Abstract

Partners for Middle School STEM is a 24-month National Leadership project grant designed to build community anchor partnerships that result in increased science, technology, engineering and math (STEM) learning opportunities designed to engage low-income middle school youth. The Urban Libraries Council (ULC) will lead the project in partnership with the Space Science Institute (SSI), National Center for Interactive Learning (NCIL) serving as the lead STEM education expert.

The United States will not be able to meet the STEM workplace demands of the future if we are unable to engage, inspire and educate our growing, ethnically diverse populations in a variety of STEM disciplines (NSF, 2011). Middle school youth in low income communities are a key audience to address this "leaky STEM pipeline" due to the surge in brain development in these years increasing their capacity for intellectual processing and the limited STEM education access for youth in low-income communities.

This project will build on emerging best practices to create multi-sector partnerships across public library-school-business-local government leaders in six pilot communities. Pilots will develop programs to engage low income middle school youth in STEM education programs and catalyze the adoption of new partnerships, approaches and STEM activities led by libraries.

Goals include:

- *Catalyze the establishment of local partnerships led by the public library to create stronger education outcomes for youth* showcasing the role of libraries as valuable and essential partners for education and STEM learning to local government,

- *Identify and showcase the leading practices that support STEM Partnerships that reach low-income/underserved youth* informing libraries and other partners of the key elements for successful STEM education partnerships

- *Identify successful STEM programs that utilize the strengths and resources of each local partner in middle school youth's STEM education* increasing library capacity to create and leverage local partnerships to reach low-income youth and design programs to engage middle school students so that underserved youth build knowledge, interest and confidence with STEM.

The project has been designed to conduct a national scan, form a multi-sector national advisory group, and facilitate six pilot projects to increase STEM opportunities for low income youth.

These activities will result in new tools and resources including a national report on STEM partnerships led by the public library and online resources to support adoption of programs designed to reach and engage low income middle school youth in STEM.

This project continues to build on the growing understanding and appreciation for the role of public libraries in STEM education. The importance of this cannot be overstated as public libraries can uniquely contribute to the education of youth of all ages, particularly those most in need. As the United States continues to grapple with low educational achievement in our most disadvantaged communities, it is time for local leaders to address this issue together.

Partners for Middle School STEM is a 24-month National Leadership project grant designed to build community anchor partnerships that result in increased science, technology, engineering and math (STEM) learning opportunities designed to engage low-income middle school youth. The total budget of $962,578 includes $479,637 requested from IMLS.

The Urban Libraries Council (ULC) is the lead agency on this grant. With the help of our members, ULC initiatives strategically advance the value that 21st century libraries provide communities in critical areas including race and social equity, education/lifelong learning and digital inclusion. ULC brings a network of leading libraries and experience connecting library, local government, school, business and workforce development stakeholders. ULC has successfully developed ongoing partnerships with the Council of the Great City Schools, National Center for Families Learning, National Summer Learning Association, National League of Cities and International City/County Management Association.

The Space Science Institute (SSI), through its National Center for Interactive Learning (NCIL), will serve as a partner and lead STEM education expert on this project. SSI is shaping the future by enabling scientists to advance the understanding of Earth and the universe, increasing science and technology literacy for people of all ages and backgrounds and inspiring youth to pursue science-technology education and career opportunities. This project will focus on STEM engagement through Earth and space science programs and build on SSI's Science-Technology Activities & Resources for Libraries (STAR_Net).

Statement of National Need

The United States' economy is seeing rapid growth in the number of STEM-related jobs at the same time that it is facing diminishing numbers of qualified STEM professionals. The middle school years have emerged as critical to addressing this "leaky STEM pipeline" since, during that period, youth experience both a surge in brain development (NEA, 2014) and exposure to subjects that influence their pursuits in high school, college and careers. (Afterschool Alliance 2010; YALSA, 2014)

 Building on a recent report that highlights public libraries' role in promoting STEM equity, (SSI, 2016) there is an opportunity for public libraries to build on their experience in science-technology programming for teens and ensure they also provide related programs for "tweens," especially those from low-income communities. By partnering with schools, libraries can better target and deliver programs that complement classroom learning and develop 21st century skills.

