



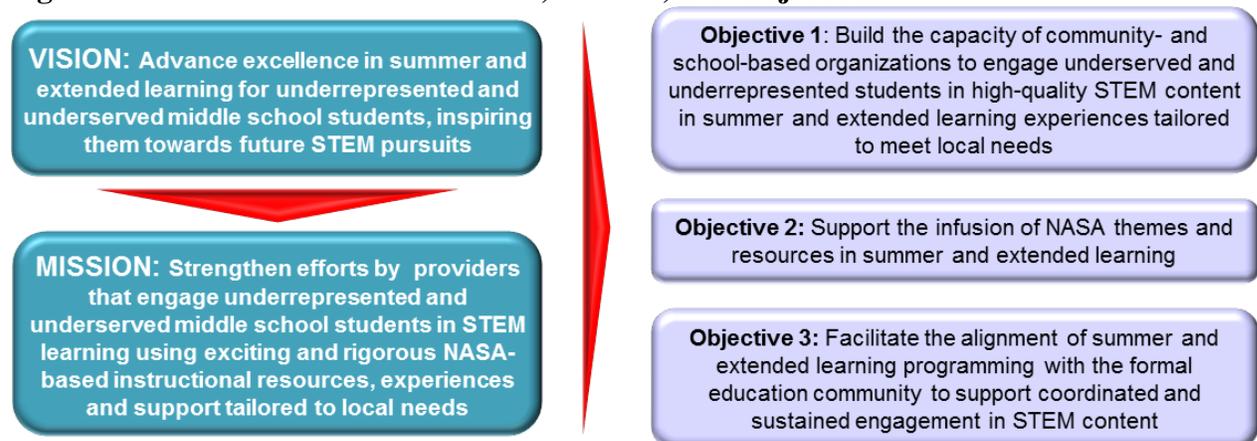
2012 Annual Performance Report Summer of Innovation (SoI)

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PROJECT DESCRIPTION

In 2009, President Obama announced the “Educate to Innovate” campaign to foster a renewed commitment to strengthen Science, Technology, Engineering, and Math (STEM) education. In January 2010, the National Aeronautics and Space Administration (NASA) launched the Summer of Innovation (SoI) project in response to the President’s call to action. As can be seen in the Figure I, SoI’s clearly articulated Vision, Mission and Objectives are centered on building local educational capacity for supporting STEM education for underserved and underrepresented middle school students.

Figure I: Summer of Innovation Vision, Mission, and Objectives



Summer and after-school programs present a prime venue for fostering student interest in STEM because of their informal atmosphere and their unique ability to inspire and excite children through enrichment experiences and hands-on, project-based group activities.¹

¹ Robelen, E. (April 2011). Awareness Grows of Importance of Learning Science Beyond School. *Education Week: Science Learning Outside the Classroom*, 30 (27), S2-S5.

Out-of-school time (OST) activities allow students to connect with STEM on a personal level, which is especially important for students who are underrepresented in these fields and may not have previously felt encouraged to pursue STEM.² SoI was designed to give students an opportunity to engage in OST learning at an early age and during a critical period in the education cycle: summer. As a recent study has shown, 75% of Nobel Prize winners in science attribute their interest in science to an out-of-school experience,³ and many students who originally underachieved in STEM before successfully pursuing STEM careers discovered their passion during OST programs.⁴ A meta-analysis of 93 summer program evaluations showed that summer programs designed to improve students' academic abilities tend to increase skills and knowledge by the end of the summer.⁵ In fact, not attending summer programs can have negative impacts on student performance. While students are on summer break, many forget what they learned in the previous year and enter the next grade at a disadvantage. Because of this "summer slide," the average student loses around two months of math skills by the end of the summer.⁶

SoI strategically partners with summer, school, and community-based organizations to strengthen summer programming, and to increase STEM education capabilities with NASA support and tailored content. SoI is geared specifically towards underserved and underrepresented students in grades 4-9 and leverages a multi-faceted, partnership-based implementation approach to maximize the project's scale and reach while allowing for local flexibility and innovation. Currently, the Summer of Innovation is implemented across five different approach models described below.

