STEM Equity Framework: Building Equitable, Inclusive Library Services That Address Community Needs

5. Narrative

Cornerstones of Science in partnership with the Institute of Innovative Learning, the University of Missouri School of Library and Information Science and nine state library agencies, respectfully requests a $249,899 Laura Bush 21st Century Librarian Project grant to develop a STEM Equity Framework for libraries and a Library Leadership training program. Over 24 months, we will build state and public library capacities to serve as community catalysts for equitable STEM learning. We will strengthen library leaders' skills and expertise to deliver equitable, inclusive culturally responsive services, in partnership with local leaders that address science-based issues of concern to local community members, particularly those from underserved and underrepresented groups.

A. Statement of Broad Need

Although public libraries are located throughout communities across the country, they currently do not serve or represent all members of society. These underserved populations use their local libraries in different ways though they are not fully tracked, understood or intentionally planned for by library leaders (Cooke 2017). There is compelling evidence that these underserved populations are often underrepresented users of their libraries because of cultural and racial barriers, inequities and disparities (Zickhur et al 2013; Lopez et. al. 2019, Sullivan and Hildreth, 2016). Despite this situation African-Americans (60%) and Hispanics (55%) are more likely to say that libraries are "very important" to them and their families compared to

> **STEM Equity in Libraries** – Through this proposal we will work with state and public library leaders to build operational capacity to deliver intentional equitable, culturally responsive STEM services able to serve all individuals and families from diverse cultural and socioeconomic backgrounds, including disadvantaged families with incomes below the poverty line; individuals with disabilities; people underrepresented and unaccustomed to using the library; and underserved communities.

Caucasian families (41%) (Zickhur et al 2013). Studies have also indicated the effectiveness of STEM engagement when connected to issues of community advocacy and social change (Benecze and Carter 2011). Though state and public libraries as well as the federal IMLS recognize the importance of equity and inclusion, there is no substantive advocacy within the state and public library profession and, at present, many library leaders do not place a priority on engaging underserved audiences in <u>an intentional and systematic manner</u> (IMLS 2020; Baek, 2013; Bell, et. al 2009; Gordon, 2017; IMLS 2021 and Hakala et al, 2016).

At this moment, the majority of people in the library field currently does not reflect and therefore cannot fully understand the communities they serve (Cooke 2017). The need and types of information and the way we learn are not neutral - as both library staff and users filter information through their personal life experiences. The way libraries operate in this country (open stacks, asking for help at a large desk, public computers, as examples) may be different, strange, unwelcome, or even false models of service (Liu 1995). Information-seeking behaviors are affected by "different cultural experiences, language, level of literacy, socioeconomic status, education, level of acculturation and value system (Liu 1995)." Invisible barriers and implicit assumptions could unwittingly impact services to these users (Cooke 2017). Race-neutral librarian practices that are often used can reproduce racial disparity, resulting in unfair access and outcomes (Curren et al 2018).

The principles of diversity, equity and inclusion, and the resulting practices that seek to explicitly ensure engagement from all members of the community are library core values but not necessarily established core competencies for the library profession (ALA 2019; Cooke 2017 and Curren et al 2018). If these competencies

are not prioritized or addressed, the library's inability to serve all members in their communities and improve access to relevant equitable, culturally responsive STEM services that address science-based issues of concern will continue to be a prevalent issue. State and public library leadership do not have an applicable shared definition, understanding, benchmarks, strategies and the necessary training to successfully address the types of 21st Century STEM literacy information and resources affecting the underserved populations in their communities. There is an impressive body of diversity, equity, inclusion, social justice (DEISJ) and STEM literacy research, projects, training and program materials developed for and directed at front-line library staff. However, little is developed for library leadership. The pivotal role that library leaders play in advocating and promoting equitable STEM literacy continues to be a glaring omission in current scholarship.

Finally, library leaders are not alone in tackling this issue within their communities nor should they be. These are also concerns for state and local governments and community leaders. As the Urban Libraries Council (ULC) so eloquently stated, *"By establishing shared language, goals and metrics with local government agencies, library leaders can align resources, personnel and priorities across diverse types of partners and build the political [and institutional will] essential for this difficult and important work* (Benton et al, 2020)." Library leadership community engagement skills and competencies are essential if they: 1) want a "seat at the table" with other community leaders who are addressing these science-based issues (e.g., water quality, public health, as examples); 2) have the visibility, be recognized and considered an essential and vital community institution; 3) be a part of the conversations, which include many viewpoints that reflect the true complexities of their communities.

