FULL PROPOSAL ABSTRACT, NARRATIVE, AND SCHEDULE OF COMPLETION

Vermont Department of Libraries

ABSTRACT

Lead applicant Vermont Department of Libraries (VTLIB) will partner with the Vermont Center for the Book (VCB) and the Montshire Museum of Science (MMS) to develop the Vermont Early Literacy Initiative - STEM (VELI-STEM) over three years (11/1/15 - 10/31/18).

U.S. policymakers and education experts have made clear the urgent need for STEM (Science, Technology, Engineering and Mathematics) learning opportunities for citizens of all ages nationwide. Research shows that learning in informal environments such as public libraries can positively influence children's science learning in school, the pursuit of STEM occupations and an interest in lifelong science learning. The challenge is that librarians in small, rural libraries have limited ability to offer meaningful, ongoing and informal STEM learning experiences.

This project will equip public librarians from 25 Vermont libraries with the concepts and practices essential to STEM learning appropriate for children ages 3-7, along with the tools to deliver intentional, open-ended, ongoing and standards-based STEM learning experiences and programming and will give librarians approaches that will build on their own expertise while incorporating new content and skills. VELI-STEM will provide librarians with the resources and training needed to recognize and use opportunities to weave STEM language and ideas throughout their programming for young children, parents and community childcare providers.

The first key outcome is that librarians from rural communities will have been trained to recognize opportunities to incorporate STEM learning experiences for children and families throughout their library practice, including "story hours," after-school programming, collection development, displays and "Discovery Science Centers," newsletters and bibliographies. The second outcome is that librarians will have received advanced STEM training, learning tools (such as picture books), hands-on learning methods and materials and other STEM resources. Third, librarians will have access to and will inform an online STEM Clearinghouse of Resources developed throughout and after the project. Fourth, librarians will have transferred their newly acquired STEM knowledge and skills to community childcare providers through outreach and training programs so that providers will, in turn, introduce STEM learning experiences to the preschool children in their care.

Project evaluation and measurement will include: all 25 participating librarians, a sub-set of participating children and families, community childcare providers and key community stakeholders. The Project Evaluator will collect and analyze both quantitative and qualitative data at every level of the project, in order to measure and assess the ongoing operation (progress indicators) and overall effectiveness (outcomes) of the project.

The replicability of VELI-STEM is essential to project success and sustainability. Project personnel will select hands-on project materials with an eye to accessibility and cost. The STEM Clearinghouse of Resources and YouTube channel will remain active throughout the three years of the project, and VTLIB will work with COSLA (Chief Officers of State Library Agencies) to promote the program to other states, so that librarians everywhere—particularly in rural libraries across the country—will have access to training materials and will be able to use the resources and curriculum in perpetuity.

VELI-STEM addresses the IMLS goal: "To place learners at the center and support engaging experiences in libraries that prepare people to be full participants in their local communities and our global society." In addition, VELI-STEM will help libraries ensure their place in the greater community as informal STEM learning environments for young children and their families.

STATEMENT OF NEED

U.S. policymakers, education experts and business leaders have made clear the urgent need for STEM learning opportunities for citizens of all ages. According to the U.S. Department of Commerce, "The greatest achievements in our society, from medicine to mechanics, have come from the minds of those interested in or studied in the areas of STEM…STEM jobs are the jobs of the future." (U.S. Department of Commerce, 2011*) The National Education Association has called on educators, parents, businesses and community leaders to give all children the STEM learning foundation necessary to compete in the worldwide economy: "Bolstering STEM education combines the principles of social justice as well as economic competitiveness, and brings together different community interests to work towards a shared goal: student achievement." Moreover, it has been stated that 95% of STEM learning occurs outside the formal education sector. (*American Scientist,* 2010*)

   * *See:* "Addendum: Narrative References" in Supporting Documents, SupportingdocAddendum1.pdf

If most STEM learning is to occur outside of school, it is the responsibility of communities to support high-quality learning programs. Public libraries are uniquely positioned to provide young children and their families with opportunities to explore a wide range of STEM topics, practice inquiry, express their curiosity and experience the excitement of problem-solving and genuine discovery.

Research shows that learning in informal environments such as public libraries can positively influence children's science learning in school, their pursuit of STEM occupations and their interest in lifelong science learning (Dusenbery, 2013*). Public libraries are already established as community resource centers, especially in small towns and rural areas. The challenge is that librarians in our smallest and most rural libraries have limited ability to offer effective STEM learning experiences (RMC, 2007*). While librarians are trained to provide print and digital resources for STEM learning, they are often unable and unprepared to provide sustained experiential learning for young children and their families.

An environmental scan of online STEM resources designed for children shows three results: (1) craft projects masquerading as STEM learning; (2) resources that are teacher-directed and/or designed specifically for classroom use; and (3) resources for children's librarians which are meant to be used in one-time programs, a series of programs with a different topic each session or in occasional single-topic family nights. Research has shown that "One-time activities—a single exploration of materials or a demonstration…have serious limitations. They deprive children of opportunities to actively engage in scientific inquiry and to collect and compare many related experiences over time in pursuit of new explanations or ideas. Not only do children learn science best through long-term investigations…but when inquiry is a central focus…they learn literacy skills, social skills and mathematics as well. Inquiry requires learners to use language to build a specialized vocabulary and a way of talking about experiences, and to record their observations and ideas." (Shillady, 2013*)

Although some public libraries have access to interactive exhibits or short-term maker-space programs with a STEM theme, the reach of these exhibits/programs is limited due to high cost or space requirements, and such exhibits are rarely designed for use with children ages 3-7. Lack of physical space and resources are just some of the challenges that small, rural libraries face. In Vermont, one of the most rural states in the country, young children and their families have limited, if any, opportunities for out-of-school STEM programming. Access to science museums is also a challenge for residents of rural states. The barrier to providing rich, hands-on and open-ended science learning experiences for children in our rural libraries is not a lack of available classroom lesson designs or published instructional materials, but rather the gap in awareness of these materials (many which can be adapted

for use in libraries) and the required training and skills for librarians to successfully and confidently implement such programs in a public library setting.