2010 National Awards: Four Space Grant Consortiums and one sub-award supported major efforts to mitigate the effects of the "summer slide" on student academic achievement and to increase student interest in STEM education. The five objectives of the pilot, as explicitly stated, were as follows: (1) Professional development and training opportunities for educators; (2) An intensive and interactive middle school education experience; (3) Strategic infusion of NASA content; (4) A STEM community of learning for sustained engagement over the 36-month performance period; and (5) Assessment of efficacy in implementation (evaluation).

2011 National Awards: Eight National Awards support major efforts to build the capacity of high quality or promising educational organizations targeting underserved and underrepresented populations. These National Awards are intended to broaden the scale of successful STEM efforts and/or to deepen the educational content value for organizations that already have a broad student reach by providing them with rich NASA-based STEM curriculum and professional development.

² President's Council of Advisors on Science and Technology, 2010

³ Friedman, L. & Quinn, J. (February 2006). Science by Stealth: How After-School Programs Can Nurture Young Scientists and Boost the Country's Scientific Literacy. *Education Week*, 25 (24).

⁴ President's Council of Advisors on Science and Technology, 2010

⁵ Cooper, H., Charlton, K., Valentine, J. C., & Muhlenbruck, L. (2000). Making the Most of Summer School: A Meta-Analytical and Narrative Review. *Monographs of the Society for Research in Child Development*, 65 (1), 1-127.

⁶ Afterschool Alliance. (2008b). Summer: A Season When Learning is Essential. *Afterschool Alert* (33)

Center Awards: Nine NASA Field Centers and the Jet Propulsion Laboratory have extensive experience engaging local community partners in summer programming for students across the country. These Ten Center Awards enhanced SoI's ability to support NASA STEM programming through Centers' collaborations with individual organizations or consortiums that benefited from the use of Centers' resources, facilities, and personnel. The participation of Centers is integral not only to expanding the geographic reach of SoI, but to ensuring that NASA resources are available and accessible to program implementers with a history of successful collaborations with NASA.

Mini-Grants: During the pilot of the SoI project in 2010, numerous organizations expressed interest in partnering with NASA in Summer Learning. Many of the organizations that provide opportunities to the SoI target audience are community based, and do not have substantial experience in government partnerships. NASA used the mini-grant opportunity to focus on these smaller organizations across the country to introduce them to Summer of Innovation content and themes. In partnership with the National Space Grant Foundation, SoI awarded mini-grants with a maximum value of \$2,500 to various sites across the country.

General Public: Organizations that are not awarded financial support or could not meet the project funding or sustained engagement requirements still had full access to the project's educational content through the SoI website (<http://www.nasa.gov/soi>). Through the Summer of Innovation website, visitors have access to NASA content modules, individual student lessons for grades 4-9, educator training modules, and information regarding alignment to National Standards.

PROJECT BENEFIT TO OUTCOME 2

Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.

The goals of the SoI Pilot Project align to Outcome 2 of the 2006 NASA Education Strategic [Coordination Framework](#), working to “attract and retain students in STEM disciplines.” SoI also supported the following objectives also aligned to Outcome 2:

Objective 2.1—Short Duration Professional Development

Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.

Objective 2.2—Long Duration Professional Development

(Educate) Provide long-duration and/or sustained professional development training opportunities to educators that result in deeper content understanding and/or competence and confidence in teaching STEM disciplines.

Objective 2.3—Curriculum Support Resources

(Educate) Provide curricular support resources that use NASA themes and content to:

- a) Enhance student skills and proficiency in STEM disciplines (Educate);*
- b) Inform students about STEM career skills and proficiency in STEM career opportunities (Engage); and*
- c) Communicate information about NASA's mission activities (Engage).*

Objective 2.4—Student Opportunities

(Engage) Provide K-12 students with authentic first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers; and/or provide opportunities for family involvement in K-12 student learning in STEM areas.

