc.)	O	O	O	O	O
Science kits/materials on loan (telescopes, microscopes, tablet computers, etc.)	O	O	O	O	O

11. **Which of the following topics are of interest to you and your family?** Please check all that apply.

Nature/Environment	Health	Astronomy	Computers/Technology
O Marine Biology, Underwater exploration	O Family Health	O Star gazing and telescopes	O Robotics, Legos
O Gardens, Forests, Water quality	O Cutting edge medical breakthroughs (e.g. genetic testing)	O Planets, meteors and other celestial objects	O Computers, coding, circuits, smartphone apps and games
O Wild and domestic animals, animal tracks	O Food, Nutrition, Food Security and Food Systems (e.g. Think/Buy Local)	O Humans In Space	O Maker spaces
O Bird watching	O Exercise, yoga	O Living on Mars	O Video production
O Sustainability	O Alternative Medicine	O Rocketry	O Alternative Energy
O Geology, Archaeology	O Financial Health	O Physics	O Inventions

12. Are there other topics that you would like to explore through your library?

_____

_____

About You
Please tell us a little about yourself.

13. How old are you (years)? _____

14. What is your gender?

    o   Male

    o   Female

    o   Transgender/Other

15. Do you have children who live with you in this community?

    o   Yes

    o   No

16. What other suggestions do you have for ways of expanding the library's role as a science center for your community?

Thank you for your help with this survey.

1. **Which of the following public libraries do you use most regularly?** Please check one and answer the rest of the survey in terms of your experience with that library.

   - ○ Auburn Public Library (Auburn, ME)
   - ○ Jesup Memorial Library (Bar Harbor, ME)
   - ○ Portland Public Library (Portland, ME)
   - ○ Bellingham Public Library (Bellingham, MA)
   - ○ Nevins Memorial Library (Methuen, MA)
   - ○ Erving Public Library (Erving, MA)
   - ○ Leverett Public Library (Leverett, MA)
   - ○ New Salem Public Library (New Salem, MA)
   - ○ M.N. Spear Memorial Library (Shutesbury, MA)
   - ○ Wendell Free Library (Wendell, MA)

2. **During the past year, how often have you visited the public library you listed?**

   - ○ Never
   - ○ Once or twice per year
   - ○ 3-4 times per year
   - ○ At least once per month
   - ○ At least once per week

3. **When you visit the public library, do you most commonly visit by yourself, with children or grandchildren, or with a spouse, partner or friend**? Please check the response that matches your most typical activity.

   - ○ By yourself
   - ○ With children or grandchildren
   - ○ With a spouse, partner or friend

4. In the past 12-months have you done *any of the following* at the library? Please mark an answer for each item.

	Yes	No
Attended any science-related *programs* (discussions, reading groups, presentations, exhibits, etc.)	O	O
Participated in any science-related *activities* (science projects, maker-space activities, museum trips, etc.)	O	O
Borrowed/used any science-related *materials or resources* (science-related books, science kits, telescopes, microscopes, etc.)	O	O

5. How familiar are you with the following?

	Not Familiar at All	Not Very Familiar	Unsure	Familiar	Very Familiar
Your library's science-related materials and resources?	O	O	O	O	O
Your library's science-related programs and activities for adults?	O	O	O	O	O
Your library's science-related programs and activities for children?	O	O	O	O	O
The science-related resources and organizations in your community?	O	O	O	O	O
The science-related expertise of the professional staff at the library?	O	O	O	O	O

6. In the past 12 months, **to what extent have you used the library to do the following**?

	Often	Occasionally	Rarely	Never	Don't Know/Not Applicable
Learn to use new technologies.	O	O	O	O	O
Learn about science-related issues affecting your community (e.g. health, water quality, removal of plastic/styrene, etc.).	O	O	O	O	O
Decide what science information you can trust.	O	O	O	O	O
Discover new interests and ideas based on science.	O	O	O	O	O
Engage your family in discovering new ideas and interests based on science.	O	O	O	O	O