To respond to this need, the Vermont Department of Libraries (VTLIB), in partnership with the Vermont Center for the Book (VCB) and the Montshire Museum of Science (MMS), requests $343,971 in IMLS funding to develop the Vermont Early Literacy Initiative-STEM (VELI-STEM) program to identify, validate and adapt the strongest hands-on STEM activities already available and compile them into an easy-to-use, online and interactive STEM Clearinghouse of Resources for public librarians. VELI-STEM will implement a compelling model for providing new kinds of learning for young children in small and rural libraries, the lessons from which could be replicated in libraries and communities across the U.S., providing an inviting pathway to STEM learning, STEM-related careers, and lifelong exploration starting in young childhood and spanning through adulthood.

VELI-STEM will give librarians the tools they require to deliver intentional, open-ended, ongoing and standards-based STEM learning experiences and programming and will give librarians approaches that will build on their own expertise while incorporating new content and skills. Librarians will learn to incorporate inquiry methods, such as: asking open-ended questions, documenting and representing, communicating and reflecting on what is being learned and using appropriate STEM vocabulary to name skills and practices. VELI-STEM librarians will learn to recognize and incorporate STEM language and ideas throughout their programming.

The twenty-five (25) Vermont public libraries participating in this project are already part of a broader established network of seventy-five Vermont libraries that have implemented programs of the Vermont Early Literacy Initiative (VELI), a collaboration of VTLIB and VCB, established in 2010. The 25 libraries have been selected for VELI-STEM based on location, population and a proven record of success in and commitment to the VELI program. Thanks to VELI, librarians have improved the cognitive content of their programming, elevated the traditional library story hour into meaningful learning experiences for children and provided engaging resources for parents, with outreach to local childcare providers. (See: *VELI Partnership* in Supporting Documents, SupportingdocVELI2.pdf.) The VELI-STEM librarians represent a wide range of professional expertise and come from libraries that vary in both the availability and the quality of institutional resources, including current, engaging book collections, public computers (and perhaps digital devices), robust websites and fluency in the use of social media. And, while all are rural, their communities do provide a wealth of locally available "people resources," from retired engineers to gardeners, science educators to carpenters. The VELI-STEM librarians share positive common characteristics: they know and love books; they see the library as a community resource for information, materials and programs; they serve children and families; and they offer outreach to local organizations, including childcare sites. However, they do not currently offer intentional STEM learning programs for young children, families and childcare providers. Nor do they have programs designed to introduce young children to adults who work in STEM-related careers.

Data gathered from the VELI librarians showed that our previous trainings and resources helped to improve service delivery in their libraries and at community outreach sites with regard to early literacy and mathematics. Delivering hands-on STEM learning for young children with a focus on Physical Science is the logical next step. (See: Data and anecdotal information in *VELI Partnership* in Supporting Documents, SupportingdocVELI2.pdf.) According to one VELI librarian, "In order to give young children the support they need in STEM, the people who work with young children need to understand what STEM looks like for 3-7 year olds. Through VELI, librarians like myself have been uniquely positioned to be not only role models and trainers for childcare providers, parents and other adults who

work with young children, but through VELI, have become experts…our community members look to us as a resource." (See: *Library Letters of Support* in Supporting Documents, SupportingdocLibrarySupport3.pdf.)

The VELI-STEM project will add a new dimension to children's learning in public libraries by equipping librarians to incorporate STEM, namely Physical Science Through Inquiry, for children ages 3-7 into all aspects of librarian practice, including library-based and community-based programs. The emphasis will be on creating and evaluating a professional development model that meets the specific needs of rural librarians (often in small buildings with limited staff, training, funding and material resources), providing them with the tools (resources), knowledge (STEM content), practice (model Inquiry Science investigations as part of the training) and confidence needed to incorporate STEM learning experiences wherever possible.

IMPACT

The VELI-STEM design encourages learners at every level—primarily children ages 3-7, their families and community childcare providers—to have multiple opportunities to engage in discovery about Physical Science: Force and Motion, Sound and Light and Air and Water. (See: *VELI-STEM Curriculum* in Supporting Documents, SupportingdocCurriculum4.pdf.) VCB's experience working with libraries nationwide in *What's the BIG Idea?* showed that librarians need to experience first-hand the skills and practices of inquiry before exploring content with children (RMC, 2007*). Librarians need to experience, as Richard Feynman termed it, "the pleasure of finding things out" before they can convey these concepts to children (Robbins, 1999*). Librarians also need practice in furthering the inquiry process by asking clarifying, open-ended and extending questions, commenting to children on what they observe and giving children prompts that help move the process forward. These learning facilitation skills are not typically included in library education so training and reinforcement are essential parts of this process.

This project addresses the IMLS goal: "To place learners at the center and support engaging experiences in libraries that prepare people to be full participants in their local communities and our global society." While libraries are already centers for lifelong learning in their communities, VELI-STEM has the potential to revolutionize how library staff, librarians themselves and community members regard the library, resulting in the more strategic use of libraries to build the requisite intellectual capital for a thriving 21st Century society and economy. Librarians will come to view their practice, programming and their library's physical space through an expanded set of lenses that will compel them to create a new learning environment that supports STEM and hands-on learning, starting with our youngest learners. VELI-STEM will also provide a pathway to STEM and hands-on learning in the library for others, including school-age children and adults, and can serve as a model for how librarians can facilitate learning in other subject areas.

One of the most notable impacts will be the development of a scalable, replicable model of best practices in effective STEM-related programming and resources for use by librarians with young children, which can be used for effecting systemic change in libraries nationwide, large and small, urban and rural. Toward that end, all materials and activities will be developed based on the Common Core State Standards and Next Generation Science Standards. In addition to providing a model for effective training, the project will include development of a coherent and comprehensive STEM Clearinghouse of Resources made available to (and informed by) VELI-STEM librarians throughout the project. The hands-on materials, trainings and other resources developed throughout this project will be promoted via a YouTube channel and other social media.

The past success of VELI in transforming the practice of Vermont librarians who work with young children points to the value of extending VELI-STEM training to other state library agencies, which would in turn offer training to their local librarians. In addition to the STEM Clearinghouse of Resources and YouTube videos of Vermont librarian trainings, we believe that an in-person orientation will be important for other states to successfully rollout this program. IMLS has already made an investment in building the capacity of COSLA's (Chief Officers of State Library Agencies) member agencies with funding for the CE Connector project which stimulates cross-state sharing and development of continuing education (CE) resources, curricula and training. VELI-STEM proposes to support this model by virtual sharing of project findings via the "CE Community of Practice" and training for up to 22 state library agencies at the 2017 COSLINE (Council of State Library Agencies in the NE) conference. (See: COSLA letter of support in SupportingdocSupportletters5.pdf.)