In FY 2012, the SoI Project contributed to Outcome 2 and its objectives with the following accomplishments:

PROJECT ACCOMPLISHMENTS

- Implemented research based summer programming aligned to the organizational capability of providers
 - Five 2010 National Awards with 67 partnerships
 - Eight 2011 National Awards with 129 partnerships
 - Ten Center awards which partnered with more than 308 organizations and school districts and
 - Mini-Grant awards to 206 organizations
- In 2012, served **58,289** middle school students in grades 4-9 representing an overall **156%** increase from the SoI Pilot in FY2010
- Reached targeted audience (underserved and underrepresented students):
 - 58% minority
 - 50% female
 - 79% received free/reduced lunch
- In summer of 2012, SoI 2011 National Awards and NASA Center partners delivered summer STEM activities to almost 39,000 students and provided professional development opportunities to over 3,200 educators
 - Data submitted indicates that 79% of these students were eligible for free and reduced lunch
 - The number of female and male participants was virtually even
- 2010 National Awards continued to engage students and educators in STEM Learning Community activities including a “Back to School Rally”, Educator Best Practices Conferences and SoI camps around the country
- The SoI Mini-Grant program received 470 applications. Of those applications, 206 were funded. The geographic distribution of the awards covered 49 states, the District of Columbia, and Puerto Rico

- NASA Center partners engaged student participants in over 1.1M hours of NASA SoI content (46,533 Days; 6,648 Weeks; 128 Years)
- SoI engaged a forum of experts for the continued refinement of Summer of Innovation (SoI) and its evaluation
- Developed eight themed camps of NASA Summer of Innovation content. Thirty hour, two day, and one day modules are outlined for each theme allowing design flexibility for collaborators.
- Developed a highlights report providing a snapshot of the activities being implemented during summer 2012 to nurture the budding STEM workforce. A copy of this report can be found in the *About the Project* section of the SoI website (<http://www.nasa.gov/soi>).

Table I: FY2012 Summer of Innovation Project Participant Data

Participants	Students	Educators (Certified Teachers & Informal Educators)
2011 National Awardees (8) – Summer Implementation	11,991	1,592
Center Awards (10) – Summer Implementation	26,958	1,617
*STEM Learning Community Activities	2,800	405
**Mini-Grant Awardees	16,540	2,627
Totals	58,289	***6,241

* Participants served by FY2010 national awardees and FY2010 contract award in FY2012

** Total Mini-Grant Awardees' 2012 participant data (reports submitted by 204 out of 206 awards to Nat'l Space Grant Foundation)

*** Total Educators (3,970 Certified Teachers and 2,271 Informal Educators)

Table II: FY2011 Summer of Innovation Project Participant Data

Participants	Students	Educators (Certified Teachers & Informal Educators)
2011 National Awardees (8) – Summer	8,901	1,112

Implementation		
Center Awards (10) – Summer Implementation	17,434	1,474
*STEM Learning Community Activities	5,533	613
**Mini-Grant Awardees	15,544	2,583
Totals	47,412	***5,782

* Participants served by FY2010 national awardees and FY2010 contract award in FY2011

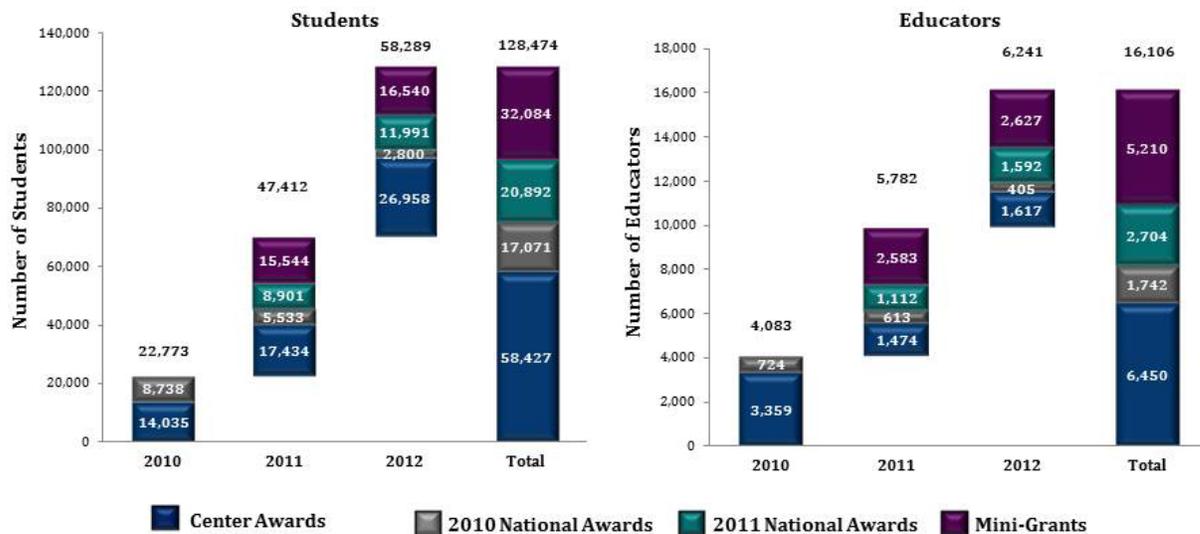
** Total Mini-Grant Awardees’ 2011 participant data (reports submitted by 178 out of 180 awards to Nat’l Space Grant Foundation)