Why is STEM equity important? STEM equity issues are framed by city and state leaders, and libraries have the potential to serve in the front lines by taking purposeful STEM equity action through their facilities, technology, programming and policies to address these disparities (Public Management Magazine, 2019). Our nation is in the midst of renewing its commitment to social equity and inclusion. There is strong evidence that many pressing issues, such as health concerns (e.g., COVID-19 pandemic, lead in drinking water, food insecurity) and environmental impacts (e.g., climate change, energy security, etc.) disproportionately affect our most vulnerable, disadvantaged populations (Grusky, et al, 2017; Chetty, et al 2019). Increasingly public libraries are called on to help people navigate such problems and many librarians struggle in this new role (Friedheim, 2017). However, large or small, urban, suburban or rural, all libraries face challenges regarding inclusion and equity which might stem from a variety of organizational or leadership problems, such as a lack of funding or lack of interest in directly engaging with vulnerable populations. Improving state and local public library leaders' abilities and capacities as well as increasing their interest and beliefs regarding libraries' role in solving these issues is a vital way to achieve STEM equity in our nation's communities.

> *This project will address two major challenges: 1) Increasing access and engagement by underserved audiences to needed equitable, culturally responsive STEM library services and resources and 2) enhancing state and public library leadership skills and competencies to intentionally plan for and provide equitable and culturally responsive services in partnership with local government, community leaders and broadening the participation of vulnerable populations around relevant science-based community issues.*

B. Project Design

The overarching goal for this project is that state and public library leaders have the capacity to deliver equitable, inclusive, and culturally responsive services, in partnership with local leaders, that address science-based issues of concern to local community members, particularly those from underserved audiences. The project's objectives are:

1) **A STEM Equity Framework for libraries** that describes the core diversity, equity,inclusion and social justice (DEISJ) and STEM literacy skills and competencies that library leadership needs to effect change in their communities.

2) **A STEM Equity Leadership training program** that delivers the *Framework*'s core skills and competencies. Our pilot libraries will prepare a STEM Equity Library operational plan developed in partnership with local government, community leaders and underserved groups. Their plan will integrate equitable, inclusive, culturally responsive STEM literacy into library infrastructure, services and programming.

3) **Increase awareness about the STEM Equity Framework and Leadership Training** – The project team, partners and advisors will increase awareness within the library community about the STEM Equity Framework and the leadership training program.

A focus on library leadership

To accomplish significant and long-term change within a library its leaders (e.g., library directors, library managers including department heads, branch managers, and assistant/deputy/associate directors, etc.) must be involved. These leaders are key decision-makers responsible for the: 1) development of the overall vision and direction for the organization; 2) allocation of staff and financial resources; and 3) development and support of strategic partnerships with government and community-based organizations. Further, state libraries have an important role because they support (e.g., provide funding, contribute technical resources, provide staff training, etc.) and influence public library priorities and programming. As such, our state library partners have committed to model intentional, equitable, and culturally responsive STEM operational planning that is critical to developing the shared language and belief needed for the use and adoption of the STEM Equity Framework.

Leveraging existing work

This project will build on previous IMLS STEM-related projects, current research, and instructional materials on DEISJ and informal science learning. Notable examples include:

1. Empowering Libraries Initiative (LG8050041)(Cornerstones of Science 2018) – The proposed project incorporates the lessons-learned from more than a decade of work by Cornerstones and its IMLS National Leadership Grant *Empowering Libraries* initiative. Completed in 2017, the initiative developed, evaluated, and finalized strategies to expand library involvement in STEM and to transition them to being STEM resource centers for their community. Key activities included developing a local STEM planning process, providing technical assistance and professional development on STEM programming, working to integrate STEM into library operations, and implementing expanded STEM programming. Our eleven pilot public libraries demonstrated: 1) an increased capacity for planning STEM programming; 2) ability to form new partnerships with government agencies, nonprofits, and area businesses; 3) increased knowledge and increased interest in STEM programming among staff; 4) increased confidence and ability among leadership and staff to identify STEM issues of interest and relevance to their communities and to develop programming to meet that need; and 5) increased visibility of the library within the community.