The key project outcomes will be that a cohort of librarians from 25 rural and small libraries will have: (1) received advanced STEM training, mentoring, learning tools (such as picture books), hands-on learning methods and materials and other STEM resources; (2) been trained to recognize opportunities to incorporate STEM learning experiences for children and families throughout their library practice, including story hours, after-school programming, collection development, displays, "Discovery Science Centers," newsletters and bibliographies; (3) been given ample opportunity to access and contribute to an online STEM Clearinghouse of Resources developed throughout and after the project; and (4) transferred their newly acquired STEM knowledge and skills to community childcare providers through outreach and training programs so that providers will, in turn, introduce STEM learning experiences to the young children in their care.

In addition, project capacity will have been extended by conducting outreach to and informational exchanges with library staff, library directors and trustees, town officials, local businesses, the American Library Association (ALA), ARSL, COSLA and other key change agents in order to affect a fundamental shift in the roles that libraries play in the life of their communities and, more specifically, in setting a lifelong course of STEM learning, inquiry and career exploration for program participants. We believe that an important consequence of this program will be a growing recognition by policymakers of the dynamic role that public libraries can play in supporting STEM learning that contributes to career awareness, future workforce development and overall economic development.

Ongoing project monitoring, a project-end evaluation and a follow-up evaluation will be conducted by Dr. Kelly Myles, an independent evaluator based in Vermont. In conducting the VELI-STEM evaluation, Myles will use a hybrid of Results-Based Accountability™ (RBA) and Utilization Focused Evaluation (UFE). RBA informs ongoing program monitoring by addressing the questions "How much is being done?" and "How well is it being done?" The evaluator will apply project data to answer those questions and to make any needed project improvements and corrections along the way. At the end of the project, we will want to be able to answer the question: "What's different?" Myles will use both RBA- and UFE-driven approaches to measure success and to disseminate results to support STEM learning and innovation in libraries across Vermont and beyond.

The VELI-STEM evaluation will be designed to assess the extent to which the project goals and objectives were achieved, or not fully achieved. In order to accomplish this, the evaluation will apply a combination of methods to answer a series of questions. (See: *VELI-STEM Evaluation Plan* in Supporting Documents, SupportingdocEvaluation1.pdf for sub-set measurements). The "levels of

measurement" of the evaluation will include all 25 participating librarians (and their libraries), a sub-set of participating children and their families, childcare providers, and key stakeholders from each of the communities served by the project libraries. The evaluator will use a variety of methods to collect and analyze both quantitative and qualitative data at each level of measurement, in order to assess the ongoing operation (progress indicators) and overall effectiveness (outcomes) of the project. The following data collection methods will be used throughout the project: pre-formatted data-tracking Excel spreadsheets, surveys, observations, interviews to collect anecdotal information and archival records. (See: *VELI-STEM Evaluation Plan* in Supporting Documents, SupportingdocEvaluation1.pdf.)

Summative statistics will be processed using Excel formulas. Quantitative data visuals will be generated using Excel and Tableau. In addition, the evaluator will conduct qualitative analysis by running keyword frequency distributions using word-clouding software and other qualitative analysis tools. All statistics and data visuals will be compiled using the latest data "storytelling" techniques to reveal how and why the project did (or did not) succeed, so as to make the evaluation accessible and useful to library audiences and community partners. Statistics will be continually shared with the full project team throughout the project to inform any necessary mid-course corrections.

Evaluation results will be widely disseminated using a "storytelling" format, using data visuals and a brief narrative-style presentation, much like that found in traditional picture books. These VELI-STEM stories will include the perspective of the librarians, as well as the children and families (presented anonymously), and will be shared with a wide array of key stakeholders: in person, remotely through Web-based real-time presentations and via a visually rich final report. (See: VELI Partnership in Supporting Documents, SupportingdocVELI2.pdf. for a list of potential target participants in the VELI-STEM "storytelling" and a list of recipients of VELI-STEM reports.)

We will submit proposals to publish project evaluation results and outcomes in a variety of industry periodicals, such as library science, government, evaluation, educational and scientific publications. In addition, evaluation results will inform longer-range strategies of VTLIB, VCB and MMS to expand the role that libraries play in community-based lifelong learning and in supporting local and statewide economic development through the development of intellectual capital, career awareness and the personal development and enrichment of local citizens of all ages.

PROJECT DESIGN
The overarching goal of VELI-STEM is to transform librarian practice to infuse STEM content, skills and knowledge into all aspects of their work with children ages 3-7 and their families. The goal will be achieved through these objectives, which are both achievable and measureable:
- Recruit and train 25 librarians from rural communities in STEM content (Physical Science Through Inquiry), skills and knowledge over three years;
- Develop and monitor an online STEM Clearinghouse of Resources for project librarians to access and inform during the three years of the project;
- Investigate with librarians ways to recognize STEM language and concepts in picture books and other existing library resources, in order to be confident and competent in using this knowledge in ongoing programming;
- Assist librarians in the infusion of appropriate STEM content into their regular practice, including collection development, ongoing programming, conversations, bibliographies, displays and outreach;

- Provide librarians with non-fiction books, STEM resources and hands-on learning materials to be used throughout the library setting and in programming with children, families and childcare provider trainings and in the development of library "Discovery Science Centers";
- Support development of programmatic relationships between librarians and community STEM resource people;
- Develop and promote a YouTube channel and other social media for librarians to use as resources and networking tools;
- Evaluate efficacy of training and materials for refinement and dissemination of results, and for replicability;
- Disseminate and promote project results. (See: *VELI-STEM Evaluation Plan* in Supporting Documents, SupportingdocEvaluation1.pdf for detailed information on dissemination and use of project results).