7. **To what extent do you agree or disagree with the following statements?**

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My library is a useful resource for information on science and technology.	O	O	O	O	O
My public library offers a variety of science-related programs and activities **for adults** in the community.	O	O	O	O	O
My public library offers a variety of science-related programs and activities **for children** and youth in the community.	O	O	O	O	O
The professional staff at my public library can help me find information on science-related topics better than I can find information on my own.	O	O	O	O	O
People in my community see the public library as a resource for science-related information.	O	O	O	O	O
Our public library is an important resource for my community.	O	O	O	O	O

8. **How important is it for your library to offer the following kinds of science-related programs and resources?**

Type of Activity	Not important at all	Not Very Important	Neutral/ Neither Important nor Unimportant	Somewhat Important	Very Important
Children's science programs (presentations, activities, etc.)	O	O	O	O	O
Adult science programs (science presentations, discussions, activities)	O	O	O	O	O
Community reads and/or book clubs where science is a theme	O	O	O	O	O
Activity areas related to science (computers, 3D printers, science kits, etc.)	O	O	O	O	O
Science kits/materials on loan (telescopes, microscopes, tablet computers, etc.)	O	O	O	O	O

About You
Please tell us a little about yourself.

9. How old are you (years)? _____

10. What is your gender?

    o   Male

    o   Female

    o   Transgender/Other

11. Do you have children who live with you in this community?

    o   Yes

    o   No

12. Do you have any suggestions about how to expand the library's role as a science resource for your community?

    _____

    _____

Thank you for your help with this survey.

MSL MAINE STATE LIBRARY

Massachusetts Libraries
BOARD OF LIBRARY COMMISSIONERS

Cornerstones of Science
awakening curiosity, enriching lives

Libraries as Science Resource Centers
Program Evaluation – Adult Version

As part of a federal grant program supporting public libraries as science resource centers, our library and Brandeis University are conducting surveys of participants in science-related programs and activities at the library. The goal of the surveys is to help the library assess the value of these programs to library patrons and the community.

Please tell us about your experience with today's program. The survey should take only 2-3 minutes to complete. Please note that the survey is *anonymous* — we do not ask for your name. The survey is *voluntary*, but we hope that you will take the time to respond. If you prefer to answer online, an online version of the survey can be found at: http://cyc.brandeis.edu/librarysurvey2.html .

Thank you!

1. Library Name: _____

2. Name of today's program or activity: _____

3. To what extent do you agree or disagree with the following statements about today's program/activity?

	Disagree	Neutral (Neither Agree nor Disagree)	Agree
Today's program was well-presented and engaging.	O	O	O
Today's program was informative.	O	O	O
As a result of today's program:			
I am interested in learning more about this science-related topic.	O	O	O
I am interested in learning more about science-related topics in general.	O	O	O
I am interested in attending other science-related programs and activities.	O	O	O
I want to look at or borrow materials related to this topic.	O	O	O
I am more likely to look for science-related materials and resources at my library.	O	O	O
I have a greater appreciation for the role that the public library can play as a science resource in my community.	O	O	O

4. Overall, how much do you feel you learned about today's science topic through this program/activity? (Please check one)

Nothing at All (1)	A Little (2)	A Lot (3)
O	O	O

INSTITUTE of Museum and Library SERVICES

(over for page 2)

Library Program Evaluation – Adult Version
For adults and young people grades 7 and up

5. Please describe **one thing** you learned through today's program that you found interesting or would like to learn more about.

Please tell us a little about yourself

6. How often do you **visit** the public library in this town? Please mark the response that best reflects your typical activity.

   O   At least once per week

   O   At least once per month

   O   3-4 times per year

   O   Once or twice per year

   O   Never

7. How old are you (years)? _____

8. Do you have children who live with you in this community?

   O   Yes

   O   No

9. How important are today's kinds of activities to you as a library user?

   O   Not Important at All

   O   Not Very Important

   O   Moderately Important

   O   Very Important

10. Do you have any suggestions for additional science-related programs or resources that you would like to see at the library?

Thank you for your help with this survey.

For administrative use: ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨   ⓪

Libraries as Science Resource Centers
Program Evaluation – Parents Version

As part of a federal grant program supporting public libraries as science resource centers, our library and Brandeis University are conducting surveys of participants in science-related programs and activities at the library. The goal of the surveys is to help the library assess the value of these programs to library patrons and the community.

