

INSPIRE
Administered by: Oklahoma State University
Type of Agreement: Cooperative Agreement
Project Manager: Steve Chance
Center: Kennedy
Telephone Number: (321) 867-4194

PROJECT DESCRIPTION

The Interdisciplinary National Science Project Incorporating Research and Education Experience (INSPIRE) is a multi-tiered student pipeline program designed for students in 9th to 12th grade, providing a vital link between NASA's Elementary/Secondary Projects and Higher Education projects. The scope and purpose of INSPIRE will place a heavy emphasis on the recruiting of underserved and underrepresented students to ensure a diverse pool of candidates from throughout the U.S.

Students selected to participate will:

- Learn about science, technology, engineering and mathematics (STEM) fields of study and careers
- Participate in the INSPIRE Online Learning Community (OLC)
- Compete for unique, grade-appropriate summer STEM experiences at a NASA facility.

NASA's unique mission provides the content for the INSPIRE OLC, the centerpiece of INSPIRE. It provides a place for INSPIRE students to interact with their peers, NASA Subject Matter Experts (SME's) and education specialists. Through grade-level-appropriate educational activities, chats and the discussion board, students and their families are exposed to the many careers and opportunities at NASA. The INSPIRE OLC also provides parents resources designed to help them champion their student's education and career goals.

In addition, to bridge the "digital divide", and ensure all students have an opportunity to participate in the INSPIRE OLC, those who qualify for the National School Lunch Program are eligible to receive a free laptop.

Once selected and actively participating in the INSPIRE OLC, students are then eligible to compete for the following grade-appropriate summer STEM experiences:

- **Explorers:** Rising 10th-grade students compete to be awarded a summer visit to a NASA facility for a one-day VIP Tour, briefings and workshops, with their legal guardian.
- **Collegiate Experience:** Rising 11th-grade students compete to participate in a two-week, on-campus residential experience during the summer at a Space Grant Institution selected by NASA. This exposure to college students and faculty is designed to encourage improved study skills and the pursuit of higher education and careers in STEM areas. The Space Grant Institution provides lodging, meals, supervision, and educational activities.

- **Residential Internship:** Rising 12th-grade students who will be at least 16 years of age at the start of the internship, compete to participate in a paid eight-week summer internship at a NASA facility. Students gain valuable on-the-job experience by working directly with NASA scientists and engineers during the work day and will participate in enriching after-work educational and cultural activities. During the internship, students receive:
 - A stipend based on minimum wage for the state in which the NASA facility is located and lunch allowance to cover the workweek
 - Meals and housing at a location within commuting distance from the NASA facility
 - Transportation to and from work and any after-work project activities
 - On-site supervision and structured enrichment events after work hours
 - Mentoring by scientists and engineers at the NASA centers during work hours

- **Pre-College Internship:** Rising college freshmen who will be at least 16 years of age at the start of the internship, compete for participation in a paid eight-week summer internship at a NASA facility. Applicants for this experience must have been accepted at a college or university and declared a STEM major. This experience provides valuable on-the-job training and introduces the students to additional education and employment opportunities. Lodging, meals, transportation and after-work activities are the responsibility of the student. NASA will pay the student a stipend of \$5,000 in three installments, providing all requirements have been met.

PROJECT GOALS

Goal 1:

Serve as a nationwide project to develop emerging adolescent and parental awareness and *understanding of STEM-related education and careers.*

Goal 2:

Engage students and families with grade-appropriate resources and activities/educational modules and provide the capability for them to interact, ask questions, and share knowledge with their peers through participation in the INSPIRE OLC.

Goal 3:

Provide unique NASA/STEM experiences for students and their families to further inspire and reinforce student's aspirations to pursue STEM education and families to support their student's pursuits.

PROJECT BENEFIT TO OUTCOME (1, 2, OR 3)

INSPIRE benefits Outcome 2 by attracting and retaining students in STEM disciplines while providing students and families NASA resources and grade-appropriate experiences in the course of participation in the INSPIRE OLC and unique summer STEM experiences. The activities nurture and support student interest and student understanding of STEM careers.

In addition, INSPIRE is a critical link in NASA's pipeline of programs, drawing students from the middle grades, from programs such as NASA Explorer Schools (NES) and Science, Engineering, Mathematics and Aerospace Academy (SEMAA) and center-unique projects like Middle School Aerospace Scholars(MAS) at Johnson Space Center (JSC), and engaging them early in high school with NASA in STEM-related fields. As students exit INSPIRE, we will encourage them to expand their education and employment activity in next-level NASA programs such as:

- Motivating Undergraduates in Science & Technology (MUST),
- Undergraduate Students Research Program (USRP)
- Human Capital-sponsored programs such as the Student Temporary Employment Programs (STEP),
- Student Career Experience Program (SCEP)
- As well as various other NASA internship programs

PROJECT ACCOMPLISHMENTS (CONNECTION BACK TO ANNUAL PERFORMANCE GOALS AND PLANS)

INSPIRE's OLC and four unique, grade-appropriate summer STEM experiences were fully implemented during 2009. In February 1,318 students were selected to participate in the INSPIRE OLC. In addition to the Residential and Pre-College Internships which were offered in 2008, the Explorer and Collegiate summer STEM experiences were implemented in 2009. Three Space Grant Consortia institutions were selected from a competitive solicitation to provide the 2009 Collegiate Experience:

- University of Puerto Rico (Rio Piedras),
- Virginia Polytechnic Institute and State University
- The South Dakota School of Mines and Technology

The number of students participating in the Residential or Pre-College Internships increased from 154 (representing 23 states and Puerto Rico) in 2008 to 180 (representing 38 states and Puerto Rico) in 2009.