*** Total Educators (3,764 Certified Teachers and 2,018 Informal Educators)

Since its inception in 2010, SoI has continually refined its approach to maximize the scale and effectiveness of the project’s resources, and through the review of lessons learned and adoption of best practices, SoI has positioned itself to reach more students and educators each successive year. In the last three years, SoI has made significant advancements in its design and capability offerings, changes that are a testament to the project’s ability to evolve and adapt to address stakeholder needs for increased student and teacher reach, programmatic fidelity, and collaborator accountability. SoI has also made significant improvements to its service offerings by making marked strides in its catalogue of educator resources and available content while refining its performance monitoring and data collection processes. SoI’s demonstrated ability to engage underrepresented and underserved students and educators with hands-on learning activities, and collaborate with a diverse portfolio of partners from across the country, has illustrated a new way for the Agency to design, plan, manage and to evaluate future education initiatives.

Overall, the project has significantly improved its partnering, planning, implementation, and evaluation efforts since 2010, which has been reflected in the project’s results. In each year of implementation, SoI has reached an increasing total number of students and educators, resulting in a three-year total of over 128,000 students and over 16,000 educators (see Table III on following page). As the project continues to incorporate lessons learned, SoI will continue to identify the capabilities needed for achieving stronger results.

Table III: Summer of Innovation Cumulative Success



PROJECT CONTRIBUTIONS TO ANNUAL PERFORMANCE GOALS (APGs)

The Summer of Innovation Project supported the following Fiscal Year 2012 Annual Performance Goals (APGs):

Table IV: NASA Office of Education APGs Supported by SoI

APG #	APG Description	SoI Contribution
6.1.1.1	35,000 educators participate in NASA education programs	6,241 educators (certified teachers and informal educators) participated in professional development opportunities offered by the SoI Project
6.1.2.2	200,000 elementary and secondary students participate in NASA instructional and enrichment activities	58,289 middle school students in grades 4-9 participated in the SoI Project

IMPROVEMENTS MADE IN THE PAST YEAR

In order to be more efficient and effective in the collection, review and communication of performance data, NASA has procured licenses to utilize *ProjectManager*, an online collaborative project management software tool for professionals. *ProjectManager* allows for real-time project performance monitoring and provides the project a dashboard for planning, tracking and collaboration. Each of the 2011 National Awards and NASA Centers (including the Jet Propulsion Laboratory) were trained and given access to

ProjectManager in order to provide performance data and track performance milestone tasks throughout the project life cycle. *ProjectManager* significantly contributed to the following 2012 improvements:

- Weekly performance monitoring and reporting throughout the summer of 2012
- Strategic communications to 2011 National Awards, Centers Awards, NASA Education Leadership
- 25% increased efficient in the participant data validation process (i.e., reduced the time to validate final summer participant data by 12 weeks compared to 2011)

The NASA Office of Education undertook the redesign of Summer of Innovation (SoI) and its evaluation during the time period of May through August 2012. A leadership team was convened by NASA Associate Administrator for Education Leland Melvin, consisting of staff members from Glenn Research Center charged with the management of this national project and members of the NASA Headquarters leadership team, representing K-12 programs, evaluation, and infrastructure. This team worked collaboratively to develop an action plan for the redesign process. This process included conducting targeted literature reviews, review and analysis of existing project data, consultation with SoI National Awardees, NASA Center SoI leads, and other SoI stakeholders, and convening of a series of three technical review forums with education and evaluation experts.