We are asking you to complete this survey to report on your child's experience at today's program. The survey should take only 2-3 minutes to complete. *If you are attending the program with more than one child, please pick one of the children (your choice!) and answer the questions for that one child*.

Please note that the survey is *anonymous* — we do not ask for your name. The survey is *voluntary,* but we hope that you will take the time to respond. If you prefer to answer online, an online version of the survey can be found at: http://cyc.brandeis.edu/libraryparents2.html

Thank you!

1. Library Name: _____

2. Name of today's program or activity: _____

3. To what extent do you agree or disagree with the following statements about today's program/activity?

	Disagree	Neutral (Neither Agree nor Disagree)	Agree
Today's program was fun and engaging for my child.	O	O	O
Today's program made this science topic interesting for my child.	O	O	O
As a result of today's program:			
My child is interested in learning more about this topic.	O	O	O
My child is interested in attending other science-related programs and activities at the library.	O	O	O
My child wants to look at or borrow materials related to this topic.	O	O	O
I am more likely to look for science-related materials and resources for my child.	O	O	O
I have a greater appreciation for the role that the public library can play as a science resource in my community.	O	O	O

4. Overall, how much do you feel your child learned today through this program/activity?

Nothing at All (1)	A Little (2)	A Lot (3)
O	O	O

5. What do you think **your child** will remember the most from today's program?

6. What is one thing that **you** learned from today's program that you thought was particularly interesting?

Please tell us a little about yourself and your child

7. How often do you **visit** the public library in this town? Please mark the response that best reflects your typical activity.

    O   At least once per week

    O   At least once per month

    O   3-4 times per year

    O   Once or twice per year

    O   Never

8. How many children came with you to today's program? _____

9. How old are the children who attended today's program with you? (Years)

    Child 1 _____   Child 2 _____   Child 3 _____   Child 4 _____

10. How important are today's kinds of activities to you as a library user?

    O   Not Important at All

    O   Not Very Important

    O   Moderately Important

    O   Very Important

11. Do you have any suggestions for additional science-related programs or resources for children that you would like to see at the library?

Thank you for your help with this survey.

Libraries as Science Resource Centers
Program Evaluation – Children's Version

We want to know what you think about today's program at the library. Please answer the questions on both sides of this page to let us know what you think. To mark your answers, please fill in the circles completely, like this: ●

---

1. What was the name of today's program or activity? (Ask the librarian if you do not know.)

   _____

2. Look at each of the sentences about today's program/activity. For each sentence, please fill in the circle if you agree (☺), if you disagree (☹) or if you don't know (😐).

	Disagree	Don't Know	Agree
Today's program was fun and interesting.	☹	😐	☺
As a result of today's program:			
I want to learn more about this topic.	☹	😐	☺
I want to come to other science programs at the library.	☹	😐	☺
I want to look at or borrow books about this topic.	☹	😐	☺
I want to look at or borrow books about other science topics.	☹	😐	☺
The library is a great place for me to learn about science.	☹	😐	☺

3. How much do you feel you learned today at the library? Mark the answer that is most true for you.

   ○ Nothing

   ○ A Little

   ○ A Lot!

4. Tell us **one interesting thing** that you learned at today's program.

Please tell us a little about yourself

5. How often do you **visit** the public library?

  ○ Every week

  ○ Every month

  ○ 3 or 4 times each year

  ○ Once or twice each year

  ○ Never

6. Do you want your library to have more programs about different kinds of science topics?

  ○ Yes

  ○ No

  ○ Not Sure/Don't Know

7. What other science programs would you like to have at the library? Do you have any suggestions?

Thank you for your help with this survey.

Library Baseline Site Visit Protocols

TOPICS:
- Background/Context (Library history, prior STEM involvement, why this initiative?
- Current capacity: Space, Funding, Staffing, STEM Resources, Partnerships around STEM, State Library Agency Role, Communications
- Goals for Initiative: Goals, expected impacts, measuring impacts
- Stakeholders/Influencers: Budget and funding support
- Other comments?

