

Pennsylvania Afterschool Youth Development Network

Project Accelerate: A Systems Building Plan to Infuse Science, Technology, Engineering, and Math into Out of School Time

The Pennsylvania Statewide Afterschool/Youth Development Network (PSAYDN) through its parent organization, the Central Susquehanna Intermediate Unit - Center for Schools and Communities, is seeking funding from the Noyce and Charles Stuart Mott Foundations to increase the capacity of Pennsylvania's (PA) statewide Out of School Time (OST) networks to initiate state system-building efforts. The CSIU-CSC is requesting funding to implement a statewide systems building project, entitled *Project Accelerate*.

Pennsylvania Statewide Afterschool/Youth Development Network

PSAYDN is a C.S. Mott Foundation funded statewide after-school network that brings together key decision makers in Pennsylvania (PA) who are dedicated to improving outcomes for children and youth through high quality after-school programs. PSAYDN is committed to providing statewide leadership to build and sustain high-quality, after-school programs that promote positive youth development, support student success and their transition to a successful adulthood. With schools struggling to keep up, schools and communities need to take advantage of after-school hours to not only help keep students engaged and in school, but to expose them to careers in Science, Technology, Engineering and Math (STEM) and accelerate passion for STEM.

PSAYDN's *Project Accelerate* has adopted the following Vision and Mission:

Vision: All Pennsylvania children/youth will have access to high quality, innovative informal after school STEM activities and programs that develop inquiry and discovery to prepare them for college, work and life.

Mission: To increase awareness and facilitate capacity building of high quality, innovative, informal STEM programs in OST settings throughout Pennsylvania.

Project Accelerate's efforts align with PSAYDN's efforts to link statewide after-school professional development systems - early childhood, K-16 education and workforce development. The infusion of informal STEM as a major component of these efforts will assist in leveraging resources and maximizing effectiveness. PSAYDN is committed to deepening regional and national connections and supporting capacity building with the Afterschool Alliance STEM initiative and other Noyce Foundation funded after-school statewide networks.

Over the last several months, key elements to build and sustain a quality informal STEM system for PA have been identified. *Project Accelerate* will create an infrastructure of support at the state level to foster partnerships and effective communication, promote

high quality programming and begin building a growing database of programs, research, curriculums, and coordinated initiatives within the state.

PSAYDN's recent acquisition of a \$150,000 two year grant from The Heinz Endowments will be leveraged to assist in accomplishing the goals of *Project Accelerate*.

Program Narrative

I. Description of the state of STEM in Pennsylvania

To create a snapshot of STEM in OST in PA, PSAYDN administered a survey to OST programs across PA and conducted focus groups in the spring and summer of 2012. The survey was developed by the PSAYDN STEM OST Planning Workgroup formed following the award of the Noyce and Charles S. Stuart Mott Foundations' planning grant in March, 2012. The survey yielded 265 responses statewide from OST administrators, direct service workers and capacity builders. Focus groups were also held with PSAYDN Network Members and United Way staff. Two regional Forums with business, parents, education and OST providers were hosted by the Team Pennsylvania Foundation, (TEAM PA) a nonprofit corporation established in 1977 to create and sustain jobs in Pennsylvania. Team PA is chaired by the Governor.

The survey results indicate a need for OST STEM professional development opportunities to impart STEM content knowledge, to build cross-cutting STEM skill sets and to cultivate STEM teaching confidence. The survey results are a baseline for further survey in *Project Accelerate*. Several survey highlights follow:

- Limited STEM programming is the majority of the OST programs surveyed.
- Over 40% of survey respondents indicated that OST staff was uncomfortable in delivering STEM Curriculum. Math was rated highest in terms of staff comfort, Engineering was the least comfortable.
- Limited participation by OST professional staff in STEM professional development opportunities, with 41% indicating no annual participation in STEM staff training and 37% reporting participation in training only once a year.
- Different instructional activities are used to teach STEM disciplines. Hands on activities are the most common, although discussions, small group activities, service learning and field trips are also used. About 25% of respondents report that these activities are sometimes carried out by volunteers, while approximately 23% of the respondents report that Implementation of STEM is "always or "often" done using STEM curricula, toolkits and/or lesson plans.
- Regional partnerships are in place among OST Programs and STEM partners but supports are needed to forge more partnerships.

Key professional development resources (e.g., PA Keys, 21st Century Community Learning Centers, 4-H Impact STEM Program, Allegheny Partners in OST Time (APOST) and Philadelphia OST) will be leveraged to increase access to professional development opportunities.

The survey and focus group results indicated that PA has many nationally recognized STEM institutions, but in concentrated regions of the state. The STEM Asset Map completed by Team PA Foundation's PA and the program registering data collected by the PA STEM Girls Collaborative Initiative will provide a basis for additional mapping to occur under *Project Accelerate*. PSAYDN and OSTRC will use its online resource capability for sharing and expanding partnership and resource information among OST sites.

II. Description of how your Statewide Afterschool Network is well-positioned to effectively lead STEM system-building efforts.

Since 2007, PA has worked to implement its *Science, Technology, Engineering and Math Initiative* (PA STEM), in partnership with Team Pennsylvania Foundation, a nonprofit corporation established in 1977 to create and sustain jobs in Pennsylvania. The *PA STEM Initiative* operates through a collaborative approach governed by regional boards representing education, OST and business communities. A cornerstone of this effort was the formation of a state-wide STEM strategy, to align and enhance existing resources while developing new programs and partnerships that allow PA to engage in a STEM education redesign. The partnership's goal is to increase the number of students (especially females, minorities and other under-represented groups) engaged in STEM career areas, while continuing the development of effective strategies to retain, recruit and train the state's incumbent workforce in these critical fields.

With the awarding of a Noyce Foundation funded STEM Planning Grant in 2012, PSAYDN convened a 30 member OST STEM workgroup, representing diverse OST and STEM organizations and networks to strengthen collaboration among STEM stakeholders and align PA STEM resources to fully include OST time venues. Workgroup members included PA Department of Education, colleges and universities, museums, libraries, business foundations, OST resource centers, OST programs and OST intermediaries.

The goal of the OST STEM Workgroup was to *develop a PA STEM OST Action Plan that promotes network collaborations in the development of statewide partnerships for informal STEM education*. This goal was selected *since* PA OST settings continue to lack a coordinated STEM effort. *Project Accelerate* will seek to build and strengthen program collaborations and partnerships,

PSAYDN is well positioned to advance collaboration toward STEM implementation in OST. Throughout the initial six month Noyce and Mott Foundations planning grant period, PSAYDN accomplished the goals and objectives of the planning grant. Survey and forums were conducted and the STEM workgroup was established. The newly formed STEM workgroup collected and reviewed STEM assets, data, and researched STEM program content for the purpose of developing new program strategies/processes. The workgroup was also successful in creating a continuum of resources and supports between the formal and informal school day, improving collaboration between and among existing regional structures, and creating new OST program business partnerships to advance OST STEM efforts statewide. The STEM workgroup will continue transitioning into new leadership and working committees associated with grant implementation. The efforts of PSAYDN and the STEM workgroup are of interest to PA Department of Education, who is also addressing STEM as part of its awarded Race-to-the-Top funding.

III. Afterschool and STEM System Building Plan, including measurable goals and supporting activities

Need for *Project Accelerate*

STEM industries drive economic prosperity. The growth of these jobs is three times greater than non-STEM jobs and STEM workers earn 26 percent more than their non-STEM counterparts (US Department of Commerce). Even so, in 2012, PA has over 75,000 STEM job openings across the commonwealth. Industry employers in the state are not able to find enough qualified STEM workers to fill the number of current job openings. Reasons for this worker shortage can be found in the gaps that exist in skills and knowledge, as well as an overall lack of interest in the sciences.

In addition to needing a robust STEM workforce, the United States must have STEM literate citizens. All adults must understand basic STEM content and how to utilize STEM skills, whether these apply to balancing a checkbook, fixing an appliance, using a computer, or understanding pharmaceutical packaging. Moreover, STEM literate citizens are informed problem-solvers and decision-makers – those who can effectively influence STEM-specific policy issues and legislation.

Pennsylvania must significantly improve its STEM education and to do this, the state must focus on the human resource – its children. OST programs in PA serve over 187,000 children in grades K-12, helping them prepare for college, work and life. By working with schools, communities, businesses and families, OST programs are uniquely positioned to quickly and effectively improve STEM education across the commonwealth.

Purpose of *Project Accelerate*

The purpose for implementing *Project Accelerate* statewide across Pennsylvania will assist in strategically positioning PSAYDN to achieve the following:

- Increase statewide quantity and quality of STEM programming in OST organizations;
- Enhance the capacity of OST programs to assess the depth, breadth, focus and success of their STEM implementation, and to provide tools to measure these attributes;
- Cultivate and deepen regional, state and national OST-STEM partnerships to increase familiarity with existing programs, resources and promising practices; and
- Establish a communications campaign by mobilizing regional, state and national resources to build a public understanding of STEM and its importance.

