Glenn Informal Education

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Background

Glenn Research Center's Educational Programs Office and Visitor Center will work together to develop NASA STEM education activities, including exhibits, events and materials that address one or more of the NASA Education Outcomes and align with NASA Education principles, and state or national standards/needs. The goal of the project is to create alliances among the NASA Glenn Educational Programs Office and the Visitor Center that outlasts the funding. NASA Glenn will utilize the funding to accomplish 5 projects: development of a NASA Constellation Gallery at the NASA Glenn Visitor Center, upgrade of the Solar System Gallery at the NASA Glenn Visitor Center, develop a partnership with the Great Lakes Science Center that will result in a NASA gallery at their venue, development of a an immersive and interactive Lunar Base simulation, support of the agency's presence at the Smithsonian Folklife Festival and support for NASA 50th anniversary events.

Constellation & Solar System Galleries

NASA Glenn Visitor Center, Cleveland, OH
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PROGRAM DESCRIPTION

The Solar System Gallery is one of the main galleries in the Visitor Center that educates the general public about our Solar System. The Constellation Gallery will explain how NASA will explore the next frontier in the Solar System. These galleries will include the Return to the Moon Discovery Path curriculum which has been aligned to the National Science and Mathematics Standards.

PROGRAM RELEVANCE TO NASA

The Solar System and the Constellation Gallery directly applies to NASA and specifically the Exploration Systems Mission Directorate (ESMD) which includes demonstrating NASA's priority of returning to the Moon and going beyond.

PROGRAM BENEFITS TO SOCIETY

NASA's Space program has provided many benefits to society, not only nationally but internationally as well. Some of these benefits include: health & medicine, transportation, public safety, consumer recreation, environmental, computer technologies, etc. These technologies have been developed with NASA humans exploring low earth orbit. The next generation of vehicles will enable humans to explore high earth orbit; the moon, mars, and beyond. The nearly 70,000 guest who visit the Glenn Visitor Center each year will get an opportunity to experience and to be educated on Glenn's, and the Agency, role in the exploration of Space.

PROGRAM GOALS
The following are the goals of this program: (1) develop NASA STEM education activities, including exhibits, events and materials that address one or more of the NASA Education outcomes (2) align with NASA Education principles, and state, or national standards/needs (3) create alliances among the NASA Glenn Educational Programs Office and the Visitor Center that outlasts the funding, become self-sustaining (4) develop "hands-on" activities that will enhance and educate the general public.

PROGRAM ACCOMPLISHMENTS
Phase 1 of the Constellation Gallery has been completed. Drawings have been developed and preparatory work has begun to complete phase 2 of the project. Some major components have been purchased or ordered, including: The base for the Ares I and Ares V models. Materials have been procured that was used to rehab and refurbish the existing structures and exhibits. The labor hours for this task are accounted for as well.

Lunar Base Design and Exploration (LunarSim)

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PROGRAM DESCRIPTION
LunarSim will engage students in the design, construction, and exploration of a lunar base. Students will begin by selecting lunar elements from a design palette and placing them on a two-dimensional grid representing the Lunar Surface. LunarSim will mimic the operation of a real base so students will have to consider the various costs (Dollars, Power Usage, Oxygen Usage, etc …) and benefits (Productivity, Power Generation, Overall health of crew, etc …). Students will receive continuous feedback on their design and can make changes at any time to obtain a better cost vs. benefits ratio similar to the goal of a real mission engineer. When the student is happy with his/her design, they can chose to walk around and explore their base design in 3-D.

PROGRAM RELEVANCE TO NASA
The LunarSim software relates directly to the work of the Exploration Systems Mission Directorate (ESMD) to design a lunar base for our first permanent human presence on the moon. LunarSim will engage students in an engaging and educational activity that encourages them to think like engineers as they construct a lunar base and then explore it.

PROGRAM BENEFITS TO SOCIETY
LunarSim will be designed with special features which make it perfect for usage in informal education centers such as museums and science centers to engage the public in a simulation of one of NASA's most exciting endeavors. LunarSim will also be valuable in middle and high school classrooms and in private homes. LunarSim will be distributed free for the PC and MAC via. web download and on DVD.

PROGRAM GOALS

The goals for LunarSim are (1) captures a student's attention and engages them in a fun, creative, and challenging activity to design and explore a lunar base, (2) helps students discover the engineering challenges of designing and exploring a lunar base and (3) inspires students to excel in Science, Technology, Engineering, and Mathematics (STEM) coursework in school and encourages them to pursue careers in STEM disciplines.