Library "Team" (Director, STEM lead, etc.) – Library Overview

Topic	Questions
Background/Context	

Setting:	• **Tell me about the town(s) where you are located:**
	  – Population – size and diversity
	  – Socioeconomic characteristics
	  – Local government and economy (major employers)
	  – Educational institutions (K-12 and Higher Ed)

Library	• **What has been the history of the library in the town?**
	  – **What role has the library traditionally played in the community?**
	  – To what degree is the library seen as a source of information/support in the community?
	  – How is the library helping to address issues important to the community?
	  – Who are the key audiences/stakeholders? Does the library tend to focus on one or another population/role?
	  – To what extent has the library been supported as a key local institution?

History with STEM	• **What has been the library's history/role in regard to STEM?**
	  – Prior STEM initiatives/programs at library
	  – Involvement in state/regional STEM initiatives
	  – Expertise/staffing related to STEM
	  – Resources/materials on hand

Why this initiative?	• **Why this initiative?**
	  – What prompted you to undertake this initiative?
	  – How does this build on/respond to prior efforts?
	  – Fit with other major initiatives by the library
	  – Fit with local STEM issues and government directives (Pew speaks about how a library can help a community address municipal issues)?

Current Capacity	

Space	• **Overall, how big is the library? How is the space organized?**
	  – Square footage
	  – Reading rooms, meeting space, specialized rooms/ resources?
	• **What kind/percentage of space is currently used for STEM-related activities?** Is that permanent space or "as needed"? Is STEM present as you look about the library?
	• What kind of non-public space does the library have (office space, workrooms, storage, etc.)? How much of that is currently available/used for STEM-related activities?
	• **What do you see as the biggest challenges or constraints in terms of space for expanding the library's involvement in STEM?** Are there any particular STEM space "opportunities" or "resources" that the library has?
	• Do you have ideas at this time on how your use of space might change as you become more involved in STEM? What are your hopes/goals around space for STEM?
	• What kind of help do you think you might need to address space needs as you increase your involvement in STEM?

Funding	• **What is the annual budget for the library (dollars)?** • **What are the major sources of funding? (Local government, state/federal grants, fundraising/private sources, etc.)?** • Over the past 5 years has the budget increased or decreased? • What are the budget conditions of the community and how has the library fared compared to other government departments? • What are the major budget allocations (staffing, materials/purchasing, professional development, etc.)? • **Does the library currently have any funds designated for STEM-related staff or activities? How would you characterize that funding – Too little? Adequate? Sufficient or better?** • Has the library actively sought funding for STEM activities in the past few years? With what result? • Do you envision any change in funding available for STEM-related activities and resources? Increase or decrease? • What is the library's recent history in writing competitive proposals and your success rate? • **What do you see as the biggest challenges or constraints in terms of funding for expanding the library's involvement in STEM? Are there any particular STEM funding "opportunities" or "resources" that the library has?** • What kind of help do you think you might need to address funding needs as you increase your involvement in STEM?
Staffing	• **How is the library staffed? How many full-time and part-time positions? How many regular library volunteers?** • How is the library staff organized – major units/departments? Where are STEM-related activities located on the org. chart? • **How much and what kinds of STEM expertise is there currently among library staff? Does the library already have a STEM point person or team? Please describe.** • How do you envision the library staff changing as the library expands its involvement in STEM? Do you anticipate adding additional staff? Developing the skills of current staff? Drawing more heavily on outside partners? • **What do you see as the biggest challenges or constraints in terms of staff for expanding the library's involvement in STEM? Are there any particular STEM staffing "opportunities" or "resources" that the library has?** • What kind of help do you think you might need to address staffing needs as you increase your involvement in STEM?
STEM Resources	• **What kinds of STEM resources does the library have now?** – Does the library have a collection of science or technology-related printed materials? What kinds of materials are included? How large is the collection? On