2. Existing Frameworks and Library Professional Development for Librarians - Considerable informal STEM learning, DEISJ, and community engagement research materials exist. However, what is lacking is a cohesive, synthesized approach that effectively and specifically addresses the skills and competencies library leaders need to connect: (1) intentional equitable, culturally responsive library services and infrastructure with (2) a community's pressing health and environmental issues that are having a disproportionate effect on their most vulnerable, disadvantaged populations. There are several frameworks, equity and inclusion training and community engagement resources this project will build on including: The GARE Equity Framework (Curren et al 2016) and ALA Office for Diversity's *"6 Steps For Changing Bias" (*LeBossiere et al 2020); NILLPA Framework (Sheppard et al 2019); the Informal Science

Learning Framework (Glass et al 2018); the 21st Century skills sets and competencies highlighted by IMLS (2020);

3. <u>Training</u> – There are also several recent LIS instructional text books and training programs that address DEISJ, community engagement and STEM literacy. The project will review and synthesize this information to create the STEM Equity Leadership training program. These include: *Information Services To Diverse Populations* (Cooke 2017); *Diversity, Equity, and Inclusion In Action: Planning, Leadership and Programming* by Christine Bombaro (2020); [Project Voice](#) (2019) and [Project Ready](#) (2017). In addition, OCLC's WebJunction platform offers numerous pertinent tools and templates including: [Supercharged Storytimes](#); [Pathways to Civic Legal Justice training](#); [Exploring Equity, Diversity, And Inclusion In Online Library Instruction: The Design For Learning Program](#); [Toolkit for Creating Small Spaces](#); and [Community Discovery Tool](#) [Basket](#). Training from the National League of Cities (*Race, Equity and Leadership (REAL) program* and *National Association of Counties Serving the Underserved initiative* will also be used to address important linkages between public library-local government activities.

Project Objective #1: Development of the STEM Equity Framework (Months 1-15)

The project's principal investigators (Cornerstones of Science, Institute for Learning Innovation and University of Missouri) will develop the STEM Equity Framework. The *Framework* will be evidence-based and grounded in research, evaluation, and knowledge of effective and emerging practices. It will provide the structures and processes library leadership require to develop and implement equitable, culturally responsive library services <u>relevant to the needs of their communities</u>. The STEM Equity Framework will offer a step-by-step process for state and public library leaders to reflect on current operations and policies as well as strengthen leadership skills and capacities. The focus is on intentional equitable and culturally responsive operational planning, in partnership with local leaders and underserved communities, around science-based issues of concern. The *Framework* will then serve as the basis for identifying the curriculum content of the STEM Equity Leadership professional development training. A core construct of the *Framework* is that equity and inclusion are value and moral considerations while STEM literacy is content and process driven. As such the skills and competencies, as defined in the *Framework*, will be developed in ways that ensure that any effort to deal with a STEM-based community issue also passes through the lenses of equity, inclusion and cultural responsiveness. The *Framework* will: 1) identify key library leadership skills, knowledge and characteristics; and 2) provide a roadmap for library leadership to define and integrate equitable, culturally responsive STEM literacy into the daily operations and decision-making that is appropriate for their libraries.

Fundamental to the development of the *Framework* is external review. This means that: 1) the key stakeholders from the library, government and community leaders will be involved in its development; 2) the process used to create the *Framework* is iterative and transparent; and 3) there will be expert review by our key stakeholders throughout the project. Together, these will be critical to building the credibility, usefulness and adoption of the *Framework* and STEM Equity Leadership training materials by state and public library leaders. The development of the *Framework* includes: 1) creating a shared language and understanding of what STEM equity means; 2) preparing a synthesis of pertinent frameworks that highlights salient library-appropriate points of STEM Equity; 3) articulating a set of core skills and competencies needed in intentional equitable STEM operational decision-making and community engagement with underserved groups and local leaders; 4) conducting case studies of libraries that provide STEM equity library services, demonstrate engagement with diverse communities, and address a STEM-based community need; and 5) engaging project partners, advisors and the library community in reviewing all materials.

Step 1: <u>Developing a shared language</u> – Currently there is not a shared description within library leadership of what STEM equity is and how this can be operationalized in their institutions. We recognize that all library leaders manage unique staff with their own skill sets, have operational constraints and community interests, and that a one-size does not fit all. However, we also assert that a shared language and intentional processes defined by and tailored for state and public library leaders can provide the basis to successfully operationalize equitable, culturally responsive STEM services that meet the needs of their communities. We will broadly engage library leadership to document current perspectives on these issues and garner input through a variety of methods (e.g., surveys, interviews, etc.). We will examine: a) how they describe STEM equity and inclusion practices as well as how to operationalize them; b) the meaning of "equitable, culturally responsive STEM literacy"; c) the skills sets and competencies needed to provide equitable, culturally responsive library services; and d) current practices of engaging with local government, community leaders and underserved groups to identify and address relevant science-based community issues.