Systemic Components

Project Accelerate is designed to address five systemic components that Noyce has identified as critical to STEM integration.

1. Partnership /Leadership Development
2. Quality Systems/Professional Development
3. Evaluation and Data Collection
4. Policy and Communications
5. Governance and Staffing

Goals, Objectives, and Supporting Activities

Project Accelerate's design, goals, objectives and supporting activities have been developed based upon the following project vision - *All children and youth deserve access to high quality, engaging STEM OST programs that support the transition to workforce and adulthood.* These goals, their objectives and the supportive activities have been organized under the five *Project Accelerate* systemic components.

Partnership/Leadership Development

The Noyce Foundation implementation grant funding will continue to strengthen collaboration among STEM stakeholders and will assist in redirecting resources to fully include OST time venues. While both formal school day and other informal settings were included in the PA STEM effort, the majority of the focus was placed on formal school day coordination and processes. Therefore, OST settings continue to lack a coordinated STEM effort. PSAYDN will take a lead role in helping to create a continuum of resources and supports between the formal and informal school day. Collaboration with existing, functioning regional structures and creation of new OST partnerships will be an important step for OST STEM advancement. One of PSAYDN's primary project focuses will be to increase and heighten awareness between and among existing regional STEM initiatives, STEM stakeholders and OST programs. These connections for OST programs will be guided by identified needs in resource sharing, partnership planning, leadership development, staff expertise and STEM implementation.

Since 2007, the Commonwealth has worked to implement its *Science, Technology, Engineering and Math Initiative* (PA STEM), in partnership with Team PA Foundation, a nonprofit, public private partnership organization established in 1997 to create and sustain jobs in PA. A cornerstone of this effort was the formation of a state-wide STEM strategy to align and enhance existing resources, while developing new programs and partnerships that allow PA to engage in a STEM education redesign. The partnership's goal is to increase the number of students (especially females, minorities and other under-represented groups) engaged in STEM career areas, while continuing the development of effective strategies to retain, recruit and re-train the state's incumbent workforce in these critical fields. The PA STEM initiative operates through a collaborative approach governed by regional boards representing education, OST and business communities.

This initiative created five Pennsylvania STEM regional centers that are organized into partnerships representing education, OST, government and business communities. Through this grant, the five STEM regions will be engaged in regular, bi-monthly meetings (6 per year) that will aim to bridge communication and support for local, regional and state-level strategies to increase access to and quality of STEM education. Specifically, these sessions will be used to share progress, struggles, and practices of regional partners, including those of the *Project Accelerate* networks, with the goal of increasing an understanding of the practices and policies necessary to advance STEM education in the commonwealth. Government leaders from the PA Departments of Education and Labor & Industry and business representatives will participate to assist in understanding

and aligning state and regional priorities. Their knowledge of key resources such as the DOS assessment tool, will be helpful in advancing this effort.

All participants will be expected to share the learnings from these regular meetings directly with their constituents to help inform the field, leverage resources, and support the goals of advancing the quality and access to STEM OST programs. Key communications materials will be developed following each meeting to be used and distributed. Further, a communication toolkit to be developed by the Governor's Manufacturing Council with a focus on the importance of STEM education will be shared.

ASSET MAPS AND PROGRAMS

The PA STEM initiative also mapped over 1600 STEM assets in the state and developed a user friendly database of assets by region, age and program. Its legacy is found within its coalitions of business, government, and education - all working toward practical methods to increase the number of STEM graduates and STEM job opportunities in the commonwealth. Team PA will build upon this work by involving potential partners including the Pennsylvania Girls STEM Sprout Fund region wide connected learning network and others to make available a robust, easy-to-use, online resource for parents, educators, higher education administrators and businesses. This online resource will include detailed and standardized information on STEM OST programs and providers by region.

Goal 1: Strengthen partnership and leadership development opportunities for key stakeholders in Pennsylvania.

1-A Objective

Establish the *Project Accelerate* Leadership Committee

1-A Supporting Activities

- Create a Core STEM OST Leadership Committee from current workgroup members or other interested parties
- Articulate the Core STEM OST Leadership Committee roles and responsibilities
- Retain the OST STEM Workgroup structure and recruit additional members
- Articulate Workgroup members' roles and responsibilities

1-B Objective

Increase the number of STEM Partnerships

1-B Supporting Activities

- Define partnerships, and differentiate them from Workgroup and Leadership Committee member participation
- Recruit and engage additional OST STEM partnerships by utilizing PSAYDN Partner organizations (i.e. Pennsylvania Association of School Boards, Pennsylvania Elementary and Secondary Principals Association, Pennsylvania

- PTA, Pennsylvania State Teachers Association) to facilitate local and state level partnership building and cultivation.
- Partner with TEAM PA to host 5 regional bi-monthly partner meetings designed to recruit new partners and inform current partners on STEM activities in the commonwealth.

Quality Systems/Professional Development

Importance of Professional Development for OST Staff

Many recent studies have explored and suggested frameworks for quality OST programs. These frameworks often include the common components of sound administrative structures, engaging activities, and connections to families and communities.¹ A final and perhaps most frequently cited element of quality is effective staff.

Research demonstrates that, in OST settings, there is a concrete connection between the caliber of adult/youth relationships and degree of youth achievement.² For example, a mixed-method, multi-city study conducted by the Harvard Family Research Project concluded that high-quality relationships between skilled staff and program participants lead to better child and youth outcomes.³

Further evidence points to positive connections between staff training and staff quality. A 2002 evaluation of BEST (Building Exemplary Systems for Training Youth workers) used literature reviews and surveys to ascertain the effectiveness of its youth worker trainings.⁴ The evaluation concluded that participation in BEST trainings strengthened staff participants' understanding of youth development and helped their organizations serve youth more effectively. In a similar study, The Annie E. Casey Foundation, working with Cornerstones for Kids and the Harvard Family Research Project, developed a multi-year project to determine whether a better trained workforce results in better child outcomes.³ The study concluded that high-quality relationships between staff and children lead to better child outcomes; and that professional development is one key activity in a large system of overall workforce development. A related three-year study, conducted by the Intercultural Center for Research in Education⁵ used interviews, observations, and standardized assessment tools to examine the relationships between staff training, indicators of program quality, and youth development outcomes. This research confirmed that staff who have appropriate training contribute to program quality, and that program quality translates directly into desired youth outcomes. Lastly, "A Recipe for Quality Out-of-School Time Programs"⁶ includes interviews with eight national experts in the OST field. Each was asked to identify the single most important ingredient for creating and sustaining quality improvement systems in OST programs. Five of the eight respondents identified issues of staff recruitment, training, and development as the most important ingredients and barometers of program quality.

There is clearly substantial evidence linking professional development for OST staff to increases in program quality and youth achievement. For this reason, PSAYDN and the STEM-OST Workgroup have devoted a considerable amount of thought and effort into both creating and coordinating a robust training and technical assistance system for OST staff. These efforts are described under the following sub-headings:

- *Curricula Selection and Training*
Site Selection – The PA OST- STEM Workgroup will create a referral process to solicit 20 pilot sites from the following OST networks: 21CCLC (state); PA Keys (state); Philadelphia OST System (Philadelphia); and APOST (Pittsburgh). Referrals will be reviewed and assessed for site capacity to participate in the program by the OST- STEM Workgroup. Five sites will be selected from each network.

The PA OST-STEM Workgroup has selected a set of five published curricula, to implement with the twenty pilot sites. The Workgroup intends to create and distribute a “curriculum selection tool” to assist sites in selecting curricula that best aligns with their needs and capacity. The five curricula will provide choice and diversity, while being manageable and affordable. The following curricula were selected to be used with the pilot sites:

1. **Engineering is Elementary** - Focusing primarily on elementary students, this engineering curriculum is well supported by the Museum of Boston and represents an integration of science and engineering with a literacy component.
<http://www.mos.org/eie/index.php>
2. **Junk Drawer Robotics** – Focusing on middle school students, it can be adapted for elementary and high school students.
<http://www.4-hmall.org/Product/robotics/junk-drawer-robotics-track/08431.aspx>
3. **Educational Quality Center - After School Math Plus and Playtime is Science** – Focusing primarily on math and science. Combined, these two products provide comprehensive grades K-8 STEM curricula.
<http://www.edequity.org/programs/science-and-math-programs/#24> ,
<http://www.edequity.org/programs/science-and-math-programs/#22>
4. **LEAP into Science** –incorporate a variety of science themes meant to introduce children (K-5) to science concepts that they experience in the world around them and provide opportunities for scientific thinking by encouraging them to be critical observers of their surroundings and to ask questions.
<http://www.fi.edu/leap/>
5. **Techbridge** - Designed to engage fifth to twelfth grade girls in OST STEM curriculum activities.
<http://www.techbridgegirls.org/Educators/Curriculum.aspx>

Once curriculum has been identified, a minimum of two *Project Accelerate* staff will receive training in the identified STEM curriculum. To ensure cost effectiveness, train-the-trainer models will be utilized (where possible). Modalities, such as online and regional trainings will also be used.