Current Capacity	
	average, how up-to-date? − What other kinds of STEM resources does the library have (science kits, demonstration materials, maker space, etc.)? How recently were these added? • How actively used are the library's STEM materials, and who are the primary users (or primary users for each type of material)? • Has the use of STEM materials increased, decreased, or stayed the same over the past year or two? Any thoughts on why? • **What do you see as the biggest challenges or constraints in terms of STEM materials/resources for expanding the library's involvement in STEM? Are there any particular STEM materials/resources "opportunities" or "resources" that the library has?** • What kind of help do you think you might need to address resource needs as you increase your involvement in STEM?
Partnerships around STEM	• **Does the library currently partner with any local organizations or businesses to support STEM resources and activities at the library? These might include a friend's group, local schools, colleges and universities, nonprofit science groups, or local businesses, among others.** − If Yes, who are the partners and what is the nature/focus of that partnership? − If No, why not? What have been the challenges and barriers that have limited those local partnerships? − What do you see as the opportunities and challenges for developing or expanding local partnerships around STEM moving forward? Do you have any particular 'targets' in mind?
State Library Agency Role	• To what extent is the State Library agency a resource for your library on STEM? Please describe the kinds of support/assistance they provide related to STEM?
Communications	• What methods and techniques do you use to notify patrons and cultivate their interest in library programming? • How effective do you believe these methods are? What are most successful?

Goals	
Goals for this initiative	• **What are your goals and expectations for this initiative?** − Are there particularly priority populations that you want to serve? Who and why (or why not)? − Are there particular programs or strategies that you want to pursue or see as priorities? Again, what and why? − Are there other changes in basic library operations that you hope to address or impact through this initiative? − Ultimately, in terms of your overall goals and expectations for the library, where does this initiative fit? How important is this to you? To other library stakeholders? To staff? − Do you believe that you will be able to sustain this effort after the IMLS grant ends?
Impacts	• What kind of impacts on patrons do you currently see with current programming? • **What kinds of impacts do you hope to see in two years? What about longer term (for example, 5 years from now)?** − Impacts on role of library in community − Impact on library growth/sustainability? − Impacts on local residents and community at large? − Impacts on library staff and leadership? • What do you think is reasonable to expect in the short-term, given the timeframe for the initiative? How much change, how soon?
Measuring impacts	• What thoughts do you have about measuring impacts?

Goals	
	– What kinds of indicators/benchmarks do you think it will make sense to look at? – What will "success" look like from your perspective? • What kinds of information/data does the library currently collect related to patron impact? Circulation data? Patron surveys? Other kinds of feedback? • What do you think are the most feasible ways to gather feedback from patrons on their STEM experience in the library? Are there strategies that you "know" wouldn't work?

Stakeholders/ Influencers	

Funding and budget support	• **Who do you see as the key stakeholders and influencers in the library's efforts to expand its role as a STEM resource in the community**? Which people, groups, institutions, etc. have an important voice/influence on the library's growth and development? (This might include staff, town leadership, Friends, other institutions in town, etc.)
	• **To what extent are key stakeholders aware of this initiative?**
	• To what extent have key stakeholders bought-in to the expansion of the library's role as a STEM resource for the community?
	    – Are key stakeholders generally supportive of this effort?
	    – If not, what kinds of concerns/issues are you likely going to have to address?
	• **What do you see as the biggest challenges or constraints (if any) in building support for expansion of the library's involvement in STEM?**
	• Are there any particular "opportunities" or "resources" for building that support?
	• What kind of help do you think you might need in building support for increased involvement in STEM?

Other Thoughts	
Other comments?	What else do you think is important for me to understand about your library and this initiative?

Library Director/Library Staff (Individual Questions)

Topic	Questions
Role	• What do you see as your role in this initiative?
Experience	• What experience with STEM do you bring to the initiative?
Professional Development/ Training	• What kinds of professional development/training have you received, if any, to help you build the STEM capacity of this or other libraries where you have worked? • What has been the most helpful training/PD in that regard? • What kinds of training/PD would you like to have as part of this initiative?

Confidence as STEM facilitator	• One of the goals of the initiative is to increase the capacity of library staff to serve as "STEM facilitators."
	  – How would you assess your (individual) readiness now to be a STEM facilitator? Please explain?
	  – What kinds of knowledge or skills do you think you need to develop in order to play that role?
	  – How confident are you about your ability to become a STEM facilitator over the next two years?

Library readiness	• How would you assess the readiness of the library (as an institution) to become a STEM resource in the community? What knowledge, skills, capacities do you think the library needs to develop in order to take on that role?

Challenges and Opportunities	• The goal of this initiative is for the library to become more of a STEM resource in the community.
	  – In general, what do you see as the challenges and opportunities in that goal?
	  – To what extent do you think becoming a STEM resource will help strengthen the library and its role in the community? How?
	  – What do you see as the major challenges to meeting that goal?