Step Two: <u>Research and synthesis of informal science, library, and DEISJ frameworks, practices, and training resources</u> – We will assess existing research and best practices to prepare a working draft of the STEM Equity Framework. Current DEISJ and informal STEM learning Frameworks ([GARE Racial Equity Model](#), [ALA's ODLOS Frameworks](#) , [Informal Science Learning Framework](#)) are all directed at particular issues and do not specifically address STEM equity. We will draw on these to create a cohesive draft STEM Equity Framework specifically designed for state and public library leaders. It will describe the core competencies, commitments, knowledge, and skills that state and public library leaders need to create accessible equitable and culturally responsive library STEM services. The draft *Framework* will be informed by 3-5 case studies of library exemplars (e.g., they have equitable, culturally responsive STEM infrastructure, programs and services; they collaborate with local government and community leaders; they engage underserved and disadvantaged groups in their communities in intentional ways, etc.). We will document: 1) the environmental, governmental, community needs and factors that precipitated operational changes in their libraries; 2) explore their processes, strategies and types of library leadership skills, professional development and capacity building they pursued; 3) the benefits, values and importance of STEM equity to their institutions and community; and 4) what types of professional development they would like to have and/or have developed including the types of community outreach performed. These exemplars will be identified by our project partners and advisors as well as research (e.g., winners of the Urban Library Council's [Innovations Initiative Awards](#) that successfully demonstrate STEM Equity attributes, etc.).

Step Three: <u>Prepare the STEM Equity Framework</u> – We will prepare a draft of the STEM Equity Framework and use two iterative processes to confirm and validate its utility with key stakeholders from library, government and community leaders. Library leaders' input will be sought and included during development of the working draft and their reviews and discussion will be used to further elaborate and refine the Framework at the conclusion of the STEM Equity Library Leadership training.

Project Objective #2: Prepare STEM Equity Leadership Training (Months 6-21)
OCLC/WebJunction, Cornerstones and the University of Missouri will design an online training series for library leaders based on the *Framework* and related content. The learning objectives will identify a set of competencies, leadership skills, and desired capacities. Examples of these are): 1) intentional equitable, culturally responsive operational planning; 2) community engagement with local leaders and underserved audiences; 3) use of STEM skills by those affected by science-based community issues; 4) use of library and community data to inform operational planning; and 5) identification of unconscious biases in order to increase sensitivity and break down service barriers. We will use a Community Engaged Learning (CEL)

approach (i.e., online learning while remaining in their own communities). Studies have shown that when librarians participate in this way their new skills and knowledge are successfully transferred into everyday practice (Kazmer, 2005). The training will be delivered through a WebJunction training platform.   This approach optimizes library leaders' abilities to relate their learning directly to their institutions as well as their communities.

Pilot cohort of public libraries – Our three state library partners (CT, ID, MD) will use a competitive process (Letter of Interest) to select nine public library leaders (3 in each state). Examples of selection criteria include: willing and able to perform all requirements of a pilot library; experience with and prioritization of STEM programming by the library system; a library system commitment to staff training that demonstrates a culture supportive of continuous learning; the depth and breadth of community partnerships especially those that support equity and STEM initiatives; library equity, diversity, inclusion, and anti-racism initiatives; and working relationships between the state library agency and the library system's directors/leaders.

Training Content and Platform

The STEM Equity Leadership training content will follow a scaffolded, collaborative instructional model combining experiential learner-centered, action-oriented activities (Mitchell, Henry, & Young 2001) with reflection and focus on real-world problems (Reason & Bradbury 2001; Mitchell, Henry & Young 2001; Schon, 1983). The content will be determined through ongoing state and public library input and feedback starting with the development of the STEM Equity Framework and carried throughout the development of each planned unit. The STEM Equity Leadership training will be delivered online over a 6-month period and hosted in the WebJunction learning management system. This approach is the most cost-effective and efficient way to present the program to participants from around the country and it addresses current COVID-19 safety concerns of participants and project team. The lessons for each topic will span two weeks of instruction and learners will commit to approximately 4-6 hours for each topic. Each session of the training series will build upon the previous session. Participant activities include: 1) online face to face instruction from project team members, subject matter experts and peers; 2) completion of the STEM Equity Leadership Workbook that will be designed to guide participants in reflecting on the information learned online, going deeper to further define and challenge their own beliefs and steps to translate this understanding into appropriate next steps and strategies that build a STEM Equity Operational Plan for their organization; 3) group work where participants engage with staff, local government, community leaders and underserved populations to aid in the development or implementation of a section of their library's STEM Equity Operational plan; and 4) participation in online threaded discussions on WebJunction's learning platform, where participants share their work and offer and receive feedback from peers, instructors, and other subject matter experts. Participating state library leaders will also be trained to serve as project mentors to their pilot libraries.

