A NATIONAL PARTNERSHIP-BASED SUMMER LEARNING INITIATIVE TO ENGAGE UNDERREPRESENTED STUDENTS WITH SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS

Leland Melvin
Dovie Lacy, Shanessa Jackson, Carol Galica

National Aeronautics and Space Administration

Paper IAC-11-E1.5.9,
International Astronautical Congress
Cape Town, South Africa, October 2011
Education Landscape

Achievement-level results in NAEP science at grades 4, 8, and 12: 2009

Grade 4: 72% at or above Basic, 34% at or above Proficient, 1% at Advanced
Grade 8: 63% at or above Basic, 30% at or above Proficient, 2% at Advanced
Grade 12: 60% at or above Basic, 21% at or above Proficient, 1% at Advanced

...a National Imperative
Educate to Innovate

National Campaign launched by President Obama

- Increase STEM literacy
- Move American students to the top
- Expand opportunities for underrepresented groups, including women and girls

NASA’s Response

- Summer of Innovation Pilot Project
- Middle School Students
- Underrepresented, Underserved, Underperforming
- Multi-week STEM experiences
“As Only NASA Can”

NASA Education Strategic Framework
A Clearly Defined and Coordinated Portfolio Approach

Outcome 1
Contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals through a portfolio of investments.

Outcome 2
Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

Outcome 3
Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission.

Principles/ Criteria
Relevance  NASA Content  Diversity  Evaluation  Continuity  Partnerships/ Sustainability

Cultivate Diversity of Workforce Disciplines and Practitioners
**Organization**

Notional Management Structure

- **Project Manager**
  - Administrative Support
  - External Liaison
  - Advisors (OGC, Procurement, OLIA, Comm.)
  - Project Control Specialist
  - Office of Ed K-12 Manager
  - Project Integration Manager
  - Evaluation Manager
  - Messaging, Awareness, and Communications Manager

- **Space Grant Cooperative Agreements**
- **NASA Center Collaborations**
- **Contract Award**
- **Partnerships Development**
- **National Call**
Organization

Notional Management Structure

- Multi-Faceted Approach
  - Space Grant Awards
  - Contract Award
  - Center Collaboration
  - Partnerships Development
  - National Call

- Infusion of NASA Content

- Teacher Professional Development

- STEM Learning Communities

- Evaluation

- Student Engagement

- Project Objectives
  - Student Engagement
  - Infusion of NASA Content
  - Teacher Professional Development
  - STEM Learning Communities
  - Evaluation

- Project Support Elements
  - Communication, Awareness and Messaging
  - Project Assessment
  - Performance Monitoring, OEPM
  - Project Management Infrastructure

- Project Components
  - Space Grant Awards
  - Contract Award
  - Center Collaborations
  - Partnership Development
  - National Call
Project Objectives

1. Professional development and training opportunities for teachers who will lead students through the *Summer of Innovation* summer learning program.

2. An intensive and interactive middle school education experience that accelerates student learning and improves student STEM skills and knowledge.

3. Strategic infusion of NASA content and educational resource materials.

4. A community of STEM education stakeholders that is able to sustain student interest and achievement.

5. Assessments of effectiveness of *Summer of Innovation* interventions and the effectiveness of the STEM learning communities developed through this pilot.
Project Components: Space Grant

- Wyoming Space Grant -- "Powering STEM Education in Wyoming with Wind Energy"
- New Mexico Space Grant -- "Launch and Learn"
- Idaho Space Grant -- "NASA Education and STEM Program for Underrepresented Populations"
- Massachusetts Space Grant -- NASA robotic, Earth and space science, astrophysics and engineering missions.
Project Components: Centers

10 Centers Funded for Targeted Areas in their Regions
Project Components: Sub-Award

Sol task to existing NASA STEM education contract

Sub-Award Sol Sites

<table>
<thead>
<tr>
<th>Chicago, Illinois</th>
<th>Los Angeles, California</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland, Ohio</td>
<td>Orlando, Florida</td>
</tr>
<tr>
<td>Columbus, Ohio</td>
<td>Sharon, Pennsylvania</td>
</tr>
<tr>
<td>Dayton, Ohio</td>
<td>Toledo, Ohio</td>
</tr>
<tr>
<td>Detroit, Michigan</td>
<td>Youngstown, Ohio</td>
</tr>
</tbody>
</table>
Project Components: Partnerships

**STATUS**

- Federal Agencies Partnership in Initial Development Stage
  - FAA, ED, NSF

- Non-profit Partnerships in Initial Development Stage
  - Conrad Foundation
  - NFL Players Association
  - Great Minds in STEM
  - Foundation for the Advancement of Women Now (FFAWN - Mary J. Blige)
  - Mathematics Engineering and Science Achievement (MESA)
  - Micro Enterprise Charter Academy (MECA)
  - One Hand to Another (Pharrell Williams)

- Industry in Initial Development Stage
  - Mad Science
  - Bionic Yarn

**PLANNED ACTIVITIES**

- Partnership Summit
- OGC discussion on levels of engagement (SAA, MOU, collaborator, etc.)
- Announcement of Opportunity, OGC Approval June 15, will be posted on SoI Web site and FedBizOps
National Call

DESCRIPTION
The National Call is an entry point for STEM Stakeholders to participate in the NASA SoI and become STEM Collaborators.