The United States will not be able to meet the STEM workplace demands of the future if we are not able to engage, inspire and educate our growing, ethnically diverse populations in a variety of STEM disciplines (NSF, 2011). Further, a basic understanding of STEM is part of being an informed and engaged citizen (IMLS, 2009) and critical to our democracy and country.

An educated workforce, growing economy and healthy environment all begin today with students who have the opportunity to engage STEM to gain confidence and critical thinking skills. Middle school is particularly a key time for increasing exposure to and confidence in STEM. Middle school experiences influence interests and pursuits that youth explore in high school, college and their careers. (Maltese, 2014)

Additionally, middle school youth experience a surge in brain development which significantly increases their capacity for intellectual processes including the transition from concrete to abstract thinking, deductive reasoning, problem solving and generalizing. These developments and others increase adolescent preference for active learning, a key component of informal learning offered in library programs.

Youth in low-income communities have less access to informal STEM education and informal activities than their more affluent peers. Providing out-of-school time (OST) learning that increases access to STEM activities can impact youth's interest and engagement in STEM throughout their school years. The National Research Council (NRC) concluded that learning experiences across informal environments (such as public libraries) positively influence science learning in school, attitudes toward science and pursuit of science-related occupations (NRC 2009). There is considerable research about the positive role that OST experiences can play in student achievement (Afterschool Alliance, 2017; Afterschool Alliance 2014; NRC, 2015).

In a review of STEM education literature, Jakubowski et al. (2011) identified OST activities as essential to increasing achievement and diversity within the STEM disciplines. OST programs are especially well-positioned to help close the opportunity gap that many youth from underserved audiences face (Afterschool Alliance, 2014; NRC, 2014; NRC, 2015).

In 2010, IMLS and the MacArthur Foundation partnered with ULC and the Association of Science-Technology Centers (ASTC) to pilot Learning Labs (ASTC, IMLS, MacArthur Foundation, ULC 2014) in public libraries and museums across the United States. This project introduced the concept of Connected Learning that engaged youth in spaces that have lots of technology and adult mentors ready to facilitate teen learning. An early evaluation by New York University has shown that these labs reach minority youth who self-reported as struggling in school, and now have new skills that support career readiness and a path to college.

Further, there is a growing body of research that has shown the value of multi-sector partnerships including collective impact models. Collective Impact (Kania and Kramer, 2011) is a strategy to harness the power of collaborative programs to solve complex and often intractable social challenges. This model requires that all organizations within the STEM-learning ecosystem work together. Certain conditions must be present for such collaborations to be successful (e.g., a shared vision, shared measurement system, shared activities, open communication and organizational support). Traphagen and Traill (2014) reviewed 15 learning ecosystem efforts and provided useful lessons that informed the design of this project, including assessing gaps, developing collective vision and goals and providing active learning opportunities throughout the education system.

Through this project, public libraries will learn how to build partnerships to reach low-income middle school youth to provide STEM programs that ensure youth have fun with STEM and understand its long-term relevance and value in their lives.

The audiences that benefit from this project include:

- **Public Libraries, Schools, Businesses and Local Government (STEM Education Partnerships).** Through this project, public libraries will demonstrate their strength as a leader in building community-wide STEM education partnerships. ULC will partner nationally to expand awareness across local government, school and corporate leaders

and the organizations that serve them. Further, these national relationships will support development of local multi-sector **STEM Partnerships**.

- **Pilot Communities**. The project activities are designed to ensure pilot communities effectively build and implement education partnerships led by the public library that provide high-quality STEM programs and reach underserved youth in the critical middle school years. The **Project Partners** (ULC and NCIL) each bring expertise essential to coach, develop and ensure the pilots include building community-wide partnerships and designing high-quality STEM learning.

- **Youth.** Libraries will have new resources to replicate both the community partnerships and programs designed to engage low-income/underserved youth ages 10 to 13 in high-quality STEM learning. Youth will have expanded opportunities to learn about and engage in STEM activities that have relevance to their current life while building skills that will support their ongoing education, career and lifelong curiosity and learning.

The project is further informed by the needs identified by public libraries and the organizations that serve them, as well as emerging models from the library field. With IMLS funding, ULC and its partner the National Summer Learning Association (NSLA) surveyed libraries on their summer reading/learning programs. The survey found that a majority of participating libraries need additional guidance and resources on "engaging youth from low-income families" in their summer programming. Further, in the 2017 ULC Member Survey libraries report a need to better reach "Underserved Populations." Both surveys indicated that libraries need more guidance for developing school partnerships.