The training topics and corresponding content will be determined after the first consultation is completed on the STEM Equity Framework. Complex and sensitive subject areas will be afforded more time and emphasis while other areas will be more straight forward and tactical in nature. We will address difficult and sensitive subjects with participants including the willingness to explore and recognize their own inherent biases, racial identity, and social location within intersecting structures of power and privilege. The intent is for participants to gain and enhance their skills in order to confidently guide their staff [and operations] through a process of recognizing and addressing the needs of those people that are invisible in the library though present in the community (Carter and Goodwin, 1994; Morris 2006). Planned units may include (but are not limited to): 1) Introduction to the STEM Equity Framework and STEM Equity Operational Planning; 2) What does STEM literacy mean and how can it be integrated into library operations; 3) Who is not using your library:

Understanding DEISJ biases and institutional barriers; 4) DEISJ Library Strategies: Methods to address bias, barriers, and expand access for underserved populations; 5) Be Part of The Solution: Using science-based community issues affecting underserved populations and leadership roles for libraries; 6) Community engagement strategies and tactics for creating partnerships with local government and community leaders; 7) Creating a roadmap and measuring the quality of your library STEM Equity Operational Plan through evaluation and logic modeling; 8) Implementing your Library STEM Equity Operational Plan; and 9) Wrap-up session - Sharing lessons learned.

STEM Equity Operational Plan – Each pilot library and state library partner will prepare a STEM Equity Operational Plan for their organization. It will describe their methods, strategies and timeframes for integrating STEM equity into daily operations.

Project Objective #3 - Increase awareness about equitable, culturally responsive 21st century STEM literacy (Months 18 - 24) – Cornerstones and its state and public library partners and advisors will increase awareness, within the national library community, about the STEM Equity Framework and the leadership training program. Examples of engagement methods include (1) project materials presented at multiple state library and regional workshops/conferences; (2) distribution via state library Continuing Education Coordinators and STEM Coordinator listservs for comment; (3) hosting national webinars/Zoom sessions for the library community; (4) host a Zoom session with the public library STEM and DEISJ exemplars; (5) distribute to library organizations that work directly with people engaging underserved audiences (e.g., REFORMA, American Indian Library Association, the Black Caucus of ALA, the Asian Pacific American Librarians Association, the Chinese American Librarians Association, etc.), Urban Libraries Council and ALA and their many divisions (e.g., PLA, ARSL, YALSA, etc.); and (6) engage non-library organizations that focus on equity and inclusion.

Project success and national impact: The project brings together library partners, experts, advisors and representatives of organizations that focus on engaging underserved audiences. These include:

> **Project team** - Cynthia Randall, PI and Executive Director of Cornerstones of Science with expertise in development of products and training for state and public libraries, informal STEM organizations and federal agencies that builds capacity and access around community engagement and relevant science science-based issues. The Institute of Innovative Learning, under the supervision of Dr. John Falk (Co-I) a national thought leader in informal STEM learning. Alan Melchior (Co-I), project evaluator with expertise evaluating informal STEM, service-learning and civic engagement. Dr. Jason Alston, College of Education, with Dr. Denise Adkins and Dr. Jenny Bossaller from the University of Missouri, School of Information Science and Learning Technologies with expertise in Latino/Hispanic Literacy practices, community engagement with underserved populations, diversity and quality of information in libraries. OCLC/WebJunction under the direction of Dale Musselman and Steph Harmon with extensive online training experience and expertise in building the knowledge, skills and confidence of library staff.
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> **Partners (state libraries):** Connecticut (CT), Maryland (MD) and Idaho (ID) state libraries will provide input, generate discussions in their states and serve as mentors with the pilot library cohort. Rationale for choosing these state libraries include: 1) proven performers through previous multi-year projects with Cornerstones; 2) their demonstrated commitment to working with underserved audiences; 3) each have different organizational structures within state government and in working with their public libraries; 3) these states offer a broad spectrum of underserved populations (MD – a focus on the visually impaired, 30% African American and 9% below poverty; ID – has significant Hispanic and Native American populations; and CT – 30% is non-white and 35% speak a language other than English).