VELI-STEM will focus on Physical Science Through Inquiry: Year One, Force and Motion; Year Two, Sound and Light and; Year Three, Air and Water. (See: *VELI-STEM Curriculum* in Supporting Documents, SupportingdocCurriculum4.pdf.) The primary goal of Physical Science experiences for children is to allow them to explore objects, materials and events in new and different ways. The more learning experiences children have, the more they can ask new questions and construct new theories about what is happening and how things work. Children will also ask questions about how and why. Some questions such as "What will happen to the ball when it rolls down this ramp?" lead to new investigations. Other questions may lead to simple experiments, such as "Which ball rolls the farthest after going down a ramp?" Librarians can encourage this investigation through the use of fiction and non-fiction picture books and rich discussion.

In order for librarians to develop their own skills and knowledge, they need time and opportunities for collaboration. The project sequence allows for three years of progressive development for librarians to understand what it means to engage children in inquiry-based experiences, the nature of facilitation and guidance that adults can offer in order to challenge and engage children and to strengthen content knowledge. By mixing face-to-face and online work, VELI-STEM will allow for the development of a collaborative and networked learning community that values both the specialized knowledge of different cohorts and the communal knowledge that is built through interaction. Innovation in what libraries offer to their communities lies in the transformation of librarian practice, and in this case, including STEM offerings wherever possible.

The Project Team has already recruited librarians from 25 Vermont libraries. Criteria for selection included: (1) past VELI participation with appropriate use of VELI training and resources in local library programs; (2) enthusiasm and ability to sustain interest and be engaged in the VELI-STEM program for three years and beyond; (3) proven record of collaboration and outreach in the local community; (4) interest and ability to promote VELI-STEM to stakeholders, community members and other librarians; (5) support of the local library director and library board, and (6) size and location of the library to ensure that the experience can be easily replicated by small and rural libraries across the country.

In order to infuse librarian practice with opportunities for STEM and provide informal, out-of-school STEM learning opportunities for young children and their families in the public library, VELI-STEM will carry out the following project activities. (*See: Schedule of Completion* in Required Documents.)
1. Recruit 25 librarians, each from a rural Vermont library, using the criteria listed above;

2. Identify and compile high-quality STEM resources and build an online STEM Clearinghouse of Resources;

3. Develop administrative documentation for project;

4. Develop online presence (YouTube channel and other social media);

5. Compile training materials and offer a two-day training (each project year) in Physical Science;

6. Purchase and ship books and hands-on STEM materials to participating libraries for programming (family programming, training for community childcare providers);

7. Monitor project by conducting site visits;

8. Work with the project evaluator to gather data and feedback from librarians, program participants and stakeholders;

9. Promote VELI-STEM at meetings and conferences in Vermont and nationally;

10. Plan and conduct a one-day follow-up training for project librarians each year to gather feedback and to inform the following project year;

11. Publish a final report and disseminate widely project data and outcomes, including a press conference at which the report will be unveiled, and provide training for selected COSLA member states to expand the program in small and rural libraries beyond Vermont.

VTLIB, VCB and MMS will partner during the course of this project. All three entities have a long history of successful collaborations. VTLIB and VCB have collaborated for over 20 years in the development and fielding of language and literacy programming for young children and their families in public libraries, starting in 1989 with the development of *Beginning With Mother Goose*, an early literacy family program fielded in Vermont libraries. Their most recent collaboration has been the Vermont Early Literacy Initiative (VELI). To date, 75 Vermont librarians have received training and resource materials to infuse their infant-toddler story hours and family programming with books and early literacy skills and concepts, with the most recent training held in April 2015. VTLIB and VCB staff co-trained librarians and have provided ongoing support through the use of webinars. In addition, VELI has continued with *Ready for School,* a program developed to bring preschool mathematics to children and families in the public library.

Since 1992 VCB and MMS have collaborated on a number of projects funded by the National Science Foundation (NSF), including *Mother Goose Cares About Math and Science*, a preschool mathematics and science program developed for childcare providers. This led to the creation of the New England Professional Development Institute (NEPDI) which extended this program into the New England states. Most recently VCB and MMS worked together on *What's the BIG Idea? Bringing Math and Science to Children and Families in the Public Library,* also funded by NSF and piloted in public libraries in the state of Delaware, at Houston Public Library and in the Clinton-Essex-Franklin County Library System in New York. Throughout the three-year project, librarians were trained to introduce the "Big Ideas" of preschool mathematics and science into their programming with children and families. MMS developed *Science in the Stacks*, a two-year museum-library collaboration funded by IMLS in 2000. Both VCB and MMS see this project as an opportunity to expand out-of-school informal STEM learning experiences into public libraries in a meaningful way. VTLIB, VCB and MMS are committed to quality library programming and the VELI librarians are eager to offer additional informal STEM programming, recognizing that they need more resources, skill-development and experience.

With this extensive prior experience separately and collaboratively, VTLIB, VCB and MMS are well poised to build on their collective knowledge, drawing upon a successful professional development model and ability to work collaboratively with librarians in small, rural settings.

PROJECT RESOURCES: PERSONNEL, TIME, BUDGET

The three-year project will begin on November 1, 2015 and end on October 31, 2018. VTLIB will: (1) recruit/confirm project librarians, (2) provide staff support as cost-sharing, (3) serve as fiscal agent and grants manager of the project, (4) promote, publicize and institutionalize the project in Vermont and nationwide at relevant library conferences, and (5) work with COSLA to extend the reach of the VELI-STEM program to other states. VTLIB has strong relationships with Vermont libraries and the ability to promote the project statewide and nationwide through available networks. VCB will: (1) develop training and program resources and materials, making connections to children's literature wherever possible, (2) coordinate all project evaluation activities with Evaluator Myles, and (3) select, purchase, prepare and inventory all training and program resources and materials needed for implementation by libraries. All VCB professional development activities are conducted in accordance with the Content and Process Standards of the National Staff Development Council. Evaluation of past projects has documented consistency of training with these standards (RMC, 2002*). MMS and research scientist Worth will work closely with VCB to: (1) help develop appropriate STEM learning objectives, (2) assess and inventory existing STEM resources, (3) develop new STEM activities as needed and (4) co-train with VCB and VTLIB. VCB and MMS have extensive experience in developing hands-on science learning opportunities for families. Total Grant: $343,971. Total Cost Share: $344,002. 10% Indirect Cost: $34,397.