PROGRAM ACCOMPLISHMENTS

LunarSim is under development so we have not used it yet. However, listed below are our accomplishments so far as well as what we expect to accomplish in the coming year (2009).

Milestones completed during 2008 … Sent out a solicitation for RFP for the development of LunarSim, an immersive and interactive simulation where students can design, build, and explore a lunar base. Evaluated RFPs and select a developer to develop LunarSim based upon proposals/quotes received.

Milestones expected to be completed during 2009 … Our selected developer will begin development of LunarSim. NASA GRC EPO and NASA subject matter experts will collaborate with developer throughout development and during several scheduled design reviews to assure authenticity, and educational content. During 2009, the following tasks will be completed (or started) …

Application Foundation development
Parametric Simulation engine development
And will begin … Visual programming Language gui development

There are two types of delivery milestones within the tasks: design
deliveries that will provide high-level designs and screen mock-ups for review by the NASA EPO, and unit deliveries that will provide executables of individual software components for unit test by the NASA EPO.

Monthly status reports on the developer's progress will be sent to the LunarSim POC from the NASA GRC EPO.

Great Lakes Science Center Partnership (GLSCP)

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PROGRAM DESCRIPTION

The NASA Glenn Research Center Educational Programs Office will enhance it's partnership with the Great Lakes Science Center by implementing the Return to the Moon Discovery Path Modules and other Exploration Systems Mission Directorate (ESMD) content into a new NASA exhibit at the Great Lakes Science Center. Through this partnership, NASA will provide the subject matter experts and content on the U.S. Space Exploration Policy as well as a grant to the Great Lakes Science Center. The Great Lakes Science Center has agreed to provide exhibit development, fabrication and maintenance support to ensure the sustainability of the exhibits beyond the completion of the grant period.

PROGRAM RELEVANCE TO NASA

The Great Lakes Science Center Partnership (GLSCP) will utilize ESMD themed content provided by NASA, to create stimulating experiences for science, technology, engineering and mathematics (STEM), learning outside of formal classroom environments through interactive exhibits. The GLSCP establishes a linkage between informal and formal education while supporting the NASA Informal Education goals to:

Engage the public in shaping and sharing the experience of exploration and discovery.
Improve public understanding and appreciation of science and technology, including NASA aerospace technology, research, and exploration missions.

PROGRAM BENEFITS TO SOCIETY

For the past 7 years NASA Glenn has been developing plans for an Aerospace Education Center, the Return to the Moon Discovery Path (RTMDP) is an outcome from past studies that consisted of K-12 teachers, informal educators and NASA content experts to determine how best to deliver NASA content through a education center setting. The curriculum contains pre and post visit materials as well as interactive exhibits that introduce students to the science and math concepts surrounding NASA's return to the Moon and eventual journey to Mars. All materials developed have been aligned to the National Science and Mathematics Standards and have been beta tested with students. The GLSCP will use the RTMDP and other ESMD themed content to engage students in space concepts using mathematics, science, and technology; and in providing teachers with a model for infusing STEM – science, technology, engineering, and mathematics in their instruction.

PROGRAM GOALS

The overall goal of the GLSCP is to create a sustainable alliance between the NASA Glenn Educational Programs Office and the Great Lakes Science Center. The GLSCP will result in a NASA gallery at their venue which provides instructional materials (and information) derived from NASA research and scientific activities (ESMD themed content) that meet the needs of NASA's informal education partners. This partnership supports the following outcomes, objectives and output measures:

Education Outcome III: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission
Objective 3.1: Provide informal education support resources that use NASA themes and content to 1) enhance participant skills and proficiency in STEM disciplines; 2) inform participants about STEM career opportunities; 3 communicate information about NASA's mission activities
Output Measure 3.1.1: Number of museums and science centers across the country that actively engage the public in major NASA events

PROGRAM ACCOMPLISHMENTS

The following highlights current accomplishments for the GLSCP:

Several planning meetings/discussions have been held with the Visitor Center Contractor to establish the GLSCP
A letter of Intent has been issued by the Visitor Center Contractor to the GLSC
Pending receipt of the final proposal from the GLSC detailing partnership deliverables including exhibit development, fabrication and installation the final contract will be issued
ESMD Content experts have been identified to support the GLSCP
A NASA ESMD content exchange meeting is tentatively schedule for December 11, 2008