Recently, the American Library Association (ALA) in partnership with the Harwood Institute for Public Innovation, launched the *Libraries Transforming Communities* initiative (Harwood, 2015). NCIL has successfully piloted a *Community Dialogue* strategy as part of its NIH-funded *Discover Health/Descubre la Salud* program. These Dialogues have yielded valuable data about the needs of identified underserved audiences and barriers to participation in certain types of programming. (Holland, 2015)

The Association for Library Services to Children (ALSC) and the Association of School Librarians (AASL) have important efforts underway to further librarians' abilities to partner with schools and to reach and engage more low-income students. The compilation of school/public library cooperative programs, the toolkit for Library Service to Special Population Children and Their Caregivers, the Working Together Is Working Smarter infographic and other resources provide valuable guidance and information. Still, the school and library fields lack a common understanding of how to collaborate to better reach and engage low-income, at-risk students.

As important, there are few examples of library, school, business and local government partnerships aimed at achieving higher education outcomes for low-income, at-risk students. This initiative will identify local partnership opportunities that build on the shared goal of a future workforce that is well-prepared for 21st century jobs dependent on STEM knowledge and skills.

This project directly builds on emerging practices in public libraries and extends these models and partnerships to focus on the middle school years and reaching low-income/underserved youth.

- The **Chicago Public Library (CPL)** was awarded the National Summer Learning Association's (NSLA) inaugural Founders Award in 2015. CPL broadened its traditional summer reading program to align with key 21st century learning priorities identified by IMLS. Through a strategic partnership with the Chicago Museum of Science and Industry, STEM learning is embedded in the program, promoting reading, discovery and creation.

- The **Denver Public Library** (DPL) won a ULC Top Innovator Award for its partnership with Denver Public Schools (DPS) and tech industry professionals to provide free week-long camps at libraries in at-risk neighborhoods where young people ages 12-19 work with professional mentors to learn basic web development skills. DPS helps recruit students from high-risk areas with large Hispanic populations to participate and provides transportation, while technology industry partners recruit mentors, provide speakers and arrange tours.

- NCIL, in partnership with the Lunar and Planetary Institute (LPI), received funding from the National Science Foundation for the first-ever *Public Libraries & STEM* **conference** in 2015. The conference brought library and STEM professionals together to explore promising practices in designing effective programs, help define a new 21st century vision of STEM learning in public libraries and develop the foundation for a future research agenda for libraries and their partners engaged in STEM education efforts.

- *The Leaders Library Card Challenge*, funded by IMLS and led by ULC, established library, school and elected city/county leader partnerships to equip every child in the jurisdiction with a library card. This initiative created a model that highlights the positive outcomes for young people's education when local leaders work together. Over 1 million cards have been distributed and importantly the new local partnerships have gone on to launch other joint projects that includes resource-sharing and more.

Project Design
This project is designed to help libraries build multi-sector STEM Partnerships to reach low-income middle school students to provide programs that ensure youth have fun with STEM while learning and understanding its long-term relevance and value in their lives.

The STEM Partnerships will focus on bringing each institution's unique resources to expand STEM experiences and education for low-income middle school youth. These partnerships will enable local leaders to work together on a shared goal — ensuring all young people are educated and can participate in the future workforce where STEM knowledge is paramount.

The activities have been designed to address areas of greatest risk for the project including building effective multi-sector partnerships, designing high-quality STEM programing to be led by the library and reaching and engaging low-income middle school youth.

Through this project the national partners will help the library pilots: 1) create library-school-government-business partnerships for education 2) identify and adapt education models,

resources and activities to reach and engage middle school youth in STEM and 3) demonstrate nationally the role of public libraries as valuable STEM education partners.

Goals include:

1. **Catalyze the establishment of local partnerships led by the public library to create stronger education outcomes for youth.**
   With support of national partners, pilot public libraries will establish partnerships to provide rich STEM learning activities to low-income/underserved middle school youth.

2. **Identify and showcase the leading practices that support STEM Partnerships that reach low-income/underserved youth.**
   With the pilots, there is an opportunity to identify, document and communicate the success factors related to collaborating on behalf of low-income youth.