The Primary Contact for this Project will be Sharon Colvin, VTLIB Youth Services Consultant. The project will be led by VCB Associate Director and Director of Program Development Wendy Martin, who developed and refined many of the materials produced by VCB with funding provided by the National Science Foundation (NSF). Martin has organized and facilitated national training conferences and coordinated the production of training and program materials. She will be joined by VCB Executive Director and Principal Trainer Sally Anderson, who was responsible for the development, refinement and training of the NSF-funded *Mother Goose Cares About Math and Science*; *Mother Goose Asks "Why?"*; *You Can Count On Mother Goose* and *What's the BIG Idea?* programs. VCB will provide indirect/in-kind cost-sharing of $47,340 during the course of the project. (*See:* Budget Justification.)

Vermont State Librarian Martha Reid will act as an advisor to and promoter of VELI-STEM throughout Vermont and nationwide, including State officials, COSLA and other state library agencies. Colvin and Martin will recruit/confirm project librarians, assisted by Brittney Wilson, VTLIB Executive Assistant and Aidan Sammis, VTLIB Youth Services Assistant. Sharon Colvin, assisted by Wilson and Sammis, will coordinate online resources and social media with Martin. Mara Siegel will promote the project with COSLINE and CE Coordinators in other states and share their feedback as the project develops. VTLIB will provide ▮▮▮▮▮▮ and $▮▮▮▮ in-kind Cost Share. (*See:* Budget Justification.)

Wheelock College Elementary Education Department Chair and Education Development Center, Inc. senior research scientist Karen Worth will provide STEM content at a cost of ▮▮▮▮▮ and will co-train with Anderson and MMS's Education Director Greg DeFrancis. Worth has been the principal investigator on a number of NSF projects in which she developed and published science curriculum materials for early childhood and elementary classrooms and led large-scale efforts to support the implementation of inquiry-based science programs in schools. Worth was part of the development team for the Science Education Standards, chairing the Working Group on Science Teaching Standards. She consults nationally and internationally on the implementations of inquiry-based science programs for children at the preschool and elementary levels and has served as an advisor to several informal science organizations, public television stations and national science reform projects. Worth is co-author of *The Young Scientist Series* and other titles, including *Worms, Shadows, and Whirlpools: Science in the Early*

Childhood Classroom, (Worth, 2003*) one of the project's resource books that will be given to participating librarians.

Greg DeFrancis, Education Director of the Montshire Museum of Science, will provide STEM content, and will co-train with Anderson and Worth at a cost of $▓▓▓▓. DeFrancis has extensive experience with creating and fielding informal science education programs for both children and professionals, and has helped create and train in prior VCB NSF-funded projects. Both Anderson and DeFrancis have conducted national trainings in informal science, taught extensive, intensive workshops in preschool math and science in urban and rural settings and have presented project materials and findings at national conferences. (*See:* Resumes of Reid, Colvin, Martin, Anderson, Worth, DeFrancis, Siegel, Sammis and Wilson in Required Documents. VCB and MMS Partner Letters of Commitment are included in Partnercommitment1 & 2. Letter of Support from Worth is included in Supporting Documents, SupportingdocSupportletters5.pdf.)

Kelly Myles, Ph.D. will serve as the evaluator to the project at a cost of $▓▓▓▓. (*See:* Myles' CV in Resumes in Required Documents.) Pat Fitzsimmons, Common Core Implementation Coordinator, Vermont Agency of Education (VTAOE) has also agreed to offer insight, perspective and feedback during the project. (*See:* Letter of Support from Fitzsimmons in Supporting Documents, SupportingdocSupportletters5.pdf.)

All three partners and Worth will co-train during the project, with Myles acting as evaluator. (See: *Impact,* above.) Colvin will make regular library site visits to observe programming throughout the project. VTLIB and VCB will monitor librarian cost-sharing activities (local libraries will contribute an in-kind Cost Share of $▓▓▓▓) and will also meet regularly to remain apprised of progress and make refinements to the project as needed. All partners agree that listening, observing and responding to feedback will be vitally important and all efforts will be made to coordinate duties efficiently.

COMMUNICATIONS PLAN

The goal of the Communications Plan will be to promote the VELI-STEM project and the STEM learning experiences and project activities taking place in the 25 project libraries. This will begin with a press conference conducted by State Librarian Martha Reid to announce the grant award and introduce the project and its planned activities. Reid will also report regularly to COSLA on project progress.

VTLIB will coordinate statewide and national publicity and findings of the project will be regularly communicated to relevant media with these points highlighted:
- Importance of science and math learning in today's society;
- Public libraries are important community assets, freely available to all citizens, offering programs, resources and trained librarians to support and facilitate lifelong learning;
- STEM learning – by even the youngest citizens – is essential for a robust future workforce;
- Importance of family programming and parent involvement in young children's learning;
- Importance of community childcare providers in supporting learning for young children by collaborating with public libraries;
- Importance of out-of-school learning opportunities, especially in the public library;
- Importance of career awareness for young children and the relationship of STEM to a variety of future jobs and careers;
- Importance of STEM learning opportunities in small, rural communities.

The Project Team will create a YouTube channel for the project and will use a variety of social media (including the VTLIB and VCB Facebook pages) to increase awareness of VELI-STEM. Participating libraries will be encouraged to provide videos and photographs of programming and other project-related activities and announcements. VTLIB project staff will record librarian trainings for YouTube.

Project Team members and librarians will make presentations on the VELI-STEM program at national, regional and state conferences, with proposals submitted to relevant associations. In addition, VCB and VTLIB will partner with IMLS to publicize VELI-STEM through public announcements to Congress and other public-policy stakeholders. Vermont's Congressional Delegation enthusiastically supports this proposal (*See:* Letters of Support in Supporting Documents, SupportingdocElectedOfficials6).

At the local level, project librarians will promote VELI-STEM to their local library boards, town officials and throughout their local communities. Librarians will be encouraged to contact organizations such as the local Rotary Club to promote the project to businesses and non-profits and to recruit local "people resources." Outreach to local public schools and child-care organizations will also be encouraged. Project libraries will use press release templates to keep local media apprised of project activities on a regular basis. In addition, project librarians will be encouraged to present programs at state library meetings and conferences and to share their knowledge and experience with other libraries.

At the end of the VELI-STEM project, the partners will publish and distribute a full final project report, including data from each library location and information on project outcomes, informed by the Project Evaluation. The final report will be available in both print and electronic formats, unveiled at a Press Conference and widely distributed.