- *Access to Existing STEM Workshops*
 Across the Commonwealth, many nonprofit organizations and cultural institutions already offer STEM workshops that are accessible but underutilized by OST staff. For example, the OSTRC maintains an online calendar of publically accessible trainings and, over the past several years, has included those offered by The Academy of Natural Sciences, GreenTreks Network, Let's Read Math!, The Philadelphia Zoo, Wondergy Science, The Philadelphia Water Department, and Historic Bartram's Garden. Additionally, publically accessible STEM-specific workshops are also offered by PSAYDN, APOST, National 4-H, the United Way of Greater Philadelphia and Southern New Jersey, The Free Library of Philadelphia, and other OST-focused professional development providers. PSAYDN and OSTRC STEM web pages will serve as a mechanism for communication and will maintain a list of STEM-specific workshop details on the respective sites.
- *New STEM Workshops*
 Informed by the previous and upcoming statewide OST-STEM surveys, as well as by regular focus groups and feedback sessions with administrative and direct-service staff, the Project Team will create and offer no-cost STEM workshops where both needs and gaps are apparent. As this point, a sample of likely topics will include "The Science of Everyday Curriculum," "Connecting to In-School STEM," "Integrating Arts and Sciences," "Finding STEM Mentors," and similar subjects. These new workshops will be held at the various workgroup members' sites and be marketed through their multiple newsletters, listservs, and websites.
- *Ongoing Technical Assistance*
 When possible, members of the STEM Steering Committee and Workgroup will be available and provide technical assistance to statewide OST staff and programs that need additional STEM support. This service will be promoted through the two organization's STEM web pages and will also included as a subheading within the OSTRC's online "Peer Mentor Directory."
- *Online Community of Practice*
 Through the generous support of the Heinz Foundation, PSAYDN will also initiate and facilitate an online community of practice. Staff from the pilot sites will be invited to participate in this virtual community, and will share information, questions, concerns, and experiences. Members will learn from each other, and have an opportunity to develop ongoing and supportive professional relationships.

Locate STEM Resources

Effective staff development should include more than simply workshops, technical assistance, and online communities of practice. Professional development for OST staff is a comprehensive term that can refer to a variety of education, training, and development opportunities.⁷ Peter (2009) defines OST PD as a spectrum of activities, resources, and supports that help practitioners work more effectively with or on behalf of children and youth.⁸ Professional development formats include workshops, conferences, technical assistance, apprenticeships, peer mentoring, professional memberships, college

coursework, and additional diverse offerings. Practitioners can be full-time staff, part-time staff, volunteers, teenagers, parents, or other non-staff members, provided that the PD experience culminates in supporting OST youth participants. Because youth impact is always the ultimate goal, staff development is indistinguishable from professional development.

Definitions pertaining to classroom teachers and to youth workers emphasize that professional development is a comprehensive collection of meaningful experiences designed to support and enrich staff, and ultimately benefit children and youth. While *Project Accelerate* cannot offer this broad spectrum of professional support, it will make a concerted effort to familiarize staff with and provide access to a variety of important resources and opportunities. These will include, but are not limited to:

- Information about STEM field trips to local zoos, museums, environmental centers, aquaria, factories, public utilities, and processing plants;
- STEM outreach programs and individuals that will visit OST programs and directly work or present to with youth participants
- Local and regional science fairs, science fair procedures, and science fair support
- Youth internship opportunities at corporations, businesses, research companies, colleges, universities, science centers, and laboratories
- Additional staff, program, and student resources and opportunities.

These resources and opportunities will be identified by the Steering Committee and Workgroup, and promoted through the respective organizations' websites, existing venues such as the OSTRC's Regional Field Trip and Traveling Services Directories; and a number of communications mechanisms described in the *Policy and Communications* section below.

Goal 2: Support quality systems for STEM programs through the development and implementation of professional development opportunities.

2-A Objective

Implement Pilot Programs

2-A Supporting Activities

- *Solicit referrals for 20 pilot sites from the following OST networks:*
 - 21CCLC (state)
 - PA Keys (state)
 - Philadelphia OST System (Philadelphia)
 - APOST (Pittsburgh)
- *Select 20 pilot sites to participate (five sites from each network)*
- *Survey sites to determine appropriate curriculum selection*
- *Purchase curriculum and train staff in curriculum implementation*
- *Provide ongoing technical assistance and support via face to face, telephone, and online modalities*

2-B Objective

Provide Statewide STEM Professional Development Opportunities to OST Staff.

2-B Supporting Activities

- Identify and select professional development opportunities for appropriate delivery of STEM workshops.
- Develop and present curriculum-specific workshops for the pilot group staff
- Identify and provide access to existing and new OST STEM workshops
- Create new workshops as/where needed

2-C Objective

Provide Technical Assistance to OST STEM programs

2-C Supporting Activities

- Provide Technical Assistance (Level1) to programs across PA that are interested in starting up or strengthening their STEM program efforts. TA will be limited to phone or email support for STEM questions asked or issues identified by these programs and will focus on directing them to resources.
- Provide Technical Assistance (Level 2) ongoing general, curriculum-specific, and problem solving technical assistance to pilot sites
- Cultivate an OST Communities of Practice Learning group for peer information exchange and support. The Learning Group will be use by pilot sites and other OST STEM programs and will be placed on the PA Department of Education's Student Aligned System (SAS) Portal Site.

2-D Objective

Establish an online STEM Resource web portal.

2-D Supporting Activities

- Define content areas and identify sources for collection
- Identify and select appropriate content for web portal
- Ensure information is user friendly and accessible
- Provide information on access to STEM opportunities
 - Field trips
 - Outreach programs
 - Science fairs
 - Science internships with museums, colleges and universities, corporations and businesses, research companies, and laboratories

Evaluation and Data Collection

See Section VII for information on *Project Accelerate's* data collection and evaluation process

Goal 3: Develop empirically-based data to support successful STEM integration at the system, program, and youth levels

3-A Objective

Collect Data Using PEAR's Dimensions of Success (DOS) tool and structured observational methods

3-A Supporting Activities

- Obtain training in the DOS tool from staff at PEAR
- Coordinate and conduct a series of OST site observations using the DOS tool
- Analyze and report on data gathered with the DOS tool

3-B Objective

Collect Survey Data to assess the status of STEM activities among STEM administrators and direct-service staff.

3-B Supporting Activities

- Utilize OST Staff and STEM questionnaire items to design a pre-post survey of OSTs statewide
- Administer survey, using best practices to maximize response rates
- Analyze and report on survey data

3-C Objective

Provide pre- and post-measures of youth engagement in STEM.

3-C Supporting Activities

- Disseminate a pre-post survey of youth engagement in STEM, using existing items from PEARS or other instruments as appropriate
- Train and coordinate OST staff to administer Youth Engagement Survey
- Analyze and report on survey data

3-D Objective

Collect various monitoring data, including the number of activities held for OST professionals, and measures of their reactions and knowledge following training events for the different STEM curricula introduced to the sites

3- D Supporting Activities

- Organize PSYADN and other administrative data to tally the number of Project Accelerate events
- Utilize existing OSTRC and CSC evaluation tools to assess OST staff responses and knowledge of trainings
- Analyze and report on administrative and evaluation data

Policy and Communications

Advancing STEM Education

The importance of advancing STEM education is a priority for Pennsylvania and a focus of government, business and education leaders. Policymakers and practitioners alike recognize the tremendous knowledge gap of students in STEM content areas and are set on improving the prospects for PA's youth.

The PSSA, a standards-based, criterion-referenced assessment used to measure a student's attainment of the academic standards, show in 2012 that:

- Nearly 25% of 8th grade students and 40% of 11th grade students did not reach proficiency in Math; and
- Over 40% of 8th grade students and nearly 60% of 11th grade students did not reach proficiency in Science.

Student results on PA's newly-developed Keystone end-of-course exams demonstrate that they are significantly lacking in their knowledge of STEM content. In July 2011 the Keystone exam results showed 61% of students that took the exam did not reach proficiency in Algebra I and 64% did not reach proficiency in Biology.

This level of student underachievement limits the talent pool available to PA employers and limits the growth of the state's economy. According to PA Department of Labor and Industry, in September 2012, PA had over open 75,000 job postings that require skills in the STEM fields and not enough qualified workers to fill them. As reported by the Governor's Manufacturing Council, 82% of manufacturers report a serious or moderate skills gap and 74% say that it has negatively impacted their company's ability to expand.

Employers need skilled workers who are able to reason and solve problems using STEM knowledge. The ability to communicate, problem solve, generate new ideas, and evaluate effectively, are all core skills that PA students must possess to be successfully employed after graduation.