Advisors: <u>Dr. Sandra Hirsh</u>, Associate Dean for Academics, College of Professional and Global Education at San Jose State University; <u>Susan Hildreth</u>, former IMLS Director, state librarian for California, and served as a member for the *Rising To the Challenge: Re-envisioning Public Libraries*; <u>Colleen Bragiel</u>, Director of Community Engagement, Urban Libraries Council; <u>Dennis Schatz</u> – Pacific Science Center - WA; public library leaders <u>Sarah Dentan</u> – Stanislaus County Librarian – CA; <u>Wanda Green</u> – Assistant Director Tom Green County Library - TX,; <u>Margaret Stone</u> – Director, Dakota County Library - MN; and <u>Aletheia</u> Turner – System Services Division Manager,

Hennepin County Library – MN, and <u>state library representatives</u> from CA, IN, MA, NM, OH, and TN. (See Supporting Documents for Letters of Commitment for full descriptions).

Indicators of project success: Examples of key indicators include:
- Participating state libraries endorse, adopt and support the use of the STEM Equity Framework within public libraries in their states.
- There is increased awareness among participating state and public library leaders about the need for and benefits of a STEM Equity Framework.
- The pilot library participants demonstrate increased skills and competencies of DEISJ and STEM literacy skills needed to successfully engage all members of their community in science-based issues.
- The pilot library participants demonstrate increased interest, confidence and capacity in integrating equitable, inclusive culturally responsive STEM literacy infrastructure, programming and services into their library operations.

Evaluation: The long-term national impacts we seek are: (1) the STEM Equity Framework is adopted by a broad array of key library institutions, including national membership organizations, state library agencies, and library higher education, credentialing and accreditation programs; (2) library leaders, through a STEM Equity Operational Plan, transform their approach to engaging underserved audiences; and (3) audiences currently not present become active users of their public libraries. The project's Evaluation Plan and logic model (see Supporting Documents) details project goals, objectives, strategies, outputs and outcomes. The evaluation will serve two purposes: 1) to inform and improve the implementation of the initiative through regular formative feedback; and 2) to document the initiative's *impacts* on participating state and public library leaders. In that context, the following questions will guide the evaluation:
1. **Was the initiative successful in developing a STEM Equity Framework and building a consensus among key stakeholders (including participating state and public library leaders) about its contents?** To what extent did the *Framework*: identify the required knowledge, skills and dispositions needed to bring the *Framework* into professional practice; lead to a shared vision among stakeholders of the definition and role of STEM equity in public libraries; and move participating libraries to endorse and adopt the *Framework* as the basis for their STEM Equity Operational Plan for their institutions?
2. **Was the initiative successful in developing and delivering leadership training and resources able to impact the knowledge, skills, and dispositions of library leaders participating in the training?** To what extent did the training meet its goals of: increasing interest and understanding of intentional

STEM equity strategies and in building the skills and confidence of library leaders to integrate those strategies at their libraries; change the thinking of library leaders about the nature of STEM equity and the delivery of equitable, inclusive, and culturally responsive services in their communities; and impact the ways in which participating library leaders engaged community partners in planning and implementing library services?

3. **What was learned about "what works" in building the capacity of library leaders to integrate STEM equity learning into their operations?** What aspects of the *Framework* development process were seen by participants: As particularly effective; about how best to build capacity for STEM equity learning among state and local library leaders; and did the project succeed in creating tools likely to influence both state and public library communities and their practices?

C. Diversity Plan

This project focuses on expanding the diversity, equity, and inclusion skills of library leadership. Project team members come from diverse backgrounds, age groups, genders and are multicultural. We are currently in discussions with the National League of Cities' Race, Equity and Leadership (REAL) Program (www.nlc.org/REALtraining) to inform the STEM Equity Leadership training as well as to conduct a project team sensitivity training session. Our state library partners will seek multicultural and ethnically diverse library leaders, libraries demonstrating STEM equity, and libraries that are located in diverse communities. Our diversity plan has three prongs:

1**. Enhance library leadership equity, inclusion and cultural responsiveness skills** – We will build the DEISJ skills of our pilot library leaders and assist them in applying these values through operational decision-making within their institutions. The result is that library leadership can identify and mitigate barriers such that there is equitable access for all community members to science-based library services and resources.

2. **Project Team Sensitivity Training** – The project team, including our state library partners, will participate in a sensitivity training in order to increase our awareness of our own biases, viewpoints and sensitivities around diversity, equity, inclusion. This will help to create a shared team language and design principles that are used within the STEM Equity *Framework* and leadership training materials.