SUSTAINABILITY

The replicability of VELI-STEM is an essential element of project success and sustainability. VELI-STEM partners and librarians will be able to spread STEM learning opportunities to young children, families and other key caregivers through the online sharing of training curricula, resources and programming ideas with librarians across the country and with other state library agencies. Hands-on materials and other resources used during the project will be selected with an eye to accessibility, adaptability, ease of use and cost. The lessons learned by VCB and MMS in *What's the BIG Idea?* and *Science in the Stacks* will inform the design and development phase of this project to support easy adoption and replicability.

Libraries everywhere—no matter what their size, location or budget—will have access to the online STEM Clearinghouse and YouTube channel throughout the three years of the project (and beyond) to learn how other libraries have incorporated into their programming rich, hands-on and open-ended science learning experiences for children, their families and community childcare providers. At the end of this three-year project, VCB and VTLIB will promote the VELI-STEM outcomes, materials and activities and will report on how participating librarians created their own local permutations and combinations. The STEM Clearinghouse of Resources will reside on the VTLIB website so that librarians working in remote and rural libraries (or, for that matter, a large urban library) will have easily-accessible resources to develop local trainings, use the curriculum, select STEM-themed books for preschool story hours, find ideas for activities to use in family programs and locate templates for creating "Discovery Science Centers" in their libraries – even in facilities with limited space. It is our hope – and our design – to provide a program that libraries can easily adopt (and adapt) so that they, in turn, will be vibrant local centers of learning, inquiry and discovery for young children and their families.

Vermont Department of Libraries

Year 1 – November 1, 2015 to October 31, 2016

	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
Activity One	███	███	███									
Activity Two	███	███	███	███	███	███	███	███	███	███	███	███
Activity Three	███	███	███	███	███							
Activity Four	███	███	███	███	███	███	███	███	███	███	███	███
Activity Five		███	███	███	███	███						
Activity Six	███	███	███	███	███	███	███	███	███	███	███	███
Activity Seven			███	███	███	███						
Activity Eight					███	███	███					
Activity Nine			███	███	███	███						
Activity Ten						███						
Activity Eleven						███	███	███	███	███	███	
Activity Twelve						███	███	███	███	███	███	███
Activity Thirteen						███	███	███	███	███	███	███
Activity Fourteen						███	███	███	███	███	███	███
Activity Fifteen						███	███	███	███	███	███	███
Activity Sixteen							███					
Activity Seventeen							███	███	███	███	███	███
Activity Eighteen	███	███	███	███	███	███	███	███	███	███	███	███
Activity Nineteen	███	███	███	███	███	███	███	███	███	███	███	███
Activity Twenty										███	███	███
Activity Twenty-one												███
Activity Twenty-two												███
Activity Twenty-three										███	███	███

Year 1

Project team will:
Activity 1 – Recruit/confirm 25 librarians for the three-year-project (November – January)
Activity 2 - Access and upload online STEM resources and build STEM Clearinghouse (November- October)
Activity 3 - Develop administrative documentation for project i.e., monitor project cost share (November – March)
Activity 4 - Develop online presence: YouTube channel, Facebook page, etc. (November – October)

Evaluator will:
Activity 5 - Draft evaluation instruments, i.e., tracking spreadsheets, surveys (December – April)

Ongoing:
Activity 6 - Promote project at meetings and conferences throughout the project year (November – October)

Project team will:
Activity 7 - Plan two-day training for 25 librarians (January – April)
Activity 8 - Purchase books and hands-on materials (March – May)
Activity 9- Compile training materials (January – April)
Activity 10- Conduct two-day training for 25 librarians: *Physical Science: Force and Motion*. (April)

Librarians will:
Activity 11 - Plan, recruit and offer STEM programming, i.e. story hours, family programming, community child-care providers. (April – September)
Activity 12 - Access, monitor and contribute activities and resources to online STEM Clearinghouse (April – October)

Activity 13 - Access, monitor and contribute to YouTube channel, Facebook and other social media (April – October)
Activity 14 - Provide cost-share and other administrative information to project team as needed (April – October)

Evaluator will:
Activity 15 - Monitor project and gather feedback from librarians, families and child-care providers, using pre-formatted data tracking spreadsheets, surveys, interviews and archival records (April – October)

Project team will:
Activity 16 - Ship books and materials to libraries for programming (May)
Activity 17 - Monitor programming with site visits and other contacts (May – October)
Activity 18 - Monitor and upload resources to STEM Clearinghouse (November – October)
Activity 19 - Monitor and upload resources to YouTube channel, Facebook and other social media (November – October)
Activity 20 - Using feedback to date, plan and develop resources for one-day follow-up training for 25 librarians (August – October)
Activity 21- Conduct one-day follow-up training for 25 librarians (October)
Activity 22 - Compile feedback to inform next year of project (October)

Evaluator will:
Activity 23 - Compile feedback from librarians and continue to monitor programming (August – October)

Vermont Department of Libraries

Year 2 – November 1, 2016 to October 31, 2017

	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
Activity One	██	██	██	██	██	██	██	██	██	██	██	██
Activity Two	██	██	██	██	██	██	██	██	██	██	██	██
Activity Three	██	██	██	██	██	██	██	██	██	██	██	██
Activity Four	██	██	██	██	██	██	██	██	██	██	██	██
Activity Five								██	██	██	██	██
Activity Six			██	██	██	██						
Activity Seven					██	██	██					
Activity Eight			██	██	██	██						
Activity Nine						██						
Activity Ten						██	██	██	██	██	██	
Activity Eleven	██	██	██	██	██	██	██	██	██	██	██	██
Activity Twelve	██	██	██	██	██	██	██	██	██	██	██	██
Activity Thirteen	██	██	██	██	██	██	██	██	██	██	██	██
Activity Fourteen					██	██	██	██	██	██	██	██
Activity Fifteen					██	██						
Activity Sixteen						██	██	██	██	██	██	██
Activity Seventeen					██	██						
Activity Eighteen							██	██	██	██	██	██
Activity Nineteen	██	██	██	██	██	██	██	██	██	██	██	██
Activity Twenty	██	██	██	██	██	██	██	██	██	██	██	██
Activity Twenty-one										██	██	██
Activity Twenty-two												██
Activity Twenty-three												██
Activity Twenty-four												██
Activity Twenty-five										██	██	██