Pennsylvania has developed numerous strategies to strengthen the quality of STEM education which are aligned and leveraged by the goal of increasing the access and quality of STEM OST programs. PA's Race to the Top plan includes the focus on developing the tools necessary to advance educator's STEM knowledge and pedagogy. Many of these tools and resources will be made available to the STEM OST community including PA's SAS Portal.

Pennsylvania's Standards Aligned System (SAS) is an open, online portal designed to provide educators with tools to enhance educator effectiveness. SAS elements include Standards, Curriculum Framework, Materials and Resources, Assessments, Instruction, and Student Interpersonal Skills. Each of these elements is interconnected and the portal provides easy access to all. The SAS alignment, when complete, will integrate the Common Core Standards in all instructional areas. Evidence of SAS as a delivery system is validated by the numbers:

- 124,460 unique users (August 2012)
- 22,724,880 total page views (August 2012)

The SAS Portal is one avenue for the work of this grant to inform statewide practice of STEM OST programs. All of the resources developed in this grant including all of the training materials, will be uploaded onto this resource and aligned with the PA standards

in STEM content areas. They will then be publicly available and shared, through STEM and OST partners including the regional centers, with all OST programs statewide.

Further, the SAS Portal will enable an on-line professional learning community to be developed for the 20 pilot sites. This professional learning community will also be opened to all OST providers, including the seven STEM sites currently hosted by the PA Department of Education.

Campaign for STEM Education

STEM advocates, educators and providers across the commonwealth have made it clear that there must be a campaign to clearly communicate the importance of STEM education and careers to parents, educators, business and policymakers. Fortunately, the business community agrees. The Governor's Manufacturing Advisory Council first recommendation is to create a campaign, led by the Governor, focusing on STEM education and the manufacturing sector. Such a campaign aims to improve the image of STEM education and its importance in providing PA students with a solid foundation in order to land a good, family-sustaining job and to compete in the global economy. Further, the business community will utilize the campaign to increase students' attraction to the STEM occupations, with a focus on the manufacturing sector which includes the engineering and technology fields.

Develop Communications Mechanisms

Data collected through the OST STEM survey, as well as feedback provided through the Pennsylvania Statewide Youth Worker Survey, OST-STEM focus groups, informal conversations, and other sources indicate that OST staff need more accessible, centralized, reliable, up-to-date, and relevant communication about STEM resources and opportunities. PSAYDN, The OSTRC, and several workgroup members have extensive experience, and success with providing timely resources to growing numbers of OST administrative and direct-service staff. One primary communication format for both PSAYDN and OSTRC is electronic newsletters. The PSAYDN communicates regularly with PA's OST community through electronic and face-to-face communications. Through its newly redesigned website (www.psaydn.org) which receives over 1000 visits monthly and its bi-monthly themed *Take 10* newsletter, and weekly email alerts which are sent to over 1800 network members, PSAYDN has the ability to send out grant alerts, promote events, share resources, highlight state and national best practices, provide policy updates, etc. to the field. Membership in the PSAYDN Network has increased by 47% in the last year and the use of electronic tools enables PSAYDN to effectively reach its' growing network membership. Through regional meetings and quarterly sub-committee meetings, PSAYDN interfaces directly with constituents and has the opportunity to gather information from the field and address sensitive issues. The network continues to explore ways to increase outreach efforts and offer support to local partnerships and initiatives.

The OSTRC Newsletter includes close to 3,000 local regional and state subscribers; its website receives an average of 1,900 visits per month; its Resource Directories collectively list over 100 destinations and services; and its Document Library currently includes over 600 OST-related articles, papers, and research studies. Moreover, the OSTRC regularly utilizes additional quantitative and qualitative methods to ascertain the

extent to which people use, appreciate, and suggest changes to its communications venues.

Building upon their current success in communicating with OST providers and providing easier access to existing resources, PSAYDN (statewide) and the OSTRC (local and statewide) will each create a special STEM “portal” on their respective websites, cross-referenced by each organization. This portal will be designed specifically for both administrative and direct-service OST staff and will include:

- Calendar of publically-accessible STEM trainings (either designed or suitable for OST staff), covering topics such as hands-on science activities, integrating math into everyday curricula, connecting STEM with project-based learning, etc.
- STEM outreach programs – individuals and organizations that will visit OST sites and offered by zoos, aquaria, environmental education centers, and science education experts.
- Library of STEM documents including research studies, journal articles, blog posts, and similar resources.
- Collection of published and peer-reviewed and recommended STEM curricula.
- Directory of STEM websites (general) and directories (collections of STEM resources) to include the George Washington Carver, Delaware Valley, and International Science Fairs; The National Girls Collaborative Directory and Pennsylvania STEM Girls Collaborative; STEM Connector; Engineering by Design; National Girls Connect a Million Minds; the Philadelphia Science Festival; the National Science Foundation ITEST site; the Collaboration for Science Afterschool, The Science Afterschool Consumers Guide, and many others.

Goal 4: Increase awareness of key stakeholders including policy makers, funders, providers, and the public.

4-A Objective

Develop communication mechanisms that create awareness of STEM.

4-A Supporting Activities

- Develop and distribute OST STEM newsletter
- Create a dedicated PSAYDN OST STEM web page
- Share and post links to OST STEM information
- Provide online access to OST STEM resources which includes: calendar of STEM trainings; list of STEM outreach programs; library of STEM articles and curricula; and directory of STEM websites and directories

4-B Objective

Create and Implement a STEM Policy Agenda

4-B Supporting Activities

- Support OST programs by implementing STEM with resources and information for legislative outreach and engagement

- Promote the use of the PSAYDN Advocacy Toolkit and provide OST STEM programs. Craft core messages to influence federal and state legislation and regulation pertaining to STEM funding and support
- Interface with state and national (classroom) STEM standards and the Pennsylvania Department of Education's Race to the Top STEM activities

Governance and Staffing

Governance and implementation of *Project Accelerate* will be done through the existing governance structure of PSAYDN. The PSAYDN Director will be responsible to provide project oversight, and management, in collaboration with the PSAYDN Steering Committee, and the ad hoc PSAYDN Project Accelerate Leadership Subcommittee and Workgroup. These ad hoc subcommittees will be responsible for working with the OST STEM Coordinator to create agendas for meetings, provide input on key decisions, identify and secure funding resources and other relevant tasks.

The Leadership Subcommittee and Workgroup will meet bi-monthly and consist of individuals representing Key STEM OST organizations such as Team PA Foundation, the Pennsylvania Department of Education, the PA Key, The Franklin Institute the Out of School Time Resource Center / University of Pennsylvania, Pennsylvania State University, the PA Girls STEM Collaborative, 4- H Extension, University of Pittsburgh UPCLOSE and local after-school intermediaries, The Leadership Committee and Workgroup will continue to expand its leadership with a strategic and inclusive cultivation of partners necessary to accomplish the goals. (*See attached PSAYDN Governance Structure Chart*).

See Section VIII for adding information regarding *Project Accelerate* staffing.

Goal 5: Ensure accountability for the governance and staffing of Pennsylvania's Project Accelerate.

5-A Objective

Provide Oversight and Management of Project Accelerate.

Supportive Activities

PSAYDN Director and appropriate CSC staff will:

- Administer the PA OST STEM *Project Accelerate*
- Hire a designated OST STEM Coordinator
- Develop a detailed project timeline and budget
- Oversee implementation of all project activities, including evaluation
- Oversee the STEM Workgroup and STEM Leadership Committee
- Purchase curricula and evaluation instruments, as needed
- Secure contractors as needed (i.e., web designers, trainers, evaluators, etc.)
- Have final decision-making responsibilities
- Drive fundraising and sustainability

OSTRC staff will:

- Chair the STEM Workgroup and Leadership Committee
- Assist in the identification and access to professional development opportunities and staff resources
- Assist in developing and managing web-based resources

The STEM Leadership Committee will:

- Create agendas for workgroup meetings and conferences calls
- Identify and recruit STEM/OST partners that are key in STEM/OST Systems Building
- Disseminate project information and resources
- Provide input on key decisions
- Identify and secure funding resources

The STEM Workgroup will:

- Review and provide feedback on project progress
- Participate in key decision-making
- Identify partners, vendors, and other project participants
- Disseminate project information and resources
- Assist in identifying funding resources

