

NASA Aerospace Education Project
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PROJECT DESCRIPTION

The Aerospace Education Services Project is a comprehensive project designed to reach out to the formal and informal education communities in all fifty states and the U.S. territories. The AESP staff consists of education specialists who are professional educators assigned to NASA centers. The AESP education specialists share NASA's use of emerging instructional technologies and the motivating outcomes of NASA's research, exploration and discovery with education communities and the public. The AESP primary focus is a professional development effort that serves the elementary and secondary education community by providing classroom demonstrations, distance learning events, in-service training for educators, pre-service training for university students, and identification of appropriate NASA education resources. The project also motivates students to continue their study of science and mathematics throughout their school career and encourages them to pursue the NASA workforce pipeline.

PROJECT GOALS

All AESP activities are designed to support the NASA Education Strategic Framework. AESP works to attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty. AESP focuses its efforts to meet the following goals:

1. Work closely with higher education to strengthen pre-service and in-service teacher education at colleges and universities where NASA R&D is conducted.
2. Shift the focus of Education Specialist school visits from one-time visits and school assemblies to efforts that strengthen university-based professional development.
3. Participate strategically in conferences such as state and regional science teachers' meetings.
4. Work early with new NASA projects that are planning K-12 components, to contribute ground-truth perspective on the actual needs of teachers, state curriculum standards, and mechanisms for training and dissemination.
5. Facilitate collaborations between K-12 schools and university and industry-based scientists and engineers.
6. Utilize technologies to reduce distance, deliver customized solutions, and support collaboration.

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 AESP Project align to Outcome 2 of the 2006 NASA Education Strategic Coordination Framework (<http://education.nasa.gov/about/strategy/>) which works to “attract and retain students in STEM disciplines.”

AESP provides educators and students with tools, experiences and opportunities to further their education through educator workshops, classroom demonstrations, parent programs and classroom resources. Informal education programs and activities are conducted at science centers, museums, and related facilities.

In FY09, 12,362 educators participated in AESP STEM professional development opportunities. A follow-up survey of a sample of teacher participants indicates that, among those who attended professional development, 72% subsequently used NASA resources in their classrooms.

AESP offers student programs to engage and retain students in STEM education and encourages them to pursue educational disciplines that are critical to NASA’s future engineering, scientific, and technical missions. Through AESP, 84,607 students participated in NASA instructional and enrichment activities in FY09.

PROJECT ACCOMPLISHMENTS

1. Eleven proposals were competitively funded to develop standards-based and sustainable courses for pre-service and in-service teachers using NASA STEM content. Eleven courses were developed and delivered to approximately 197 pre-service and in-service teachers. Three universities plan to include the courses as part of their course catalogs. Three of the developed courses will be offered as continuous virtual university or distance learning courses. Three courses are planned to be offered as yearly summer teacher workshops, summer and/or school-year evening institutes. One course will be part of NASA’s Educator Resource Center regular offerings. One course will be part of an ongoing public school district’s professional development course. AESP’s second national competition for college/university proposals for funded collaborations in teacher education has yielded 24 proposals (Oct. 2009), which will be competitively reviewed for approximately 10 awards in 2010.
2. AESP received funding from the Exploration Systems Mission Directorate (ESMD) competitive solicitation entitled “Workshops Helping Educators Explore and Leverage STEM (WHEELS)” to support 16 regional events across the US that coincided with visits by the trailer-based *NASA Exploration Experience*. AESP Education Specialists provided half or full-day teacher professional development workshops, student-centered activities in educational settings, and ancillary events to engage the general public. The workshops prepared teachers to use select ESMD materials, and featured a suite of content and activities to reflect current understandings about the needs of both teachers and school-age

- learners. The workshops also built upon other professional development initiatives to amplify the impact of short-duration professional development.
3. Several specialists have accepted positions on national education organization boards and/or their working committees.
 4. The number of student participants increased during FY09 due in part to the deployment of the Robots on the Road Program and AESP's partnership with ESMD-funded WHEELS.
 5. National conference participation is strategically planned so that the major conferences have representation and the specialists are assigned by their identified areas of expertise. State and local conferences are typically assigned to the specialists assigned to particular regions unless a specific area of expertise is needed.
 6. AESP is actively engaged in developing ways to participate meaningfully and early in the development of new NASA education and public outreach products. Several specialists are engaged in projects at the Center level which utilize their specific expertise in product development.
 7. AESP specialists have worked throughout the US to build relationships with school administrators and teachers through series of meetings focusing on the strategic development and delivery of programs that meet the needs of those schools. In so doing, AESP is customizing their efforts to provide STEM content in ways that make sense to the schools while demonstrating the role of NASA educational materials in teaching and inspiring students.
 8. AESP specialists have transitioned many of their workshops so that they may be offered using virtual and online technologies. Long duration professional development is more easily sustained through the use of these methods of delivery.
 9. Each specialist was provided the support needed to assist in their efforts to improve their delivery of STEM content and to broaden their knowledge of NASA content. A specialist-led Career and Recruitment Working Group created an inventory of specialists' expertise to help identify areas in which training is needed.
 10. The new traveling program, *Robots on the Road*, was deployed in FY09 first on a pilot basis, then as a compliment to the trailer-based *NASA Exploration Experience*, and subsequently through direct contact with potential classroom visits along a predetermined path. The program has been enthusiastically received by the schools as an effective student program which both delivers STEM content and inspires students to pursue STEM careers.

PROJECT CONTRIBUTIONS TO PART MEASURES

PART measure 7: Percentage of elementary and secondary educators "who haven't participated in intensive NASA training programs and use" NASA content-based STEM resources in the classroom

7999 teachers participated in AESP short-duration (< two days) professional development opportunities in FY 2009. Over 70% of the teachers who attended short-duration professional development subsequently used NASA STEM resources in their classroom instruction.

PART measure 8: Percentage of elementary and secondary educators who participate in NASA training programs who use NASA resources in their classroom instruction.

6,625 teachers participated in AESP long-duration (> two days) professional development opportunities in 2009. 2,262 of the participants in long duration workshops were teachers affiliated with the NASA Explorer Schools (NES), and 4,363 participants were not directly affiliated with the NES project.

PART measure 9: Percentage increase in number of elementary and secondary student participants in NASA instructional and enrichment activities.

84,607 students participated in AESP-led NASA instructional and enrichment activities

IMPROVEMENTS MADE IN THE PAST YEAR

Collaborations

AESP's successful competitive award from ESMD WHEELS demonstrated our ability to leverage other resources and, in turn enable other projects to take advantage of AESP's ability to deliver services nationwide.

Management

The addition of Deputy PI and Business Manager to PSU AESP staff has improved day-to-day management and project execution and reporting.

PROJECT PARTNERS

- Penn State has a subcontract with the National Space Grant Foundation to administer a competitive grants program to fund higher education members of Space Grant Consortia to support professional development courses aligned to state standards and needs. The project plans to support a competition each year.
- AESP works closely with the NES project and other NASA Education Office and mission-originated EPO efforts.
- AESP is actively engaged in shaping and supporting new NASA and NASA-related grant proposals, with the goal of leveraging other resources and, in turn enabling other projects to take advantage of AESP's ability to deliver services nationwide.