- Facilitates incorporation of NASA content into summer learning activities nationwide.
- Families, educators & organizations register online
- Submit Events/Activities to Calendar and Map
- Receive NASA SoI Certificate of Participation
- Share a photo and Summer of Innovation story.

STATUS/SUMMARY OF ACTIVITIES
- Launched SoI Website June 8
- Paper Work Reduction Act (PRA) Determination discussion continues
- National Kickoff broadcast via NASA TV

PLANNED ACTIVITIES
- Meeting with OMB/OSTP website on registration and evaluation
- Work with OMB examiner to obtain Emergency Clearance to collect Web registration data
- Website (Phase 2) Additional Functionality
- Review – assessment, lessons learned

2010 MILESTONES
- Concept Development – April/May
- Define Website requirements – May/June
- NASA IT, Privacy Act, Paper Work Reduction Act Compliance activities May/June
- Website Phase 1 Launch – June 8
- Website Phase 2 Release – July 8 (tentative)
- Monitoring of Web Usage/Data (weekly)
- National Call Review – October/November.
## Approach

<table>
<thead>
<tr>
<th>Approaches</th>
<th>Vehicle</th>
<th>Provider</th>
<th>Duration</th>
<th>Direct</th>
<th>Indirect*</th>
<th>Teachers</th>
<th>Outreach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Grant Awardees</td>
<td>Cooperative Agreement</td>
<td>4 Space Grant Awardees ID, MA, NM WY</td>
<td>1–5 weeks</td>
<td>6,095</td>
<td>65,000</td>
<td>673</td>
<td></td>
</tr>
<tr>
<td>Contract Award</td>
<td>Contract</td>
<td>Paragon TEC</td>
<td>2-4 weeks</td>
<td>5,000</td>
<td>TBD</td>
<td>250</td>
<td>TBD</td>
</tr>
<tr>
<td>NASA Center Collaborations</td>
<td>Varies</td>
<td>Summer Learning Providers</td>
<td>&gt; 40 contact hours</td>
<td>9,495</td>
<td>6,135</td>
<td>330</td>
<td>35,505</td>
</tr>
<tr>
<td>Partnerships Development</td>
<td>SAA/MOU</td>
<td>Federal Agencies, Corporations, Associations, Non-Profits, etc.</td>
<td>Varies</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>National Call to join Summer of Innovation</td>
<td>Sol Web site</td>
<td>Varies – Families, Academic Organizations, Federal Agencies, Industry, Non-profit</td>
<td>Varies</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>NASA STEM Celebrations</td>
<td>Similar to Ctr. Open House events</td>
<td>Throughout summer</td>
<td>Typically 1 day</td>
<td></td>
<td></td>
<td></td>
<td>Incl. in NASA Center totals</td>
</tr>
</tbody>
</table>

* Indirect includes students taught by SoI trained teachers and non-tracked participants

**May be trackable

Prior to April 14, only the Space Grant component existed

**Total 128,483
### Sol Activities

#### Structural Elements of Sites’ Implementations (Abt Associates, 2010)

<table>
<thead>
<tr>
<th>Site Name</th>
<th># Student Activities</th>
<th># Educator Activities</th>
<th>Site Locations</th>
<th>Student Activity Duration (days)</th>
<th>Educator Activity Duration (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho SG</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>3-5</td>
<td>2-5</td>
</tr>
<tr>
<td>Massachusetts SG</td>
<td>7</td>
<td>4</td>
<td>33</td>
<td>3-25</td>
<td>1-15</td>
</tr>
<tr>
<td>New Mexico SG</td>
<td>1</td>
<td>1</td>
<td>136</td>
<td>17.5</td>
<td>4</td>
</tr>
<tr>
<td>Wyoming SG</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>20</td>
<td>4.5</td>
</tr>
<tr>
<td>Paragon (Chicago)</td>
<td>Unclear</td>
<td>Unclear</td>
<td>31</td>
<td>4-20</td>
<td>0.4-1.5</td>
</tr>
</tbody>
</table>

**Center Partnership Sites**

<table>
<thead>
<tr>
<th>Site Name</th>
<th># Student Activities</th>
<th># Educator Activities</th>
<th>Site Locations</th>
<th>Student Activity Duration (days)</th>
<th>Educator Activity Duration (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp KSC&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>GEAR UP Expl. I</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td>Miami-Dade</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Galena Park</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Chicago Parks&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>17.5-20</td>
<td>N/A</td>
</tr>
<tr>
<td>Cincinnati GEAR</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

N/A: Site did not implement Educator Activities

<sup>a</sup>Camp KSC offered 8 one-week sessions; three were included in the national evaluation

<sup>b</sup>Chicago Parks implemented many activities; three were included in the evaluation due to time constraints