

NASA Explorer Schools Project

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PROJECT DESCRIPTION

NASA Explorer Schools (NES) is NASA's flagship middle and high school national education project focused on stimulating STEM (science, technology, engineering, and mathematics) education. NES provides teachers with resources that link classroom learning to real-world NASA activities, offering unique opportunities to directly engage students in NASA's missions and to connect classrooms with expert STEM professionals.

Participation in the NES project offers:

- Searchable **Lesson Library** linking STEM classroom subjects to NASA's innovative research and scientific discoveries
- **Professional development** and support to help educators implement NASA lessons into the classroom
- Weekly **NASA Now classroom videos** featuring NASA careers and STEM concepts connected to real-world missions and projects
- NASA experts in classrooms through **monthly online video chats**
- **Collaboration tools** for gathering and sharing ideas and resources with other NES educators and NASA staff
- **Recognition opportunities** for educators, students, or schools for innovative integration of NES teaching materials and exemplary use of best practices in STEM education
- **Live Help Desk** support available during standard business hours to help participants find what they need

NES harnesses the internet and Web2.0 technologies to minimize the barriers to participation so that teachers and students—regardless of school type, geographic location, or student demographics—can take advantage of unique learning opportunities designed to inspire student interest in NASA, STEM topics, and related careers.

PROJECT GOALS

Recognizing the importance of engaging students throughout their formative middle and high school years, NES aims to inspire a meaningful interest in STEM topics by providing educational experiences developed around NASA's unique missions. NES works to build teacher content and pedagogical knowledge around NASA resources through professional development delivered across distance learning platforms designed to assist teachers in developing student aptitudes in STEM.

Academic research indicates that learning becomes meaningful when students connect it to their lives and are involved in hands-on activities. To that end, the NES project was designed to directly involve students in technology and scientific instruments, their community, and with science-interested partners. NES resources and student engagement activities expose students to a variety of STEM careers and give students a sense of relevance by linking STEM classroom topics to real-world NASA activities.

PROJECT BENEFIT TO NASA EDUCATION OUTCOMES

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

NES brings the excitement of NASA's missions into thousands of classrooms across the country, delivering innovative STEM educational experiences to students in grades 4-12. During the 2010-2011 school year NES offered twenty (20) of NASA's top inquiry-based educational products, including lesson plans and classroom activities that support a broad variety of STEM topics. In addition, NES engaged students directly in NASA's work and research by offering interactive student opportunities, including thirty nine (39) exciting weekly videos highlighting current NASA missions, called NASA Now classroom videos, as well as twelve (12) live video chats that allowed students to pose questions directly to NASA experts and gain insight into STEM related careers. Evaluation findings indicate that the NES project delivers attractive, high-quality educational experiences to students, helping to inspire, engage, and prepare a new generation of future scientists, technicians, engineers, and mathematicians.

NES provides virtual professional training to educators to facilitate teachers' ability to implement NES resources in the classroom and to enhance students' proficiency in STEM topics. In 2010-2011, NES had 1,518 educator attendees at 85 live instructor-led professional development web seminars. In addition, forty (40) training modules featuring NASA lessons and curriculum support materials were available on-demand to facilitate flexible project participation

NES extends its reach beyond the classroom by recognizing innovative use of NES resources and exemplary demonstration of promising educational practices. In 2010-2011, NES recognized teachers who integrated a variety of NES resources into their classroom curricula, incorporated technology into the classroom, leveraged community partners to provide a real-world STEM connection, and engaged students' families in NES learning opportunities.

PROJECT ACCOMPLISHMENTS AND CONTRIBUTION TO PART MEASURES

In the 2010-2011 school year, NES was successful in both recruiting a broad base of teachers, as well as motivating them to participate in NES project offerings. In Y1, NES recruited 1,709 educators from over 1,300 schools to participate in the project. NES participants represented classrooms from grades 4-12, covered all STEM subjects, and came from rural, suburban, and urban areas across all 50 states. Additionally, NES had an international presence in Department of Defense or State Department schools in Turkmenistan, Mexico, Romania, Spain, Germany, Japan and the United Kingdom. Many NES participants taught at economically disadvantaged schools (44% of teachers came from schools where a majority of students received free or reduced lunch) and many teachers (41%) represented schools where more than half of the students identified as minorities. The diversity of NES participants validates the broad applicability of NES offerings regardless of geographic location, school funding, or student demographics.