3. **Identify successful STEM programs that utilize the strengths and resources of each local partner in middle school youth's STEM education.**
   Through a national scan and the pilots, identify and document high-quality STEM programming that is designed or can be adapted for the middle school years.

Outcomes:
- This project will create and showcase the significant leadership role of the public library in education and STEM learning with other key partners, so that jurisdictions across the United States will adopt the same partnership model to achieve better education outcomes.

- Local government, school and business leaders see public libraries as valuable and essential partners for education and STEM learning so that libraries are routinely part of the jurisdiction's education efforts and so that libraries receive the financial support to do this work.

- Public libraries will understand how to create and leverage local partnerships to reach low-income youth and design programs to engage middle school students so that underserved youth build knowledge, interest and confidence with STEM.

Evaluation
A national researcher will be selected to participate across the initiative to provide both cumulative and summative results. In addition, an evaluation period will be part of the final phase of pilot activities (see Pilot Peer Learning Community Phase 3 for more detail)**.** The partners have identified Education Development Center (EDC) as a possible evaluator for the initiative. EDC is a global nonprofit that advances lasting solutions to improve education, promote health and expand economic opportunity.

Project Activities and Timeline

- **National Scan** to identify strategies for creating multi-sector partnerships, approaches for engaging middle school youth and library-led STEM learning programs (for all ages).

Information will be gathered from libraries, field experts and national organizations. Identified leading practices will support the development of pilot projects, resources and tools. (June – August 2018)

- **STEM Partnerships Advisory Group** to identify gaps, opportunities and effective strategies to increase access to STEM learning activities through multi-sector partnerships led by the public library. This group of 18-20 leaders will raise national awareness of the project through their professional networks. The national leaders list below will be joined by additional library STEM professionals identified as part of the national scan. (September 2018)

  Confirmed organizations: Afterschool Alliance, Chicago Public Library, Council of the Great City Schools, Denver Public Library, Madison Public Library, National Summer Learning Association, National Afterschool Association, Pima County Public Library, Young Adult Services Association

  Key questions to be explored:
  - What is the need for STEM identified by each local partner? How is it defined and described by each? The library? schools? business leaders? local government leaders?
  - Are there leading practices for reaching at-risk, low-income youth through public-private partnerships? What are the strategies being used by the library field? By the school field?
  - What are the unique challenges that public libraries face in providing STEM learning to middle school students? To low-income/underserved youth?
  - What can public libraries, schools, businesses and local government do to create out-of-school education activities and enhance access to STEM learning?

- **STEM for Middle School Pilots:** A cohort of six diverse public libraries will build multi-sector STEM Partnerships to provide STEM learning for low-income middle school youth. The pilots' STEM programs will have an Earth and space science focus and pilots will develop programs designed to engage multiple STEM learning outcomes.

  Call for Applications
  Using their professional networks, ULC and NCIL will reach out to public libraries of all sizes through an open call for applications. Interested libraries will be invited to join informational calls to learn about the project objectives, activities and pilot responsibilities. (September – October 2018)

  Applications will include:
  1) Using the approach created for The Leaders Library Card Challenge, ULC will revise the process and commitment letter for libraries to secure commitments from local leaders.
  2) A one page description describing the library's intent and reason for providing STEM to underserved youth; relationship with school, business and local government leaders; description of community need; history working with teens and/or tweens, existing programs and experience related to this project; and a signed commitment from the Library CEO and proposed project leader.

3) Information and documents that will provide reviewers relevant information including a description of the local need for this project and historical data about the library's background in STEM and low-income student outreach.

Selection Committee and Criteria
ULC will convene a selection committee to review and rank applicants that have successfully completed the application. The committee will include a library CEO, two library STEM professionals, a business leader and a school leader. (November 2018)

Criteria will be scored based on:
1. Does the library demonstrate an understanding of the need in their community to serve low-income middle school youth?
2. Does the library demonstrate an understanding of working with middle school youth on active learning and STEM?
3. Has the library described a project focus that supports the goals and outcomes outlined in this proposal?
4. Does the library have an adequate team and an established time commitment?
5. Has the library thought about its connection to business and workforce development stakeholders?

Phase 1: Planning and Design (3 months) (January – March 2019)
Refine the focus of each pilot's project and desired outcomes.