Leadership Challenges (Director Only)	• What do you see as the key challenges facing you as a leader in moving the library towards becoming more of a STEM resource in the community? • What kinds of unique help do you think you need in terms of making you successful in that leadership role?

Measuring Impacts	• What thoughts do you have about measuring impacts?
	  – What kinds of indicators/benchmarks do you think it will make sense to look at?
	  – What will "success" look like from your perspective?

Library Stakeholders (Friends, Trustees, Local Government)

Topic	Questions
Role	• What is your history and relationship with the library?
Perception	• How do you think the library is seen in the community, in general and in terms of STEM? • To what extent do residents in this community see the library as an important resource? As a "go to" place to get information? • To what extent do you think residents see the library as a place to go for STEM information or learning? • What other kinds of roles do residents see the library as playing in the community? What do they value about the library, from your perspective?

Challenges and Opportunities	• The goal of this initiative is for the library to become more of a STEM resource in the community.
	  – In general, what do you see as the challenges and opportunities in that goal?
	  – To what extent do you think becoming a STEM resource will help strengthen the library and its role in the community? How?
	  – What do you see as the major challenges to meeting that goal?

Library readiness	• How would you assess the readiness of the library to become a STEM resource in the community?
	  – What knowledge, skills, capacities do you think the library needs to develop in order to take on that role?
	  – What do people in the community need to see from the library in order to view it as an important STEM resource?

	• What role (if any) do you expect to play in this initiative? • What do you think you can do in your role vis a vis the library to help it become more of a STEM resource in the community? • What kinds of help or support do you think you need/would you like to help you accomplish that goal?

Outcomes	• What thoughts do you have about measuring impacts?
	  – What kinds of indicators/benchmarks do you think it will make sense to look at?
	  – What will "success" look like from your perspective?

Library Post-Program Site Visit Guide

Library "Team" (Director, STEM lead, etc.) – Library Overview

	Post Program Questions
Overview: Goals and Accomplish-ments	• As you look back over the past 18 months, what do you see as the library's biggest accomplishments through this initiative? • What do you see as the major challenges or disappointments? • What would you highlight as the most significant lasting impact?

Impact on the Library-I	• What impact has this initiative had on the library's activities?
	
	    – What kinds of new programs have you developed?
	    – What new kinds of spaces or activities have you implemented?
	    – What resources have you added to the library or its collections?
	    – How has the library changed the ways it describes or 'brands' its programs and services?
	
	• To what extent are these activities/resources likely to be sustained after the end of the grant? How?
	• If no changes, why not?
	• What lessons have you learned about implementing these new activities? Are there approaches that worked? What was less successful or challenging? What would you do differently if starting a similar initiative?

	Post Program Questions

Impact on the Library-II	• Changes in library organization/operations
	
	   – **How have the library's operations changed?** Has science become an integral part of library planning and operations? How?
	
	   – **Has the library changed the way it is organized to better integrate science**? How has it changed the ways it plans and implements programs? How has it changed the way it budgets and staffs its operations? How has it changed the way that it uses space?
	
	   – **How has the initiative impacted library staff**? Are library staff more/less comfortable with the idea of science as part of the library's operations? Are staff more likely to bring their own science-related interests into library programs? Are they more confident providing science-based programming?
	
	   – **Has the library developed new partnerships/connections into the community**? With who? What difference have those connections made in the way the library works on STEM?
	
	   – **How has the initiative impacted library funding?** Has the library developed new funding sources to support STEM? Reallocated resources?
	
	   – **Has the initiative had an impact on library leadership/governance?** Are library trustees/local officials more interested or supportive of STEM programming? Do key stakeholders see a role for the library as a STEM resource center?
	
	• To what extent are these structural/organizational changes likely to be sustained?
	
	• If no changes, why not?
	
	• What lessons have you learned about changing these kinds of organizational approaches? Are there strategies that worked? What was less successful or challenging?

Impact on Library's role in Community?	• What impact have you seen on the library's role in the community?
	
	   – **Have there been changes in who uses the library?** Is the library, for example, attracting more younger or adult patrons as a result of the new STEM programming?
	