IV. Detailed timeline of implementation that spans the duration of the System Building Grant

Project Accelerate Implementation Plan

Partnership and Leadership Development		
Goal 1 - Strengthen partnership and leadership development opportunities for key stakeholders in Pennsylvania.		
Objectives	Supportive Activities	Timeline
1-A Establish Project Accelerate Leadership Committee and Workgroup	Create a Core STEM OST Leadership Committee from current workgroup members or other interested parties.	November – December 2012
	Articulate the Core STEM OST Leadership Committee roles and responsibilities	November 2012
	Retain the OST STEM Workgroup structure and recruit additional members	November – December 2012
	Articulate Workgroup members' roles and responsibilities	November 2012
1-B Increase the number of STEM Partnerships	Define partnerships, and differentiate them from Workgroup and Leadership Committee member participation	November 2012
	Recruit and engage additional OST STEM partnerships by utilizing PSAYDN Partner organizations (i.e. Pennsylvania Association of School Boards, Pennsylvania Elementary and Secondary Principals Association, Pennsylvania PTA , Pennsylvania State Teachers Association)to facilitate local and state level partnership building and cultivation.	November 2102- October 2014
	TEAM PA will host 5 regional bi monthly partner meetings designed to recruit new partners and inform current partners on STEM educational activities in the Commonwealth.	Bi- Monthly starting January 2012
Quality Systems/Professional Development		
Goal 2 – Support quality systems for STEM programs through the development and implementation of professional development opportunities.		
Objectives	Supporting Activities	Timeline
2-A Implement	Solicit referrals for 20 pilot sites from the	November -

Pilot Programs	<p>following OST networks:</p> <ul style="list-style-type: none"> ▪ 21CCLC (state) ▪ PA Keys (state) ▪ Philadelphia OST System (Philadelphia) ▪ APOST (Pittsburgh) <p>Select 20 pilot sites to participate (five sites from each network)</p> <p>Survey sites to determine appropriate curriculum selection</p> <p>Purchase curriculum and train staff in curriculum implementation</p> <p>Provide ongoing technical assistance and support via face to face, telephone, and online modalities</p>	<p>December 2012</p> <p>January 2013</p> <p>January 2013</p> <p>February 2013</p> <p>February 2013 – October 2014</p>
2-B Provide Statewide STEM Professional Development Opportunities to OST Staff.	<p>Identify and select professional development opportunities for appropriate delivery of STEM workshops.</p> <p>Develop and present curriculum-specific workshops for the pilot group staff</p> <p>Identify and provide access to existing and new OST STEM workshops. Create new workshops as/where needed</p>	<p>January 2013</p> <p>March 2013-October 2014</p> <p>March 2013 – October 2014</p>
2-C Provide Technical Assistance to OST STEM programs	<p>Provide Technical Assistance (Level 1) to programs across PA that are interested in starting up or strengthening their STEM program efforts. TA will be limited to phone or email support for STEM questions asked or issues identified by these programs and will focus on directing them to resources.</p> <p>Provide Technical Assistance (Level 2) ongoing general, curriculum-specific, and problem solving technical assistance to pilot sites</p> <p>Cultivate an OST Communities of Practice Learning group for peer information exchange and support. The Learning Group will be use by pilot sites and other OST STEM programs and will be placed on the PA Department of Education’s Student Aligned System (SAS) Portal Site.</p>	<p>January 2013 (Ongoing)</p> <p>February 2013 (Ongoing)</p> <p>March 2013 (Ongoing)</p>

<p>2-D Establish an online STEM Resource web portal.</p>	<p>Define content areas and identify sources for collection</p>	<p>November 2012</p>
	<p>Identify and select appropriate content for web portal. Ensure information is user friendly and accessible.</p>	<p>January 2013</p>
	<p>Provide information on access to STEM opportunities</p> <ul style="list-style-type: none"> ▪ Field trips ▪ Outreach programs ▪ Science fairs ▪ Science internships with museums, colleges and universities, corporations and businesses, research companies, and laboratories 	<p>November 2013</p>

Evaluation and Data Collection

Goal 3: Develop empirically-based data to support successful STEM integration at the system, program, and youth levels

Objectives	Supporting Activities	Timeline
<p>3-A Collect Data using PEAR's Dimensions of Success tool and structured observational methods.</p>	<p>Obtain training in the DOS tool from staff at PEAR</p>	<p>February – April 2013</p>
	<p>Coordinate and conduct a series of OST site observations using the DOS tool</p>	<p>September – November 2013</p>
	<p>Analyze and report on data gathered with the DOS tool</p>	<p>December 2013 – February 2014</p>
<p>3-B Collect Survey Data to assess the status of STEM activities among STEM administrators and direct-service staff.</p>	<p>Utilize OST Staff and STEM questionnaire items to design a pre-post survey of OSTs statewide</p>	<p>December 2012</p>
	<p>Administer survey, using best practices to maximize response rates</p>	<p>January 2013 (Pre-Test) January 2014 (Post-Test)</p>
	<p>Analyze and report on survey data</p>	<p>May 2013 (Pre-Test) May 2014 (Post-Test)</p>
<p>3-C Objective Provide pre- and post-measures of youth engagement in STEM.</p>	<p>Disseminate a pre-post survey of youth engagement in STEM, using existing items from PEARS or other instruments as appropriate</p>	<p>September 2013 (Pre-Test) May 2014 (Post-Test)</p>
	<p>Train and coordinate OST staff to administer Youth Engagement Survey</p>	<p>August 2013</p>

	Analyze and report on survey data	June-July 2014
3-D Objective Collect various monitoring data, including the number of activities held for OST professionals, and measures of their reactions and knowledge following training events for the different STEM curricula introduced to the sites.	Organize PSYADN and other administrative data to tally the number of Project Accelerate events	Ongoing throughout grant period
	Utilize existing OSTRC and CSC evaluation tools to assess OST staff responses and knowledge of trainings	Ongoing throughout grant period
	Analyze and report on administrative and evaluation data.	Ongoing throughout grant period
Policy and Communication		
<i>Goal 4: Increase awareness of key stakeholders including policy makers, funders, providers, and the public.</i>		
Objectives	Supporting Activities	Timeline
4-A Develop communication mechanisms that create awareness of STEM.	Develop and distribute OST STEM newsletter	Beginning March 2013
	Create a dedicated PSAYDN OST STEM web page	Beginning March 2013
	Share and post links to OST STEM information	February 2013
	Provide online access to OST STEM resources which includes: calendar of STEM trainings; list of STEM outreach programs; library of STEM articles and curricula; and directory of STEM websites and directories	February 2013 (Ongoing)
4-B Create and Implement a STEM Policy Agenda	Support OST programs by implementing STEM with resources and information for legislative outreach and engagement	March 2013
	Promote the use of the PSAYDN Advocacy Toolkit and provide to OST STEM programs and craft core messages to influence federal and state legislation and regulation pertaining to STEM funding and support	March 2013
	Interface with state and national (classroom) STEM standards and the	December 2012 (Ongoing)

	Pennsylvania Department of Education's Race to the Top STEM activities	
Governance and Staffing		
Goal 5: Ensure accountability for the governance and staffing of Pennsylvania's Project Accelerate.		
Objectives	Supportive Activities	Timeline
5-A Provide Oversight and Management of Project Accelerate.	<p>PSAYDN Director and appropriate CSC staff will:</p> <ul style="list-style-type: none"> ▪ Administer the PA OST STEM <i>Project Accelerate</i> ▪ Hire a designated OST STEM Coordinator ▪ Develop a detailed project timeline and budget ▪ Oversee implementation of all project activities, including evaluation ▪ Oversee the STEM Workgroup: and STEM Leadership Committee ▪ Purchase curricula and evaluation instruments, as needed ▪ Secure contractors as needed (i.e., web designers, trainers, evaluators, etc.) ▪ Have final decision-making responsibilities ▪ Drive fundraising and sustainability <p>OSTRC staff will:</p> <ul style="list-style-type: none"> ▪ Chair the STEM Workgroup and Leadership Committee ▪ Assist in the identification and access to professional development opportunities and staff resources ▪ Assist in developing and managing web-based resources <p>The STEM Leadership Committee will:</p> <ul style="list-style-type: none"> ▪ Create agendas for workgroup meetings and conferences calls ▪ Identify and recruit STEM/OST partners that are key in STEM/OST Systems Building ▪ Disseminate project information and resources ▪ Provide input on key decisions ▪ Identify and secure funding resource 	<p>November 2012 (Ongoing)</p> <p>November 2012</p> <p>November 2012 (Ongoing)</p> <p>January 2013 (Ongoing)</p> <p>November 2012 (Ongoing)</p> <p>December 2012 (Ongoing)</p> <p>November 2012</p> <p>December 2012 (Ongoing)</p> <p>December 2012 (Ongoing)</p> <p>December 2012 (Ongoing)</p> <p>December 2012 and then Quarterly</p> <p>December 2012 (Ongoing)</p> <p>December 2012 (Ongoing)</p> <p>December 2012 and then Quarterly</p> <p>December 2012 (Ongoing)</p> <p>December 2012 and then Quarterly</p> <p>December 2012 (Ongoing)</p> <p>December 2012 (Ongoing)</p>

	<p>The STEM Workgroup will:</p> <ul style="list-style-type: none"> ▪ Review and provide feedback on project progress ▪ Participate in key decision-making ▪ Identify partners, vendors, and other project participants ▪ Disseminate project information and resources ▪ Assist in identifying funding resources 	<p>December 2012 (Ongoing)</p> <p>December 2012 (Ongoing) December 2012</p> <p>January 2013 and then Bi-annually (As needed) January 2013 (Ongoing)</p>
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V. Afterschool and STEM Financing Plan