- Develop the process for building education partnerships among local leaders including identification of the unique role and responsibilities of each.
- Evaluate the community's STEM learning ecosystem including gaps, opportunities and untapped resources.
- Identify successful strategies for reaching and engaging low-income middle school youth.
- Identify strategies and plans to involve middle school youth in the creation of STEM programming and outreach strategies.
- Begin evaluation including defining the evaluation process, activities, schedule and opportunities for sharing information throughout the project.
- Initiate national and local communication plans for creating awareness of this initiative's value.

    Phase 1 Activities: Pilot welcome webinar, pilot in-person convening (first of two), individual pilot conference calls and assistance, launch of space for document sharing.

Phase 2: Implementation (14 months) (April 2019 – May 2020)
Pilots and national partners implement library-led STEM projects that are designed to reach low-income middle school youth with the participation and support of local partners.

- Pilot sites will receive ongoing support to build partnerships, design active STEM learning programs for middle school outcomes and align resources with partners.

o   National partners will convene an in-person meeting for pilots to share their project process; identify common strategies, success factors and challenges; and identify critical success factors and next steps.

o   **Phase 2 Activities:** Pilot bi-monthly webinars, national pilot convening (second of two) and individualized monthly coaching calls (12).

Phase 3 Evaluation (1 month) (June 2020)
A national researcher will evaluate the project from launch through implementation and provide cumulative and summative findings. As part of the project conclusion, there will be a meeting with each pilot to evaluate their partnerships and outcomes accomplished, as well as to discuss future steps. The evaluation will include:

1. What was the community able to achieve by building this partnership?
    - Better identify areas of need in the community to reach underserved students?
    - Align existing programs and resources to reach underserved youth?
    - Design library STEM programs to complement school efforts?
    - Gain multi-sector participation and support for STEM education?

2. Did the partners expand their understanding of the public library's ability to:
    - Reach low-income communities?
    - Create partnerships to address educational goals?
    - Lead high-quality STEM programs and resources in underserved communities?
    - Contribute to a stronger future workforce?

3. Did the pilot library and its partners design high-quality STEM programs?
    - Is there evidence that participants increased their exposure to and confidence with STEM skills?
    - Did the library engage low-income middle school youth? What was most effective in creating interest and participation?
    - How many low-income middle school youth were reached? How does this compare to the design of the pilot? To the library's other middle school programs?

- **National Resources**

    o   **National Report: Partners for STEM**
        This report will be issued jointly by ULC and the advisory group organizations. Its intent is to showcase the value and positive results of local multi-sector partners working together to create stronger education outcomes — specifically STEM learning for low-income middle school youth. The intended audience is local leaders who can learn and initiate projects similar to those described in the report. There will be an in-print executive summary, with a full online report along with supporting documents used by the pilot communities. (December 2019)

- o **Online Resources for Middle School STEM**

  NCIL will develop an online guide to share models, resources and programs designed and adapted to successfully engage middle school youth. The guide will be designed for library and STEM professionals and include case studies of pilot projects, as well as existing (NSF, IMLS, STAR-Net) and new resources for STEM educators. (May 2020)

- o **Webinar Series**

  ULC will host a webinar series designed for multi-sector partners to learn about building partnerships for education and STEM. The four-installment webinar series will feature national organizations, local leaders, partners, experts and pilot site teams. (September 2018 – April 2020)

- o **Communications and Dissemination Campaign**

  ULC will lead a communications campaign to showcase public libraries as education leaders aimed at key stakeholders. **Conference presentations** will be delivered at four to six national conferences. Proposals will be submitted to the Council of the Great City Schools, International City/County Management Association, After School Alliance, National Summer Learning Association, Public Library Association and American Library Association.

Key Project Staff and Consultants

- Susan Benton, President and CEO, Urban Libraries Council
- Jennifer Blenkle, Director of Strategic Initiatives, Urban Libraries Council
- Christine Becker, Senior Consultant, Urban Libraries Council
- Paul Guequierre, Director of Communications, Urban Libraries Council
- Dr. Paul B. Dusenberry, Director, National Center for Interactive Learning, Space Science Institute
- Keliann LaConte, Professional Development Mngr., National Center for Interactive Learning, Space Science Institute

Budget

The budget of $962,578 with a **request from IMLS of $479,637** has been designed to support the complexity of the project across 1) the national partners, 2) conducting a national scan and convening a multi-sector advisory group, 3) creating national resources and 4) coaching and support for six pilot communities.