3. **Engagement of Multicultural, Racial and Ethnically Diverse Library Leaders** – During the project there will be ongoing efforts to engage diverse members of the library community in the development of the *STEM Equity Framework* and the *STEM Equity Leadership* training. Throughout the project a priority will be placed on ensuring the design and implementation of all library outreach and engagement efforts have explicit efforts to engage the diverse library workforce (e.g., ethnicity, gender, rural/urban, economically disadvantaged, etc.). Finally, through the STEM Equity Leadership training, participants will create STEM Equity Development Plans that describe how they will address diversity in intentional ways in their own libraries and communities.

In summary, we will strengthen the field's commitment to diversity, equity, and inclusion by building the capacity of libraries and their leaders to build partnerships and serve all members of their community.

D. Broad Impact

Systemic change throughout library leadership - Innovation and transformative organizational change requires effective leadership. While important investments have been made to engage and train the frontline library staff in DEISJ and STEM literacy, many library leaders need support to expand their STEM knowledge, capacity and cultural competencies. These skills will enable them to thoughtfully operationalize equitable,

culturally responsive STEM literacy. This will occur through: 1) organizational change and 2) improved delivery of STEM programs and services to underserved, underrepresented and disadvantaged members of their communities. The result will be systematic change by leaders within the library community.

Diversity and societal benefits – The benefits of this project will be manifested in two ways: 1) <u>Provide relevant, culturally responsive STEM information</u> - People want their libraries to provide them with personally relevant STEM information that they can apply, both to themselves and within their communities, to address pressing issues that are important to them; and 2) <u>Libraries address STEM equity learning for all</u> – Although public libraries are located throughout our communities many do not serve all members of society. Many libraries struggle with significant cultural and racial barriers to participation. Historic inequities and disparities in these communities and their libraries impede equal access for all members of their community.

Dissemination and extending the benefits – The final products will include downloadable versions of the STEM Equity Framework, STEM Equity Leadership Training Workbook (that describes the process for library leaders to create a STEM Equity Operating Plan) and STEM Equity toolkits to support the library leader's operational planning process. Also available will be the archived video presentations by the project team and subject matter experts. Though these materials will be informative, they will be most effective through facilitated experience as the person to person relationship will be important particularly when addressing specific DEISJ content. Dissemination of the project's findings and materials will include:

1. <u>Relevant websites</u> – We will promote the final products via key web sites (e.g., www.cornerstonesofscience.org, www.stemlibraries.org) as well as links from participating state library websites. Social media will highlight the state and public library experiences through a series of blog posts.

2. <u>Participating state library websites and state-specific press releases</u> – Project findings, particularly those that highlight participating state and public library results will be posted on their websites and distributed to the media. In addition, state specific press release templates will be provided for them to customize and distribute to media outlets, their public libraries statewide, IMLS, and informal science and social justice organizations that they believe would be interested in the results.

3. <u>Presentations</u> - Members of the project team and project partners will make presentations to the library community (e.g., 1-2 regional and national conferences, as well as two webinars targeted at public library staff and leadership as well as local, state and national informal STEM learning and diversity organizations, etc.). Due to COVID-19 precautions and for the near future, all presentations will be made virtually to ensure the safety of the project team, partners and participants attending these sessions.

Work beyond the grant period will continue by Cornerstones and its state library partners. Examples of these actions include: national discussions and refinement of language that describes equitable, culturally responsive STEM Literacy for state and public libraries; adoption and use of the STEM Equity Framework and the associated leadership competencies and capacities; the *STEM Equity Leadership* training methods and curricula will be adapted, finalized and offered by Cornerstones of Science as an ongoing service to the library community; public library leaders will produce and implement STEM Equity Development Plans; webinars and social media platforms hosted by Cornerstones of Science will gather input from the library community; and web analytics will track the use of the STEM Equity Framework and STEM Equity Leadership training materials.