Quality - Professional Development Activities	Sources of Support Currently in Place	Potential Sources of Support For System Development	Estimated Costs to Complete Activity
Identify and support core set of 3 to 4 curricula	Committee has been formed from the Workgroup to identify the 3 to 4 curriculum.	In-kind support from members of the committee	In-kind support from committee members
Implement core curricula in 20 pilot sites	Low cost and free curricula are being considered.	Potential In kind support from targeted networks including Philadelphia OST, 21st Century, PA Keys 4-H Cooperative Extension, Team PA Foundation will potentially help identify potential funders.	.1 FTE depending of Curriculum chosen \$10,000 for curriculum 20 sites x \$500
Provide professional development to support these core curricula	Curriculums will be identified and partners will be asked to provide in kind support for at least one curriculum	A select number of trainings and follow-up sessions may be delivered virtually. The Workgroup will seek to	.1FTE –PSAYDN OST STEM Coordinator

	Train the Trainer.	leverage trainings being provided by partner networks such as PA Keys, Philadelphia OST, 21 st Century Learning Centers. The STEM OST Coordinator will be trained to deliver the core trainings.	.1 FTE Partner Train the Trainer for certain curriculums \$10,000 20 sites x \$500
Identify and provide access to existing and new OST STEM workshops	Other groups, such as the Franklin Institute, Carnegie Science Center, Zoos, Nature Centers, Space programs and others currently provide specialized OST STEM training.	Through collaborative efforts with larger systems these trainings and access to resources could be made available to a broader audience.	.05 FTE to initiate and follow up on collaborations
Collaboration with other statewide groups and associations to promoting STEM OST activities	The Pennsylvania Department of Education, PA Science Teachers Association, PA Math Teachers Association, etc. all offer existing professional development activities. PA OST STEM anticipates partnering with these and other organizations / associations to include OST professionals in their annual events.	Collaboration with these organizations as an in-kind contribution. Corporate organizations or other PA OST STEM partners could sponsor OST STEM strands at these events.	Development of outreach materials and participant fees estimated at \$1,000
Collaborate with other interested parties (professional associations and others) to develop a STEM strand or	The Statewide ELO Conference sponsored the PDE 21 st Century Learning Centers, PENNSACCA, PACCA all offer STEM	Need to secure funding for the OST STEM Coordinator to attend key events. Will consult with TEAM PA regarding potential	Estimate \$1,500 registration and travel costs for OST STEM PSAYDN Coordinator In-kind for partners

<p>workshops at key statewide annual OST staff conferences. Partner with the PA 21st CCLC – ELO and PennSACCA and PACCA to provide OST STEM professional development opportunities</p>	<p>professional development at the annual conferences.</p>	<p>funding for professional development for OST STEM Coordinator. Partners who are already attending the events may provide feedback and informational sessions in kind.</p>	
<p>Provider training in the use of DOS quality assessment tool</p>	<p>Not currently being utilized widely in PA.</p>	<p>Collaborate with PEAR and integrate into PA's evolving evaluation regime in-kind support from partners such as APOST, PAKey Philly OST and 21st Century CCLC . Funding for incentive stipend for observers is being explored by TEAM PA Foundation</p>	<p>\$4000 Stipend \$100 X (2) DOS Observers for 20 sites</p>
<p>Provide general, curriculum- specific assessment and problem solving technical assistance (TA)</p>	<p>Currently several organizations provide TA including: 4-H, Girls Collaborative, STEMIMPACT, and OSTRC.</p>	<p>Grant submitted to Heinz Endowments to support Level 1TA (General short in duration available by phone e-mail) statewide and Level 2 TA (Program /Site specific assessment, support in implementing specific curriculum, professional development and evaluation) targeted to 20 OST programs operating within six western PA counties (Allegheny, Beaver,</p>	<p>.30 FTE</p>

		Fayette, Green, Washington, and Westmoreland) and three geo-politically important counties (Delaware, Jefferson and Lancaster. Additional funding will be sought by PA Team Foundation.	
Cultivate peer exchange and support	The YWCA of Greater Pittsburgh STEMIMPACT is providing a website that currently encourages peer sharing. There are Peer OST networks in Philadelphia and Pittsburgh that can be leveraged for support of the effort.	The PA STEM OST WEB Portal would support virtual peer exchanges and Linkages would be explored to the PA Department of Education Standards Aligned System SAS Portal which currently has the capacity to support learning communities.	.05 FTE to help support promotion of existing peer exchanges and to foster the development of new opportunities

Leadership/Partnership Development Activities	Sources of Support Currently in Place	Potential Sources of Support For System Development	Estimated Costs to Complete Activity
Create a Core Leadership Team for the Project and maintain membership	Most members of the Core Leadership Team will be selected from the current Workgroup Organizations who provide in-kind support for staff time spent on the project.	In-kind support for staff time from new partner organizations joining the Workgroup.	.01 FTE to staff
Explore and Expand Project Partnerships through the Workgroup Core Leadership Group	Define partnerships and differentiate them from Workgroup member participation.	Leverage workgroup members to identify partners from networks they are engaged in.	.02 FTE
Utilize PSAYDN Partner Organizations to facilitate local and state level partnership and cultivation	Pennsylvania Association of School Boards Pennsylvania Elementary and Secondary Principals Association, Pennsylvania PTA Pennsylvania State Teachers Association are all engaged in PSAYDN standing or ad hoc committees.	OST STEM Coordinator will lead efforts to partner with key PSAYDN partners to integrate OST STEM at their regional and state events as well as coordination of information of resources. Seek in-kind support by requesting registration fees are waived and identifying funding sources for with TEAM Pa Foundation.	.02FTE \$1000 registration and materials for events
TEAM PA Foundation hosts bimonthly STEM partners Meetings with the 5 PA STEM Regional Centers whose stakeholders include: business, formal education,	A hosting of two regional events sponsored by Team PA Foundation is occurring in September, 2012. In-kind funding provided by TEAM PA.	In-kind funding Team PA	In-kind funding TEAM PA Foundation

government, informal STEM providers and the community			
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Evaluation & Data Collection Activities	Sources of Support Currently in Place	Potential Sources of Support For System Development	Estimated Costs to Complete Activity
Utilization of Excited and Engaged Student survey tool	Currently there is limited use of the Excited and Engaged and DOS tool in the state.	If awarded an implementation grant, we anticipate having access to this tool and professional expertise to share and utilize with a minimum of 20 school and community based OST sites.	Unknown, costs of this aspect of the evaluation program will be included as part of the grant
Utilization of the Dimensions of Success Observational Tool	Currently there is limited use of the DOS observational tool in the state.	If awarded an implementation grant, we anticipate having access to this tool and professional expertise that we can share and utilize with a minimum of 10 school and community based OST sites.	Unknown cost of DOS tool/training. Would need to provide training support.
Utilization of Professional Development Evaluation Tools	OSTRC will work with the CSC /PSAYDN Evaluation staff to adapt the OSTRC professional development tools for use in this project.	PSAYDN/CSC staffs salary is required. Potential funding resources may include the Heinz Endowments and funding sources identified by Team PA Foundation.	.05 FTE
Management of the Data Collection and Data Analysis	CSC/PSAYDN Evaluation Staff and OSTRC will manage the evaluation.	CSC/PSAYDN staff will manage the evaluation. Funding will need to be secured through the implementation grant.	1.0 FTE

Policy and Communication Development Activities	Sources of Support Currently in Place	Potential Sources of Support For System Development	Estimated Costs to Complete Activity
Development of an OST STEM web portal to facilitate statewide Communications	<p>A comprehensive PA State OST STEM Portal is not in place.</p> <p>OSTRC has agreed to support a regional STEM webpage and provide the link and develop and maintain the STEM resources for the PA OST STEM Website \$7543 in kind. An additional \$8666 need to be secured from funders.</p> <p>Girls Collaborative – Program Registration site will be linked to the Site and utilized to maintain a listing of STEM Programs. \$10,000 in-kind</p>	<p>PSAYDN development of Web portal could be supported in part by grant funding currently requested from the Heinz Endowments \$5000.</p> <p>TEAM Pa Foundation may be able to provide in-kind support to coordinate STEM Asset data collection and online data base.</p> <p>Linkages to the Pa Department of Ed SAS portal and the Better Kids Care will also be explored each which had the capacity for training and virtual community of learners and online training.</p>	<p>.20 FTE staffing to manage/promote use of portal and maintain site and coordinate</p> <p>In-kind TEAM Pa Foundation and other partners to be determined</p> <p>In-kind</p>
Interface with State and National (Classroom) STEM)Standards	<p>Department of Education Workgroup members are well aware of points of intersection particularly the STEM emphasis in Race to the Top Grant and Common Core Standards in Math and pending Science Common Core Standards. PSAYDN and PA Keys provide Links to Learning Training focused on</p>	<p>Continued collaboration and involvement with leaders and state planning groups in these areas will be a focus of the PSAYDN Director and OST STEM Coordinator. Funding from the implementation grant would be used in this area.</p>	<p>.02 FTE</p>

	alignment between the State Standards and OST. The PSYADN Director serves on the PA Competency Based Credit Workgroup		
Influence State regulations pertaining to funding and support for OST STEM	Partners TEAM PA Foundation and Pennsylvania Partnerships for Children are aware of pending state regulations and strategies to move policy and provide consultation to PSAYDN on policy issues.	The OST STEM Heinz proposal includes funding for legislative engagement by the OST STEM Coordinator.	.05 FTE