	      * **What data can we use to examine changes (patron numbers, circulation of science materials, etc.)?**
	
	   – **Are community members and local institutions (such as the schools) using the library differently?** Are new groups interested in working with the library?
	
	   – **Is there evidence that the library is seen as a focal point for science literacy in the community?** Describe.
	
	   – **Has the role of the library in the community changed in other ways?**

Challenges (Space, Funding, Staffing, etc.)	• **What kinds of challenges or constraints has the library had to address** in the course of expanding the library's role as a science resource center?
	
	   – Space?
	
	   – Funding?
	
	   – Staff training/skills/support?
	
	   – Community support?
	
	   – Other?

	Post Program Questions
	• How did you address those challenges? What kinds of strategies did you use that worked? • What additional kinds of help/support would you have liked to have had?
Key Strategies – What Works?	• More broadly, were there any strategies or approaches that you found to be particularly effective in expanding the library's role as a science resource center? What worked? What did you try that didn't work? • What advice would you offer to another library interested in expanding its involvement in STEM?

Sustainability and Support	• To what extent and how will the library sustain any expanded role as a science resource center?
	   – How has that role been integrated into library budgets?
	   – Staff patterns? Funding and fundraising?
	   – Culture?
	
	• What are the major threats to sustainability? How is the library addressing them?

Cornerstone Support/Process	• How would you assess the support you received through Cornerstone for this initiative? What was most helpful? What could have been improved? • How did the initial planning process work for your library? What did you find useful? What elements were less successful? • How effective was the cross-library exchange provided by Cornerstone (conferences, phone calls, etc.)? What did you find useful? What would you change? • What suggestions do you have for strengthening/improving the kinds of supports/tools provided by Cornerstone? (I.e., what should they do differently?) • What do you think libraries need to make the kinds of changes envisioned in this initiative? • How important was the $6000 from Cornerstone? What did it let you do? How have you used the funds? • Would you have done these activities without external funding?

State Role	• To what extent has the state library agency supported the expansion of your library's role as a science resource center?
	   – To what extent have you used the STEM clearinghouse developed for the project? How helpful was that tool?
	   – To what extent have you participated in professional development or training, and how useful were those supports?
	   – What role has the library's STEM liaison played in helping your library plan and implement its programs?
	
	• Overall, what kinds of supports have been most useful? What has helped the least?
	
	• What advice would you offer to refine the state library's role in supporting STEM at your local library?

Lessons Learned	• In general, what kinds of lessons learned have emerged from your experience? • What advice do you have for other libraries hoping to expand their role as science resource centers? • Are there a few key lessons or strategies that you think were particularly important?

	Post Program Questions
Overall Pros/Cons	• Overall, how would you assess the impact of this initiative on your library? • When you compare with the original goals for your library, what have you achieved?

Other questions:
- Consortium arrangement in Western Mass. How did that work? How did they communicate, share resources, or operate independently? What worked, what was a challenge?

Library Director/Library Staff (Individual Questions)

Topic	Questions
Role	• What role have you played in this initiative?

What have you learned?	• What have you learned as a result of this initiative?
	  – What new skills have you gained?
	  – How have your interests changed?
	  – How has your interest/involvement in STEM changed?
	• What helped make that happen? Professional development? Conferences? Staff meetings? One-to-One learning?

Confidence as STEM facilitator	• One of the goals of the initiative is to increase the capacity of library staff to serve as "STEM facilitators."
	  – Do you see yourself as more ready to serve as a STEM facilitator? In what ways? Why or why not?
	  – Do you feel more confident working with STEM related programs? Again, why or why not?
	  – Have you had a chance to develop and run new STEM programming? What was that experience like? What was challenging? What worked well for you?
	  –

Library STEM Capacity	• Overall, how do you assess the library's capacity to serve as a STEM resource?
	  – Do you think the library's capacity has changed as a result of the initiative? If so, how?
	  – Do you think the library's involvement in STEM is likely to be sustained? If so, why and how?
	  – What role do you hope to play going forward?

Library as STEM resource	• The goal of this initiative was for the library to become more of a STEM resource in the community.
	  – To what extent do you think the library has become more of a STEM resource? Why or why not?
	  – To what extent do you think becoming a STEM resource has helped strengthen the library and its role in the community? How?
	  – What were the major challenges to expanding the library's involvement in STEM? What do you think helped/how were those challenges addressed?