Schedule of Completion

Project activities	2021		2022				2023	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
	Project Year 1				Project Year 2			
Equitable STEM Framework for Libraries								
Synthesis of public library STEM literacy and DEISJ frameworks & best practices prepared	X	X						
Equitable STEM Library Framework drafted, circulated for review by library community, & finalized		X	X	X	X			
Pilot leadership PD program								
Empowering Library Guides amended, and Library Diversity and Inclusion Toolkit published			X	X	X			
Online pilot library STEM equity training suite prepared, conducted & materials revised			X	X	X	X	X	
Pilot library STEM Equity Plans prepared						X	X	
Project Dissemination								
Presentations at state and national library conferences, social media blasts, CoS web page, journal articles, etc.						X	X	X
Project Evaluation								
Implement Evaluation Plan	X	X	X	X	X	X	X	X

DIGITAL PRODUCT FORM

INTRODUCTION

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to digital products that are created using federal funds. This includes (1) digitized and born-digital content, resources, or assets; (2) software; and (3) research data (see below for more specific examples). Excluded are preliminary analyses, drafts of papers, plans for future research, peer-review assessments, and communications with colleagues.

The digital products you create with IMLS funding require effective stewardship to protect and enhance their value, and they should be freely and readily available for use and reuse by libraries, archives, museums, and the public. 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

If you propose to create digital products in the course of your IMLS-funded project, you must first provide answers to the questions in **SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS.** Then consider which of the following types of digital products you will create in your project, and complete each section of the form that is applicable.

> ### SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS
> Complete this section if your project will create digital content, resources, or assets. These include both digitized and born-digital products created by individuals, project teams, or through community gatherings during your project. Examples include, but are not limited to, still images, audio files, moving images, microfilm, object inventories, object catalogs, artworks, books, posters, curricula, field books, maps, notebooks, scientific labels, metadata schema, charts, tables, drawings, workflows, and teacher toolkits. Your project may involve making these materials available through public or access-controlled websites, kiosks, or live or recorded programs.
>
> ### SECTION III: SOFTWARE
> Complete this section if your project will create software, including any source code, algorithms, applications, and digital tools plus the accompanying documentation created by you during your project.
>
> ### SECTION IV: RESEARCH DATA
> Complete this section if your project will create research data, including recorded factual information and supporting documentation, commonly accepted as relevant to validating research findings and to supporting scholarly publications.

SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS

A.1 We expect applicants seeking federal funds for developing or creating digital products to release these files under open-source licenses to maximize access and promote reuse. What will be the intellectual property status of the digital products (i.e., digital content, resources, or assets; software; research data) you intend to create? What ownership rights will your organization assert over the files you intend to create, and what conditions will you impose on their access and use? Who will hold the copyright(s)? Explain and justify your licensing selections. Identify and explain the license under which you will release the files (e.g., a non-restrictive license such as BSD, GNU, MIT, Creative Commons licenses; RightsStatements.org statements). 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.

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.

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.

SECTION II: 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 the format(s) you will use.

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

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG, OBJ, DOC, PDF) you plan to use. If digitizing content, describe the quality standards (e.g., resolution, sampling rate, pixel dimensions) you will use for the files you will create.

Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan. How will you monitor and evaluate your workflow and products?

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period. Your plan should 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).

Metadata

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

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

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).

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, delivery enabled by IIIF specifications).

D.2. Provide the name(s) and URL(s) (Universal Resource Locator), DOI (Digital Object Identifier), or other persistent identifier for any examples of previous digital content, resources, or assets your organization has created.

SECTION III: SOFTWARE

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.

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

Technical Information

B.1 List the programming languages, platforms, frameworks, 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), URL(s), and/or code repository locations for examples of any previous software your organization has created.

Access and Use

C.1 Describe how you will make the software and source code available to the public and/or its intended users.

C.2 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

SECTION IV: RESEARCH DATA

As part of the federal government's commitment to increase access to federally funded research data, Section IV represents the Data Management Plan (DMP) for research proposals and should reflect data management, dissemination, and preservation best practices in the applicant's area of research appropriate to the data that the project will generate.

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

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 sensitive information? This may include personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information. If so, detail the specific steps you will take to protect the information while you prepare it for public release (e.g., anonymizing individual identifiers, data aggregation). If the data will not be released publicly, explain why the data cannot be shared due to the protection of privacy, confidentiality, security, intellectual property, and other rights or requirements.

A.4 What technical (hardware and/or software) requirements or dependencies would be necessary for understanding retrieving, displaying, processing, or otherwise reusing the data?

A.5 What documentation (e.g., consent agreements, data documentation, codebooks, metadata, and analytical and procedural information) will you capture or create along with the data? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the data it describes to enable future reuse?

A.6 What is your plan for managing, disseminating, and preserving data after the completion of the award-funded project?

A.7 Identify where you will deposit the data:

Name of repository:

URL:

A.8 When and how frequently will you review this data management plan? How will the implementation be monitored?