Year 2

Project team will:

Activity 1 – Continue to access and upload online STEM resources to STEM Clearinghouse (November – October)

Activity 2 – Monitor administrative documentation for project, i.e. monitor project cost share (November – October)

Activity 3 – Refine online presence: STEM Clearinghouse, YouTube channel, Facebook page, etc. (November – October)

Evaluator will:

Activity 4 – Monitor evaluation, i.e. tracking spreadsheets, surveys (November - October)

Activity 5 - Promote project at meetings and conferences (June – October)

Project team will:

Activity 6 - Plan two-day training for 25 librarians (January – April)

Activity 7 - Purchase books and hands-on materials (March – May)

Activity 8- Compile training materials (January – April)

Activity 9- Conduct two-day training for 25 librarians: *Physical Science:Sound and Light* (April)

Librarians will:

Activity 10 - Plan, recruit and offer STEM programming: story hours, family programming, community child-care providers (April – Sept.)

Activity 11 - Access, monitor and contribute activities and resources to online STEM Clearinghouse (November - October)

Activity 12 - Access, monitor and contribute to YouTube channel, Facebook and other social media (November – October)

Activity 13 - Provide cost-share and other administrative information to project team as needed (November – October)

Evaluator will:

Activity 14 - Monitor project and gather feedback from librarians, families and child-care providers, using pre- formatted data tracking spreadsheets, surveys, interviews and archival records (March – October)

Activity 15 – Begin to submit proposals for dissemination through publications (May)

Project team will:

Activity 16 – Plan two-day COSLINE Conference (April – October)

Activity 17 - Ship books and materials to libraries for programming (May)

Activity 18 - Monitor programming with site visits and other Contacts (May – October)

Activity 19 - Monitor and upload resources to STEM Clearinghouse (November – October)

Activity 20 - Monitor and upload resources to YouTube channel, Facebook and other social media (November – October)

Activity 21 - Using feedback to date, plan and develop resources for one-day follow-up training for 25 librarians (August – October)

Activity 22- Conduct one-day follow-up training for 25 librarians (October)

Activity 23 – COSLINE Conference Presentation (October)

Activity 24 - Compile feedback to inform next year of project (October)

Evaluator will:

Activity 25 - Compile feedback from librarians and continue to monitor programming (August – October)

Vermont Department of Libraries

Year 3 – November 1, 2017 to October 31, 2018

	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
Activity One	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Two	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Three	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Four	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Five								▬	▬	▬	▬	▬
Activity Six			▬	▬	▬	▬						
Activity Seven					▬	▬	▬					
Activity Eight			▬	▬	▬	▬						
Activity Nine						▬						
Activity Ten						▬	▬	▬	▬	▬	▬	▬
Activity Eleven	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Twelve	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Thirteen	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Fourteen					▬	▬	▬	▬	▬	▬	▬	▬
Activity Fifteen						▬	▬	▬	▬	▬	▬	▬
Activity Sixteen							▬					
Activity Seventeen							▬					
Activity Eighteen							▬	▬	▬	▬	▬	▬
Activity Nineteen	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Twenty	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬	▬
Activity Twenty-one										▬	▬	▬
Activity Twenty-two												▬
Activity Twenty-three										▬	▬	▬
Activity Twenty-four										▬	▬	▬
Activity Twenty-five										▬	▬	▬
Activity Twenty-six												▬

Year 3

Project team will:

Activity 1 – Continue to access and upload online STEM resources and build STEM Clearinghouse (November – October)

Activity 2 – Monitor administrative documentation for project, i.e. monitor project cost share (November – October)

Activity 3 – Refine online presence: STEM Clearinghouse, YouTube channel, Facebook page, etc. (November – October)

Evaluator will:

Activity 4 – Monitor evaluation, i.e. tracking spreadsheets, surveys (November - October)

Activity 5 - Promote project at meetings and conferences (June – October)

Project team will:

Activity 6 - Plan two-day training for 25 librarians (January – April)

Activity 7 - Purchase books and hands-on materials (March – May)

Activity 8- Compile training materials (January – April)

Activity 9- Conduct two-day training for 25 librarians: *Physical Science: Air and Water* (April)

Librarians will:

Activity 10 - Plan, recruit and offer STEM programming: story hours, family programming, community child-care providers (April – Sept.)

Activity 11 - Access, monitor and contribute activities and resources to online STEM Clearinghouse (November – October)

Activity 12 - Access, monitor and contribute to YouTube channel, Facebook and other social media (November – October)

Activity 13 - Provide cost-share and other administrative information to project team as needed (November – October)

Evaluator will:

Activity 14 - Monitor project and gather feedback from librarians, families and child-care providers, using pre-formatted data tracking spreadsheets, surveys, interviews and archival records (March – October)

Activity 15 – Draft final report (April – October)

Activity 16 – Continue to submit proposals for dissemination through publications (May)

Project team will:

Activity 17 - Ship books and materials to libraries for programming (May)

Activity 18 - Monitor programming with site visits and other contacts (May – October)

Activity 19 - Monitor and upload resources to STEM Clearinghouse (November – October)

Activity 20 - Monitor and upload resources to YouTube channel, Facebook and other social media (November – October)

Activity 21 – Using feedback to date, plan and develop resources for one-day follow-up training with 25 librarians (August – October)

Activity 22- Conduct one-day follow-up training for 25 librarians (October)

Activity 23 - Compile information for dissemination (August – October)

Activity 24 - Compile information for Final Report (August – October)

Evaluator will: **Activity 26** - Compile feedback from librarians for final report (August – October)

Project team will: **Activity 25** – Post-project: Publish Final Report and distribute, unveil report at press conference (October - December)

ORIGINAL PRELIMINARY PROPOSAL

Vermont Department of Libraries

Proposal: The Vermont Department of Libraries (VTLIB) will partner with the Vermont Center for the Book (VCB) and the Montshire Museum of Science (MMS) to develop the Vermont Early Literacy Initiative: STEM (VELI-STEM), a three-year project that will equip librarians from 25 public libraries to incorporate STEM learning experiences for children age 3-7 and their families into all aspects of librarian practice, including library-based and community-based programs.