Governance and Staffing Activities	Sources of Support Currently in Place	Potential Sources of Support For System Development	Estimated Costs to Complete Activity
Project Management of the PA OST STEM System Building CSC/PSAYDN	CSC/PSAYDN was responsible for the management of the planning grant and is positioned to manage the implementation grant	Funding for the PSAYDN Director and the newly hired OST STEM Coordinator's time in project management. Request has been made to the Heinz Endowments for \$3500 to cover half the costs of this task. Other funding need to be secured through implementation grant or other funders	.1FTE
Develop PA OST STEM Resources	OSTRC has chaired the workgroup and has given leadership to the planning process they will provide half the funding in kind \$4019 for the staff time for continued leadership of the workgroup and leadership of the Core Leadership Team and development of resources	Funding for the other half of staff funding \$4019 will need to be identified with assistance from Team PA Foundation	.1 FTE
Advisory Oversight to the PA OST STEM Building Plan	Core Leadership Team will be made up selected Work group members who have provided in-kind staff support	OST STEM Leadership Committee staff time in-kind	In-kind
Support to the PA OST STEM Building Plan	Majority of Workgroup members will continue to participate and provide in-kind staffing and other resources	Additional workgroup members staff-time in-kind	In-kind

VI. Afterschool and STEM Partnership Form

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
PA Statewide Afterschool/Youth Development Network <i>Kacy Conley</i> , Director <i>Caroline Allen</i> , Coordinator	Administered overall project; participated in all communication, activities, and decision-making.	Participate in Workgroup and Leadership Committee; Administer overall project; participate in all communication, activities, and decision-making.
Center for Schools and Communities <i>Ben Cohen</i> , Director of Evaluation	Participated in Workgroup meetings, conference calls, and between-meeting dialogue. Participated in all communication, activities, and decision-making. Co-Designed the Statewide STEM OST Survey and analyzed the results.	Participate in Workgroup and Leadership Committee; Design, oversee, and analyze all research and evaluation activities.
21 st Century Partnership for STEM Education <i>John Baker</i> , Research Associate	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped craft statewide survey.	Participate in Workgroup and Leadership Committee; focus on cultivating partnerships and on outcomes measurement.
Penn State University <i>Christy Bartley</i> , 4-H Program Leader	Participated in Workgroup meetings and conference calls; helped identify STEM curricula.	Participate in Workgroup; focus on cultivating partnerships' on implementing STEM curricula; on professional development and on identifying STEM resources.
PA Department of Education <i>William Bertrand</i> , Technology Education Advisor	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; provided ongoing STEM resources; helped identify STEM curricula and Pennsylvania online STEM directories.	Participate in Workgroup and Leadership Committee; focus on cultivating partnerships' on implementing STEM curricula' on identifying STEM resources' and on policy.

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
PA Department of Education <i>Dave Bauman</i> , Science Education Advisor	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; provided ongoing STEM resources; helped identify STEM curricula and Pennsylvania online STEM directories.	Participate in Workgroup; focus on cultivating partnerships' on implementing STEM curricula' on identifying STEM resources' and on policy.
PA Department of Education <i>Carmen Medina</i> Chief of Division of Student Services	Participated in meetings and gave input regarding the 21 st Century Learning Centers engagement in the project. Assisted with Distribution of the Survey.	Participate in Workgroup and Leadership Committee; focus on cultivating partnerships' on implementing STEM curricula' on identifying STEM resources' and on policy.
Penn State Cooperative Extension <i>Edward Bender</i> , Extension Educator	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped identify STEM curricula.	Participate in Workgroup and Leadership Committees; focus on cultivating partnerships' on implementing STEM curricula' and on identifying STEM resources.
PA STEM Network, Northwest Region <i>Ken Borland</i>	Participated in Workgroup meetings and conference calls.	Participate in Workgroup and Leadership Committee; Focus on research-based best practices in STEM.
EducationWorks <i>Martin Friedman</i> , Executive Director	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped craft statewide survey.	Participate in Workgroup; focus on implementing STEM curricula and on identifying STEM resources.
Center for Schools and Communities <i>Parke Brown</i> , Youth Development Coordinator	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; provided NPASS overview and helped identify STEM curricula; co-designed the statewide STEM survey.	Participate in Workgroup and Leadership Committee; focus on implementing STEM curricula.

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
<p>The Pennsylvania State University/Electro-Optics Center</p> <p><i>Laurie Harvey</i>, Education and Workforce Development Senior Program Coordinator</p> <p><i>Colleen Smith</i>, Outreach Coordinator</p>	<p>Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped identify STEM curricula, evaluation instruments, and Pennsylvania online directories.</p>	<p>Participate in Workgroup; focus on implementing STEM curricula and on communications.</p>
<p>Pennsylvania State University</p> <p><i>Leah Bug</i>, Assistant Director, Center for Science and the Schools</p>	<p>Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped identify STEM curricula.</p>	<p>Participate in Workgroup and Leadership Committee; focus on implementing STEM curricula and on identifying STEM resources.</p>
<p>TEAM PA</p> <p><i>Jennifer Cleghorn</i>, Director of Education</p>	<p>Participated in Workgroup meetings, conference calls, and between-meeting dialogue; provided access to Team PA resources and database; helped connect with corporate and community leaders.</p>	<p>Participate in the Workgroup and Leadership Committee; Lead 5 Regional STEM Bi-monthly Meetings Coordinate with the Manufacturers Council STEM Education Public Awareness Campaign, Lead Partnership Coordination efforts for an online STEM Assets Database. Focus on cultivating partnerships, on implementing STEM curricula, on communications, and on policy.</p>

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
University of Pittsburgh <i>Kevin Crowley</i> , UPCLOSE, Center for Learning in OST Environments	Participated in conference calls; helped craft statewide survey.	Participate in Workgroup; focus on implementing STEM curricula and on outcome measurement. Provide a linkage between Project Accelerate and the currently developing the expanded connected learning network that is growing of the Pittsburgh Spark's Kids and Creativity network.
Science Outreach Center <i>Allison Felix</i> , Outreach Coordinator, Central Penn PA STEM Region	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped identify STEM curricula.	Participate in Workgroup; focus on cultivating partnerships and on implementing STEM curricula.
California University of PA <i>Lisa Kovalchick</i> , Lead Contact, PA STEM Collaborative	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped identify STEM curricula and online directories; volunteered students' help with designing web-based resources.	Participate in Workgroup; focus on implementing STEM curricula, on communications, and on professional development.
Northwest Regional Key <i>Chuck Lytle</i> , School-Age Specialist	Participated in Workgroup conference calls.	Participate in Workgroup; focus on implementing STEM curricula.
Lehigh Carbon Community College <i>Jeanne Miller</i> , Director, Carbon and Schuylkill Education Services and the SHINE Afterschool Program	Participated in Workgroup conference calls.	Participate in Workgroup; focus on implementing STEM curricula.

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
University of Pennsylvania <i>Nancy Peter</i> , Director, OST Resource Center	Chaired Workgroup; helped administer overall project; participated in all communication, activities, and decision-making; co-designed STEM survey.	Chair Workgroup and Leadership Committee; help administer overall project; help with communication, activities, and decision-making.
Free Library of Philadelphia <i>William Richards</i> , Director Philadelphia OST Literacy Initiative	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped craft statewide survey; helped identify STEM curricula.	Participate in Workgroup and on Leadership Committee; focus on implementing STEM curricula, on cultivating partnerships, on identifying STEM resources, on professional development, and on outcome measurement.
Pennsylvania Key <i>Leslie Roesler</i> , Community Initiatives Director	Participated in between-meeting dialogue.	Participate in Workgroup; focus on communications and on policy.
Deputy Mayor's Office for Health and Opportunity, City of Philadelphia <i>Thomas Sheaffer</i> , Director of Policy and Evaluation/Fiscal Director	Participated in Workgroup meetings, conference calls, and between-meeting dialogue; helped craft statewide survey; helped identify STEM curricula.	Participate in Workgroup; focus on cultivating partnerships, on outcome measurement, on communication, and on policy.
Carnegie Mellon Robotics Institute <i>Robin Shoop</i> , Director of the Robotics Academy	Participated in between-meeting dialogue.	Not responded.
Tactile Design Group <i>Karen Smuck Tylek</i> , Project Specialist You for Youth	Participated in between-meeting dialogue.	Participate in Workgroup; focus on implementing STEM curricula and on identifying STEM.