Major areas of financial support requested from IMLS include:
- Providing national scan, managing pilot applications, building multi-sector local partnerships for STEM, evaluation activities and coaching pilot communities on creating effective STEM programs led by the public library.
- Travel support to convene an advisory group and two in person pilot peer-learning convenings with teams of four leaders from each community.
- Support of $15,000 for individual pilot program expenses for each of the six pilot communities. Each team will submit a budget with supplies, material and any other relevant costs or support to better reach underserved communities.

Diversity
This project builds on ULC's commitment to racial and social equity and the national statement it has issued. This statement serves as a baseline upon which libraries can build policies and actions that make their communities more inclusive and just. In a strong act of commitment to a more equitable society, 131 public libraries across North America have signed the statement which includes a pledge to "help achieve true and sustained equity through an intentional, systemic and transformative library-community partnership."

ULC will work with pilots to identify community partners and reach communities where the majority of students receive free or reduced lunch or other underserved communities including rural areas where there are significant barriers in access to STEM learning.

National Impact
Research, including economic and job forecasts, reflects the critical need for all youth to have STEM knowledge and skills. The **Partners for Middle School STEM** will demonstrate the ability of key local institutions to partner for STEM education aimed at low-income middle school youth. The project is intended to catalyze the adoption of new partnerships, approaches and STEM activities led by libraries.

The pilots will provide an opportunity to identify and document leading practices along with critical success factors that achieve locally-defined education outcomes. At the conclusion of this project, the participating communities will have created a multi-sector partnership that will continue to be used to meet other education objectives.
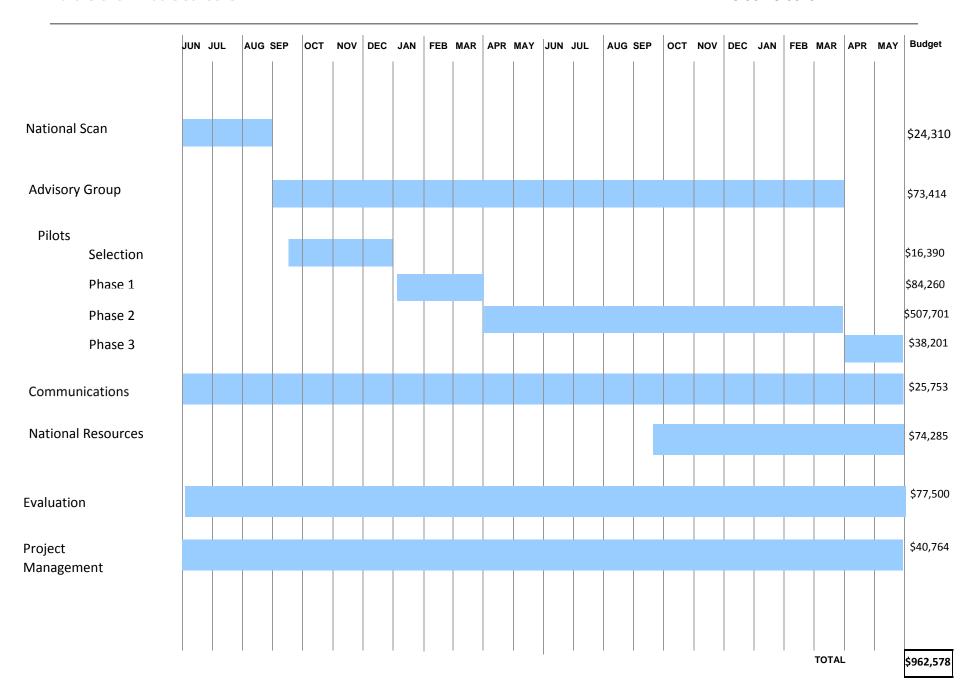
The Project Partners will use their professional relationships to share the results of the initiative so that communities across the United States can launch their own efforts. In this way, the knowledge developed and the benefits gained are multiplied and exceed the initial investment.

As this project directly builds on the work of both ULC and NCIL, the partners will create a sustainability plan for all of the national resources including a strategy to leverage them to strengthen ongoing online toolkits.