A student Advisory Committee consisting of 16 students (four students from each grade level) was selected to provide feedback to the INPIRE staff regarding the INSPIRE OLC during 2009. Their selection was based on their level of participation in the INSPIRE OLC, diversity, and willingness to serve.

In addition to the above project accomplishments, INSPIRE is directly linked to several of the NRC recommendations.

Recommendations 1 and 2:

The content of the INSPIRE OLC uses mission directorate education content

Examples are:

- Spacesuits and How They Work
- NASA Spacesuits and Spacewalks
- NASA E-eClips™: LCROSS Mission to Search for Water on the Moon.

After the students become familiar with the materials, a Quiz Tool is used to measure levels of competencies in the subject areas.

An additional example of how Mission Directorate content is utilized is through the engagement of students in online chats with Subject Matter Experts (SME's) discussing topics such as lunar soil excavating, radiation protection, the Kepler mission (to find Earth-sized planets in the habitable zones of stars) and the Hubble Space Telescope servicing mission. Student participation ranged from 23 to 95 per session, depending on their interest and availability.

The online chat is used to facilitate a seminar style virtual environment with the SME presenting their material and opening up the discussion to questions at end of the period, producing a virtual seminar.

Recommendation 7:

An example of INSPIRE's use of emerging communications technology is in the purchase a virtual presence in Second Life's teen grid. Borrowing expertise provided by NASA Learning Technologies (LT), an island infrastructure (virtual presence) is being developed for students to be "transported" to "INSPIRE Island" during FY10. Students will be able to participate individually and in teams in pre-determined scenarios and activities which provide opportunities for them to develop programming skills, collaboration, and teambuilding and leadership skills in a virtual community.

Recommendation 20:

Professional evaluation has been incorporated into INSPIRE since the beginning of the project. An ongoing evaluation based on surveys of the INSPIRE OLC and summer STEM experiences from students, parents and project staff provides continuous feedback for lessons learned and continuous improvement.

Lastly, examples of other accomplishments can be found in "push-pull" and collaboration:

- Publicize and recruit from NES and SEMAA participants
- Work with Digital Learning Network (DLN) to broadcast internship experiences at centers
- Near peer mentoring opportunities with higher education and Human capital students projects (E.g. USRP, MUST, and Co-op)
- Eight students from 2008 INSPIRE went onto higher education projects during 2009: three to MUST and five to USRP
- Working with Learning Technologies to develop INSPIRE Island in Second Life's Teen Grid
- Worked with Teaching From Space (TFS) for an International Space Station (ISS) downlink that was unfortunately cancelled due to a launch slip
- Approximately 200 INSPIRE students participated in other NASA projects prior to their participation in INSPIRE such as DLN, FIRST, SEMAA and High School Aerospace Scholars (HAS)

PROJECT CONTRIBUTIONS TO PART MEASURES (INCLUDE DATA PLUS EXPLANATION)

PART 9: Percentage increase in the number of elementary and secondary students participation in NASA instructional and enrichment activities.

1,318 students participated in the INSPIRE OLC during 2009. From this pool of candidates:

- 84 students were selected to participate in the Explorer Experience
- 105 students were selected to participate in the Collegiate Experience
- 92 students were selected to participate in the Residential Internship
- 88 students were selected to participate in the Pre-College Internship

The only component of INSPIRE that was offered in 2008 and 2009 which can be used to measure a percentage increase is in number of students participating in the Residential or Pre-College Internships. As a result, there was a 17% increase in the number of elementary and secondary students participation in NASA instructional and enrichment activities from 2008 (154 interns) to 2009 (180 interns).

PART 10: Percentage of students expressing interest in science and technology following their involvement in NASA elementary and secondary education programs.

Of the 249 students who completed a survey after their participation in a long duration event (the Collegiate Experience, Residential or Pre-College Internship) 233 (94%) expressed interest in STEM careers.

IMPROVEMENTS (e.g. project management, efficiencies, etc.) MADE IN THE PAST YEAR

As a result of the annual Lessons Learned meeting consisting of all Center Project Specialists and Oklahoma State University held in October 2008, the following improvements were implemented for 2009:

- To minimize risk associated with the Residential Internship, student advisors were hired to support the chaperones at each center.
- Students who lived within the commuting of the Center and selected to participate in the Residential Internship would not be allowed to opt out of the residential component. To ensure students shared in the after work and teambuilding activities.
- Sunday would be a day of rest with no scheduled activities
- Chaperone and student advisor training included orientations regarding emergency planning unique to each center and locality

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION (*THIS IS WHERE FURTHER FOLLOW-UP TO OCCUR FOR COLLECTING 2009 GRANTEE PERFORMANCE SUMMARIES FOR PUBLISHING TO OUR EDUCATION HOME PAGE*)

As the primary project partner, Oklahoma State University (OSU) provides administrative support for project implementation such as:

- Logistical support,
- Chaperones and student advisors who provide supervision during off work hours for students participating in the Residential Internship,
- Coordination and payment of transportation expenses and stipends
- National recruitment efforts,
- INSPIRE OLC capability

To broaden the underrepresented and underserved student participation, OSU has partnered with the National Science Foundation's Louis Stokes Alliances for Minority Participation (LSAMP), the American Indian Science and Engineering Society (AISES), and is working with Hispanic Serving Institutions. Internal evaluation of the project is done through the Technology for Learning Consortium, Inc.

As a result of a 2008 solicitation through the Space Grant Consortium, the following academic institutions were selected to provide INSPIRE's two-week residential, on-campus Collegiate Experience:

- The University of Puerto Rico (Rio Piedras campus)
- Virginia Polytechnic Institute and State University (Virginia Tech)
- South Dakota School of Mines and Technology