Partnering Organization & Main Contact(s)	Roles in Planning Process	Anticipated Roles in STEM System Building
Mission Readiness <i>Steve Dost, Director</i>	Participated in initial discussion on how STEM informal education is of interest to their Military Flag Officers membership and potential engagement of their members in educating key stakeholders on how OST can impact this issue.	Potentially participate in the workgroup and after further exploration with their national leadership determine if and how education may be executed i.e. white paper, op ed, one on one meetings etc.
YWCA of Greater Pittsburgh STEM IMPACT <i>Alexis Howard, Director</i>	Participated in discussions to overview their regional STEM Building initiative in Western Pennsylvania and gave input as to gap that could be met though the PSAYDN OST STEM Heinz Grant submission.	Will inform others statewide regarding their systems building work and will collaborate on the implementation of the PSAYDN Heinz OST STEM Project if awarded.

VII. Project Evaluation

PSAYDN/OSTRC will collect a comprehensive set of evaluation data that corresponds to the four-fold mission of Project Accelerate: increasing STEM programming, enhancing OST programs with STEM, cultivating partnerships and establishing a communications campaign. These data are collected at the state, program and student levels.

Increase Statewide the Quality and Quantity of STEM Programs

Project Accelerate provides extensive technical assistance and curricular resources to 20 OST programs across the Commonwealth of PA. These resources are intended to expand STEM learning and enhance OST staff capacity to utilize STEM curricula. The evaluation will utilize administrative data (such as the number of newly trained OST staff, the number of curricula disseminated) and survey data (the general level of STEM training statewide; the confidence levels of OST staff in teaching STEM) to document the growth of STEM resources during the grant period.

Enhancing Capacity of OST Programs to Assess STEM Implementation

It is essential to collect formative evaluation data from the OST programs that receive *Project Accelerate* resources to insure there is fidelity to program design. Specifically, measures of fidelity are best when they examine adherence to program design, the amount of exposure to program interventions, the quality of those interventions, and how participants respond to the intervention.⁹ Recognizing the importance of fidelity to program design, *Project Accelerate* will use the Dimensions of Success (DOS) tool to conduct site monitoring visits of participating OST programs, beginning in September

2013 when project training is complete and new entrants to the programs are expected. The DOS tool uses 12 dimensions of successful STEM instruction divided across four domains including, “Features of the Learning Environment,” “Activity Engagement,” “STEM Knowledge & Practices,” and “Youth Development in STEM.” Other fidelity and monitoring items may be developed, including measures of basic program characteristics.

Additionally, PSAYDN will survey OST programs to examine their STEM activities, partnerships and staff readiness. A survey instrument for this purpose was utilized during the planning grant period to assess the status of STEM in OST programs, and its results (which serve as a baseline measure for the implementation grant) indicated a need for professional development among OST staff. The same survey will be disseminated during the implementation grant period to examine change in these measures.

Additionally, *Project Accelerate* will assess change in STEM engagement among upper elementary and middle school students. Student engagement and related psychological dispositions are documented as important outcomes for the informal STEM field.^{10 11} The project’s Youth Engagement Survey will be generalized because each participating OST site will choose a different STEM curricula and focus on a different STEM area.

To design a generalized pre-post engagement measure, the evaluation will identify age-appropriate measures of student engagement from existing instruments. One potential tool is the “Excited, Engaged and Interested Science Learner” survey.¹² While this tool focuses on science, it may be easily adapted to other STEM areas for upper elementary and middle school grades. Furthermore, to inform the development of a feasible instrument for the project, *Project Accelerate* will utilize comprehensive reviews of STEM assessment tools¹³ that include measures of student engagement.

Project Accelerate will collect student-linked baseline and follow-up measures of student engagement with assistance from staff at participating project sites. These staff will receive training in data collection purposes and procedures (including methods to increase response rates, to track individuals and to ensure confidentiality, etc), and have regular contact with evaluation staff at PSAYDN, to produce an accurate and timely dataset for analysis. All data collected will be held in strict confidence. Change in student responses over time will be examined with appropriate statistical analyses. Correlations between changes in engagement and data from the DOS observations will be calculated.

Cultivate Regional, State and National OST-STEM Partnerships

Project Accelerate will deepen and expand its networks of OST partners during the course of the grant. To monitor this activity, the evaluation will utilize administrative data generated by the project, such as the number and timing of networking events, the number of new contacts made, and other measures that describe the quantity of partnerships developed over the course of the grant.

Establish Communications Campaign by Mobilizing Resources

Project Accelerate will use a variety of media to disseminate its mission, services and resources to OST stakeholders across the Commonwealth. To monitor this activity, the evaluation will utilize administrative data generated by the project, such as counts of web site visits, newsletters, technical assistance, email and listserv activities and other communications activities that describe the nature of *Project Accelerate's* communications campaign.

Overarching Methods & Design

All data collection instruments will be created using best practices in questionnaire design, and reviewed/approved by *Project Accelerate* leadership. Data collection instruments will be designed to enhance construct and face validity using standard survey item construction standards^{14, 15}. Several aspects of constructing high quality question items, such as using simple language, clear instructions, specific questions, wording effects and order effects, will be applied.^{16, 17} Furthermore, the evaluation staff will use a variety of methods known to increase response rates, including letters and email that make early announcements of the survey, providing copies of the questionnaire to respondents to improve their familiarity, offering incentives and rigorous follow-up communication with sites who have not responded. Finally, PSAYDN will rely on its extensive network, which has successfully ascertained large amounts of survey data in the past.

A key software solution for many analysis tasks is the Statistical Package for Social Sciences (SPSS/PASW). It will be used for the analysis of quantitative data collected during this process. Additionally, PSAYDN, through the Center for Schools and Communities has access to Stata, Excel, Filemaker, Access, and other quantitative analysis software tools, which will be utilized as needed. For analysis of qualitative data, the team will use nVivo, which organizes and analyzes unstructured qualitative information.

In short, the evaluation plan for *Project Accelerate* will produce evidence about its impact on students, programs, staff and the larger network of OST stakeholders statewide.

Finally, the evaluation will report on the following objectives:

1. By the end of the grant period, *Project Accelerate* will deliver STEM curricula, and related staff training and technical assistance, to 20 OST pilot sites across the Commonwealth of Pennsylvania.
2. Twenty pilot sites will serve a minimum of 400 total students over the two year grant period.
3. Participating pilot sites will utilize the Dimension of Success (DOS) observation tool, administered toward the end of the project period, to analyze implementation quality.
4. Staff at pilot sites will rate the quality and usefulness of training sessions at an average score of 4.25 or higher, on a 5 point scale.

5. Student level data from pilot sites will be used to make formative assessments of impact of STEM curricula and inform the quality of their implementation.
6. The nature of new and expanded STEM-OST communication and partnership will be documented with a variety of administrative data, including logs of web activity, technical assistance and networking events.

VIII. Staffing Plans for System Building Activities

PSAYDN Director – Kathleen (Kacy) Conley will provide administrative oversight for *Project Accelerate: A Systems Building Plan to Infuse Science, Technology, Engineering, and Math into Out of School Time*. Ms. Conley will be responsible for ensuring all goals are met, and the supporting activities are carried out in a timely and efficient manner to meet the objectives. Kathleen had a 31 year career with the YMCA and has extensive experience in OST program development, delivery, coordination of services, coalition building and advocacy.

Project Accelerate Coordinator (To be hired) - The Coordinator will have responsibility for coordinating the activities needed to meet the deliverables outlined in the project workplan. They will oversee the Leadership Committee and Workgroup: coordinate the STEM Pilot selection of sites; purchase needed resource including curricula and evaluation instruments; coordinate and provide professional development opportunities including technical assistance, provide OST STEM curricula training and the development of an OST Communities of Practice Learning Group to be placed on the SAS Portal site. They will also coordinate with lead partners in the management of online communication vehicles including web based resources and develop communication mechanisms that create awareness of STEM OST.

CSC Research and Evaluation Director - Benjamin Cohen, Ph.D. will oversee the evaluation of all facets of Project Accelerate including determination of instruments, distribution of instruments, collection and analysis of data.

CSC Administrative and Fiscal Support - Administrative staff will provide clerical support in the development of project reports, meeting agendas, meeting minutes, communication to the field, etc. The CSC's fiscal support will include the completion/submission of all required project fiscal reports, tracking of expenditures, processing of invoices, and any fiscal related functions.

Out of School Resource Center (OSTRC) - Director Dr. Nancy Peter will chair the Project Accelerate Leadership Committee and Workgroup. Dr. Peter and her staff will assist in the identification and access to professional development opportunities and staff resources and assist in developing and managing web-based resources.

Letters of Support and Commitment

See attached letters of Support and Commitment

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- (17) Sudman S, Bradburn N, Schwarz N. *Thinking about answers: The application of cognitive processes to survey methodology.* San Francisco: Jossey-Bass; 1996.