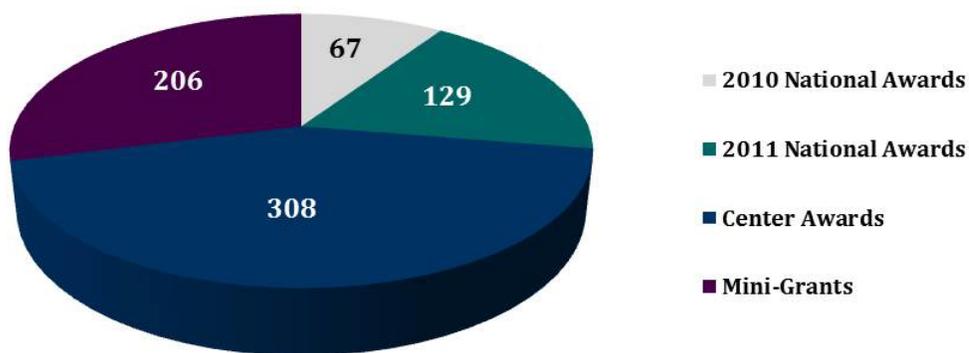
The technical review forums were central to the redesign process. Held between May and August 2012, these three forums engaged experts in the fields of out-of-school time program design, adolescent cognitive and affective development, STEM learning, professional development, and educational evaluation and research to examine the current SoI project design and evaluation. These experts also helped NASA form recommendations to create an evidence-based SoI program model that is evaluable and to design a rigorous evaluation to measure SoI's impact and effectiveness. These recommendations were used to develop an action plan that was presented to the Office of Management and Budget (OMB). Under the leadership of NASA's Office of Education, the future direction of the Summer of Innovation project will be determined and communicated in the next fiscal year.

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The success of Summer of Innovation (SoI) is dependent on partnerships. Partnering with organizations that serve populations of students underserved and underrepresented in STEM disciplines allows NASA to reach its targeted audience. In FY2012, SoI worked collaboratively with many types of organizations including community/local partners, museums/planetariums, nonprofits, U.S. Department of Education, other federal agencies, higher education institutions, K-12 schools, K-12 school districts, professional societies, state government organizations, and corporate entities. SoI awardees provide many resources, including facilities, staffing, and transportation, and recruit students through existing relationships with school districts and youth organizations.

SoI has been a catalyst for bringing together communities, local organizations, parents, and school districts to support STEM engagement. By demonstrating the value and excitement of informal hands-on learning using NASA content, support, and personnel, SoI has empowered multiple community stakeholders to collaborate in engaging underserved and underrepresented students in exciting STEM activities. SoI is designed to mobilize and rally parents, teachers, school districts, and communities around the use of NASA's unique resources, personnel, and interactive content to tackle localized STEM education challenges. SoI has spurred Awardees to partner and collaborate with a number of community organizations interested in supporting STEM education (see *Figure II*).

Figure II: Summer of Innovation 2012 Collaborators



Total Collaborators: 710

The project's flexibility and adaptability has allowed a diverse base of community organizations from across the nation to find ways to work collaboratively in order to serve underserved and underrepresented populations.

In addition to working with external partners, NASA staff at Glenn Research Center (GRC) and Headquarters (HQ) worked in partnership this summer to conduct long-term planning for SoI. Office of Education Infrastructure Division (OEID) team members collaborated with GRC project staff and HQ leaders to plan and implement a series of forums that brought together experts in out-of-school time and STEM program design and evaluation to create an evidence-based program model and rigorous evaluation design. Support was provided by the Glenn project team, which synthesized recommendations for program design into an updated set of project requirements. NASA evaluators also provided high-level technical support in logic modeling, literature reviews, and facilitation of focus group discussions with existing awardees. The final product, a formal report providing details on the redesign of SoI and its evaluation, was presented to the Office of Management and Budget (OMB). The OEID documented this program redesign process as a potential model for other NASA Education programs and projects.

CHANGE LOG

Document changes to the Annual Performance Report.

Date	Version	Author	Comments
10/12/2012	Ver.01	R. Gilmore	Initial Draft (final participant data reported for 2011 National Awardees and Centers)
11/1/2012	Ver.02	R. Gilmore	Updated Annual Performance Goals (APGs) metrics and reference numbers to reflect 2012 APGs. Updated 2012 participant and collaborator data to include 2010 National Awardees Final data for 2012. Added Alt Text for graphics.
04/29/2013	Ver.03	R. Gilmore	Added 2012 Mini-Grant Final Data throughout the document.