Relevance: In our 21st Century knowledge-based global economy, few would question the urgent need for STEM education for all ages. In the words of the U.S. Department of Commerce, "The greatest achievements in our society, from medicine to mechanics, have come from the minds of those interested in or studied in the areas of STEM…STEM jobs are the jobs of the future." In response, a major shift is happening in libraries to emphasize STEM and hands-on learning for young people. However, that STEM focus rarely encompasses the nation's youngest learners. In a sparsely populated state like Vermont, many young children and their families have limited (if any) STEM learning opportunities due to myriad factors ranging from lack of home Internet access to the absence of public transportation to the state's few science museums. Fortunately, Vermont communities —and communities across the nation— do have public libraries, which are uniquely positioned to provide children age 3-7 and their families with opportunities to explore a wide range of STEM topics, practice inquiry, express their curiosity and experience the excitement of problem-solving and genuine discovery. And even though online STEM resources designed for young children do exist, they tend to be: (1) craft projects masquerading as STEM learning; (2) resources that are teacher-directed and/or designed specifically for classroom use; and (3) resources for children's librarians that are mostly one-time programs, a series of programs with a different topic each session or used in occasional single-topic family nights. However, research has shown that "one-shot" programs don't allow for active scientific inquiry: children learn science best through long-term investigations. VELI-STEM will test a compelling model for providing sustained and ongoing STEM learning for young children in small and rural libraries, the resources and lessons from which could be replicated in libraries and communities across the U.S. while providing an inviting on-ramp to STEM learning and exploration of STEM-related careers.

Project Partners: VELI-STEM will build on VTLIB's successful collaboration with VCB in establishing a VELI network now operating in 53 public libraries. VCB has a proven record of success in developing quality science and math materials for use in public libraries through funding from the National Science Foundation. Project personnel will include: VCB Executive Director and lead trainer Sally Anderson; Wheelock College Early Education Chair and former senior research scientist Karen Worth (an expert on providing professional development on the implementation of inquiry-based early childhood and elementary science programs); and Education Director of MMS, Greg DeFrancis. Vermont State Librarian Martha Reid will act as an advisor and promoter of the program and Children's Consultant Sharon Colvin will be the Project Director. Also, librarians will be supported in recruiting and partnering with community STEM experts from education, research, business and other STEM arenas whose career perspectives will underscore the link between early STEM education and lifelong learning and career choices. These linkages will also provide opportunities for public-private partnerships that can help leverage resources, expand capacity and further engage the local community. With such extensive prior experience, VTLIB, VCB, Worth and MMS are well poised to build on their collective knowledge and experience to help transform the work of selected Vermont libraries and extend STEM learning opportunities to underserved audiences throughout Vermont in a measureable and replicable way for libraries across the nation.

Goals and Outcomes: This project addresses the IMLS goal: "To place learners at the center and support engaging experiences in libraries that prepare people to be full participants in their local communities and our global society." Therefore, the overarching goal of VELI-STEM is to transform librarian practice to infuse STEM content, skills and knowledge into all aspects of their work with children age 3-7, their families and community childcare providers. The first key outcome is that 25 librarians will have received

advanced STEM training, mentoring, learning tools (such as picture books), hands-on learning methods and learning materials and other STEM resources. Second, librarians and project partners will inform and access an online STEM Clearinghouse of Resources developed over the course of the project. Third, librarians will have the ability to use these STEM resources for library-based family programming and story hours and in the development of informal "Discovery Science Centers" for children and parents in the library. Third, librarians will have transferred their newly acquired STEM knowledge and skills to community childcare providers through outreach and training programs so that providers will, in turn, introduce STEM learning experiences to the children in their care. Fourth, project capacity will have been extended by conducting outreach to and informational exchanges with library staff, directors and trustees, town officials, local businesses and other key change agents to effect a fundamental shift in the roles libraries play in the community at large and, more specifically, in setting a lifelong course of STEM learning, inquiry and career exploration for program participants.

Independent evaluator Kelly Myles, Ph.D., will conduct ongoing project monitoring, a project-end evaluation and a follow-up evaluation to assess: (1) how much the project is achieving/did achieve (e.g., number of children age 3-7 reached); (2) how well the project is achieving/did achieve intended results (e.g., identification of best practices); (3) what is changing/different as a result of the project (e.g., impact on attitudes); and (4) what is the best utilization of the project's progress indicators and final results in expanding library-based STEM learning (e.g., sharing project results via a "story-telling" format using visual, anecdotal and statistical findings with a range of audiences—library, business, education, public policy and others—through local, regional, state and national gatherings, professional publications and electronic media). Measurement will be conducted on a number of levels to include librarians (and their libraries), children and their families and community childcare providers. Project partners will collect and use both quantitative and qualitative data at each level of measurement in order to assess the ongoing operation and overall effectiveness (outcomes) of the project.

Impact: While libraries have always been lifelong learning centers in their communities, VELI-STEM has the potential to revolutionize how library staff, librarians themselves and community members regard the library, resulting in the more strategic use of libraries to build the requisite intellectual capital for a thriving 21st Century society and economy. The innovation in VELI-STEM lies in librarians' newfound ability to view their practice, programming and library's physical space through an expanded set of lenses that will compel them to create a new learning environment that supports ongoing STEM and hands-on learning, starting with our youngest learners. Because librarians will be asked to consider all aspects of their practice, VELI-STEM will provide a pathway to ongoing STEM hands-on learning in library programming for other audiences, including school-age children and adults. One of the most notable impacts will be the development of a scalable, replicable model of best practices and activities through a STEM Clearinghouse of Resources, which can be used for effecting systemic change in libraries nationwide. Toward that end, all materials and activities will be developed based on the Common Core State Standards and Next Generation Science Standards and will be freely available on the Web.

In order for librarians to develop their own skills and knowledge, they need opportunities for collaboration. The project sequence allows for three years of progressive development for librarians to understand what it means to engage children in inquiry-based experiences, the nature of facilitation and guidance that adults can offer in order to challenge and engage children and content knowledge. By mixing face-to-face and online work, VELI-STEM will allow for the development of a collaborative and networked learning community that values both the specialized knowledge of different cohorts and the communal knowledge that is built through interaction. Innovation in what libraries offer to their communities lies in the transformation of librarian practice to include STEM offerings wherever possible.

Estimated project budget: $350,000 over three years.