Further, there is an opportunity for a next phase of this work to include a national conference on building local partnerships for STEM learning and training for library STEM professionals to design programs that better engage middle school youth.

This project continues to build on the growing understanding and appreciation for the role of public libraries in education. The importance of this cannot be overstated as public libraries can uniquely contribute to the education of youth of all ages, particularly those most in need. As the United States continues to grapple with low educational achievement in our most disadvantaged communities, it is time for all-hands to be on deck.

When public library leaders and staff along with their space and resources are aligned with key community stakeholders, the public library is better understood as an essential institution for today and tomorrow.

Urban Libraries Council
Partners for Middle School STEM

LG-95-18-0025

Task	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	Budget
National Scan																									$24,310
Advisory Group																									$73,414
Pilots																									
Selection																									$16,390
Phase 1																									$84,260
Phase 2																									$507,701
Phase 3																									$38,201
Communications																									$25,753
National Resources																									$74,285
Evaluation																									$77,500
Project Management																									$40,764
																							TOTAL		$962,578

DIGITAL PRODUCT FORM

Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (i.e., digital content, resources, assets, software, and datasets). The products you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. However, applying these principles to the development and management of digital products can be challenging. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

Instructions

Please check here if you have reviewed Parts I, II, III, and IV below and you have determined that your proposal does NOT involve the creation of digital products (i.e., digital content, resources, assets, software, or datasets). You must still submit this Digital Product Form with your proposal even if you check this box, because this Digital Product Form is a Required Document.

If you ARE creating digital products, you must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

Part I: Intellectual Property Rights and Permissions

A.1 What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

- The **Urban Libraries Council** will hold copyright on the national publication for **Partners for Middle School STEM** and recognize its partners as co-authors where appropriate.

- SSI-NCIL will hold copyright on any resources it creates and includes in the online resources.

- Pilot public libraries will hold copyright on materials they create and will be recognized in the online resources.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

- All resources will be available on the ULC website free of charge.

- ULC has a policy on use and terms on its website which restricts for profit reproduction.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

NA

Part II: Projects Creating or Collecting Digital Content, Resources, or Assets

A. Creating or Collecting New Digital Content, Resources, or Assets

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and format you will use.

- ULC will be collecting partnership agreements (6), stem pilot activities (18) and other key resources for libraries to replicate the multi-sector partnerships and STEM programs designed for middle school in PDF format.

A.2 List the equipment, software, and supplies that you will use to create the content, resources, or assets, or the name of the service provider that will perform the work.

- NA

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to use, along with the relevant information about the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

- PDF

B. Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

- ULC will hire a professional evaluation firm to assess value of tools and resources created.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

- All publications and resources will be maintained on the ULC and NCIL websites for a period of three years after the end of the grant.

C. Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata. Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

- NA

C.2 Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

- NA

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

- NA

D. Access and Use

D.1 Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

- All resources will be available on the ULC website free of charge.

D.2 Provide the name(s) and URL(s) (Uniform Resource Locator) for any examples of previous digital content, resources, or assets your organization has created.

- http://www.summerlearning.org/wp-content/uploads/2016/09/ULC_NSLA_SummerLearningOnlineToolkit.pdf

Part III. Projects Developing Software

A. General Information

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.

None

A.2 List other existing software that wholly or partially performs the same functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your software and explain why you chose them.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

B.3 Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

B.4 Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

B.5 Provide the name(s) and URL(s) for examples of any previous software your organization has created.

C. Access and Use

C.1 We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you

intend to create, and what conditions will you impose on its access and use? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

C.2 Describe how you will make the software and source code available to the public and/or its intended users.

C.3 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

Part IV: Projects Creating Datasets

A.1 Identify the type of data you plan to collect or generate, and the purpose or intended use to which you expect it to be put. Describe the method(s) you will use and the approximate dates or intervals at which you will collect or generate it.

None

A.2 Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

A.3 Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

A.4 If you will collect additional documentation, such as consent agreements, along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

A.5 What methods will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

A.6 What documentation (e.g., data documentation, codebooks) will you capture or create along with the dataset(s)? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

A.7 What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

A.8 Identify where you will deposit the dataset(s):

Name of repository:

URL:

A.9 When and how frequently will you review this data management plan? How will the implementation be monitored?