Leadership Challenges (Director Only)	• What have been the key challenges for you as the library leader in moving the library towards becoming more of a STEM resource in the community? • What was most helpful in doing that work? What other kinds of help would you have liked to have?

Measuring Impacts	• What thoughts do you have about measuring impacts?
	  – What kinds of indicators/benchmarks do you think it will make sense to look at to see if this initiative made a difference?
	  – What would you look at to measure "success."

Library Stakeholders (Friends, Trustees, etc)

Topic	Questions
Role	• What is your history and relationship with the library? • How familiar are you with the library's efforts to increase its involvement with STEM?
Perception	• How do you think the library is seen in the community, in general and in terms of STEM? Do you think that has changed as a result of this initiative? • To what extent do you think residents see the library as a place to go for STEM information or learning? Has this initiative made a difference? • What other kinds of roles do residents see the library as playing in the community? What do they value about the library, from your perspective?

Challenges and Opportunities	• The goal of this initiative was for the library to become more of a STEM resource in the community.
	  – In general, what do think the biggest challenge has been in meeting that goal?
	  – What do you think has been the greatest opportunity? What has "worked" in increasing the library's identity as a STEM resource?
	  – To what extent do you think it is important for the library to sustain this STEM effort? What do you think are the challenges and opportunities there?

Library readiness	• How would you assess the readiness of the library to become a STEM resource in the community given the past two years?
	  – To what extent do you think the library staff have the knowledge, skills, capacities needed to serve as STEM resources?
	  – What has made the most difference for the library in positioning itself as a STEM resource - what do you think was most helpful?
	  – What do you think staff and leadership still need in order to take on that role?
	  –

Advice	• What advice would you offer other libraries interested in becoming more involved in STEM? What helped? What should they watch out for?

Outcomes	• What thoughts do you have about measuring impacts?
	  – What kinds of indicators/benchmarks do you think it will make sense to look at to assess the effectiveness of this effort?
	  – What would "success" look like from your perspective?

Library Partners

Topic	Questions
Role	• What is your history and relationship with the library? • How familiar are you with the library's efforts to increase its involvement with STEM?
Background	• What prompted you to get involved with the library? How were you approached? What appealed to you? Did you have any concerns?
Activities and impacts	• What specific activities have you been involved in with the library during the past two years? • What do you see as the principal benefits to you and your organization? • Have there been costs? If so, what, and to what extent do they represent a challenge? • How successful do you think your involvement has been? Did you accomplish what you had hoped? Why or why not? • Are you interested/planning to sustain your involvement? In what ways? Why or why not? • Looking ahead, what advice would you offer the library in pursuing future partnerships? What advice would you offer potential partners?
Community Perception	• Stepping back a bit, how do you think the library is seen in the community, in general and in terms of STEM? Do you think that has changed as a result of this initiative? • To what extent do you think residents see the library as a place to go for STEM information or learning? Has this initiative made a difference? • What other kinds of roles do residents see the library as playing in the community? What do they value about the library, from your perspective?

Challenges and Opportunities	• The goal of this initiative was for the library to become more of a STEM resource in the community.
	  – In general, what do think the biggest challenge has been in meeting that goal?
	  – What do you think has been the greatest opportunity? What has "worked" in increasing the library's identity as a STEM resource?
	  – To what extent do you think it is important for the library to sustain this STEM effort? What do you think are the challenges and opportunities there?

Library readiness	• How would you assess the readiness of the library to become a STEM resource in the community given the past two years?
	  – To what extent do you think the library staff have the knowledge, skills, capacities needed to serve as STEM resources?
	  – What has made the most difference for the library in positioning itself as a STEM resource - what do you think was most helpful?
	  – What do you think staff and leadership still need in order to take on that role?
	  –

Advice	• What advice would you offer other libraries interested in becoming more involved in STEM? What helped? What should they watch out for?

Outcomes	• What thoughts do you have about measuring impacts?
	  – What kinds of indicators/benchmarks do you think it will make sense to look at to assess the effectiveness of this effort?
	  – What would "success" look like from your perspective?