In 2010-2011, NES contributed to the following NASA Annual Performance Goals:

1. 75,000 educators participate in NASA education programs: **1,709 educators participated in the NES project in the 2010-2011 school year**

2. 600,000 elementary and secondary students participate in NASA instructional and enrichment activities: **NES participants recorded engaging 32,225 elementary and secondary students in NES-related classroom activities**
3. 75 percent of elementary and secondary students express interest in STEM careers following their involvement in NASA education programs. N/A¹

Using the NES Virtual Campus as a platform, project educators recorded 673 direct engagement activities with students across grades 4-12. These interactions included participation in NES featured lessons, engagement with NASA Now classroom videos, and involvement in the NES Virtual Student Symposium. Additionally, NES documented more than 3,200 direct interactions with educators across grades 4-12. NES participants logged participation in more than 1,800 individual NASA-related educational activities. Survey feedback reinforced the value of project activities, as almost all teachers “strongly agreed” or “agreed” that NES resources were easy to implement, aligned to existing curricula, and engaging to students.

In addition to receiving positive feedback from teachers, NES was recognized by a number of industry and educational organizations in Y1. The NES model was honored as a Laureate Finalist by Computerworld magazine for the project’s innovative use of technology to reduce barriers to high quality STEM education in the nation’s classrooms. Additionally, NES’s NASA Now team won a Telly Award at YouTube’s People’s Telly Awards, as well as a Remi Award at the WorldFest-Houston International Film and Video Festival, for the high quality production of the weekly web events. These awards validate the project’s relevance in the broad STEM education realm and the impact of NES educator opportunities.

IMPROVEMENTS MADE IN THE PAST YEAR

Throughout 2010-2011 NES monitored participation rates, teacher feedback, and website analytics to assess the effectiveness of NES project offerings in supporting classroom teaching. This continuous analysis enabled NES to make a variety of data-driven refinements to project strategies on an ongoing basis, particularly around recruitment, communications, and website functionality.

- While the project experienced significant organic growth in the first year, NES was able to refine its recruitment tactics to enhance the natural expansion of the project. By focusing its recruitment pitch for in-person conference events, NES delivered a clearer and more concise message on the benefits of NES participation and consequently got more than three times as many registrations from conferences in March as it did in February
- NES identified an opportunity to leverage its suite of communications tools to shift participation trends in an upward fashion midway through the year and designed six strategic communications campaigns to reengage the NES community with action-oriented messages. Using the Virtual Campus data tracking capabilities, NES assessed the effectiveness of the campaigns and documented notable shifts in participation; by better advertising its resources to relevant audiences, participation in NES’s core activities more than doubled in early 2011

¹In 2010-2011, the NES project encountered fairly significant delays in obtaining OMB approval for its data collection tools and for its overall evaluation approach; as such, NES was unable to collect or include student-level data in the yearly evaluation

- Throughout year, NES refined the web platform and project website to enhance the user experience. NES modified surveys to improve the granularity of project data and rolled out “How-to” videos to assist potential and current teachers in navigating various aspects of the Virtual Campus. NES also tracked Help Desk submissions to identify areas of improvement in website text and navigation

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

NES works to build relationships with educational organizations to ensure that NES’s project strategies promote exemplary classroom practices and that the core educational offerings align with real classroom needs. NES leveraged the expertise of the National Science Teachers Association (NSTA), International Center for Leadership in Education (ICLE), and International Technology and Engineering Educators Association (ITEEA). These partners validated NES’s value to the broad education community and confirmed NES’s alignment to nationwide STEM efforts. NES also actively reached out to the US Department of Education’s Math and Science Partnership program to align resources and support to broader STEM reform efforts. NES publicized its offerings across its partners’ networks of educators to expand the project’s reach, as well as cross-promoted the partners’ educational opportunities to encourage in-depth engagement with STEM topics.

In addition, a majority of NES professional development content is delivered through the NSTA Learning Center. The award-winning NSTA Learning Center provided access to 40,000 NSTA member science teachers for recruitment and participation in NASA educational offerings. NES integrated the project’s Virtual Campus with the NSTA Learning Center to leverage the strengths of both resources. NES also offered educators the opportunity to earn up to two free Continuing Education Units through Oklahoma State University.