

NASA Aerospace Education Project
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Michelle Ferebee, AESP Project Manager
Langley Research Center
757-864-5617

PROJECT DESCRIPTION

Aerospace Education Services Project (AESP) is NASA's primary professional development program, responsible for:

- Assisting STEM educators in understanding how to incorporate NASA's research and education portfolio to develop engaging, innovative, and research-based learning activities.
- Creating synergy among STEM educators and NASA scientists and engineers across the Nation.

AESP staff consists of Education Specialists who are experienced STEM teachers located at NASA's 10 Centers. AESP provides customized and unique professional development programs for educators in all fifty states and US territories that are aligned to local, state and national standards which lead to high quality STEM training and sustainability. AESP serves the elementary and secondary education community as well as informal educators by providing in-service training for educators, pre-service training for university students, classroom demonstrations, distance learning events, and identification of appropriate NASA education resources. AESP has established the NASA Online Educators Network (NEON), an online learning community, for educators that provides opportunities for professional development and training based on education research which reflects current and future NASA science and exploration missions. 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 FY10, 17,231 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, approximately 69% subsequently used NASA resources in their classrooms.

AESP offers student programs in support of professional development efforts 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, 110,468 students participated in NASA instructional and enrichment activities in FY10.

PROJECT ACCOMPLISHMENTS

1. AESP educational specialists have reached 14,154 in-service and 3,077 pre-service teachers through professional development workshops and activities. In addition, another 5,554 educators have been involved with other activities conducted this year.
2. Student presentations as part of school visits, along with public demonstrations to children and adults in support of NASA-related education and outreach efforts, continue to be important component of AESP specialists' workloads. 280 school

visits has resulted in AESP reaching 110,468 students and 18,939 adults in these settings.

3. Specialists conducted 39 Digital Learning Network (DLN) presentations as part of their FY2010 efforts. Using this form of distance technology 289 teachers, 3,021 students, and 135 adults (a subset of the numbers listed above) were reached.
4. AESP began developing a web-based peer-to-peer educator professional development site, the *NASA Educator Online Network* (NEON), earlier this year. With 1,748 enrolled educators, scientists, engineers, and NASA staff, NEON continues to grow through the personal invitations extended to educators through AESP workshop visits. Regular webinars designed to demonstrate NASA educational products via hands-on demonstrations by AESP education specialists and utilizing DLN studios and staff have begun, reaching 179 teachers and 383 students, and will continue.
5. AESP has also been heavily involved with Summer of Innovation (SOI) activities this year. Specialists have been involved with 296 events this year, and reached 16,245 middle school students during the period. Overall, SOI work has included 30,739 students, 5,358 in-service and pre-service teachers, and another 705 teachers who were present during these events. (*These numbers are a subset of previously tabulated totals.*)
6. Workshops Helping Educators Explore and Leverage STEM (WHEELS) is an Exploration Systems Mission Directorate (ESMD) funded project for AESP to provide educator professional development “tie-in” activities that coincide with Exploration Experience visits across the country. In FY10, 22 WHEELS events have been supported and 248 in-service teachers have received instruction in using ESMD-developed materials in the classroom. AESP has also worked with 11,664 K-12 students and 1,005 post-secondary students at these events, with 1024 adults who were also present.
7. National Space Grant Foundation (NSGF) conducted AESP’s second and final national competition for college/university proposals for funded collaborations in teacher education. Twelve proposals were competitively funded to develop standards-based and sustainable courses for pre-service and in-service teachers using NASA STEM content. The 2010 awardees are listed below. The FY09 NSGF awardees developed courses and delivered coursework to more than 100 pre-service and in-service teachers. FY09 awardees have additional workshops planned for FY11.

FY2010 NSGF Awards

Institution/PI

Fort Hays University
TAMU Commerce
North Kentucky University
Pennsylvania State University/Nelson
Ripon College

Hampton University
Cornell University
University Nevada Reno
University Central Arkansas
College of Charleston
University Tennessee Chattanooga
Rensselaer Polytechnic Institute

8. Several specialists continue to serve on national education organization boards and/or their working committees such as the National Science Teachers Association (NSTA) John Glenn Science center task force and the Washington state Education Leaders Advisory Board
9. In FY10, AESP Education Specialists attended 69 conferences. National conference participation included the National Science Teachers Association, National Science Education Leadership Association, The GLOBE Foundation, the National Council of Teachers of Mathematics, the Space Exploration Educators Conference, and the Association for Supervision and Curriculum Development, along with many state and regional conferences in STEM teaching
10. 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 to meet the specific needs of the schools while demonstrating the effective use of NASA educational materials in teaching and inspiring students. Meetings have been held between AESP specialists and state space grants (e.g., Oregon, New Mexico, and the Rocky Mountain Consortium), state departments of education (New Mexico, MA Governor's STEM Advisory Council, Kentucky, and the 21st Century Skills Ohio), museums (Franklin Institute, Wings of Eagles, and the Columbia Memorial Space Center) over the past year.
11. 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. The NASA Educators Online Network (NEON), provides a virtual community of professional educators access to NASA content and allows the participants to share best practices of those who use the NASA content in their classrooms on a national scale. By providing educators with this forum to learn from peers, teachers will provide each other with extended professional development under the guidance of AESP specialists who will facilitate their discussions and provide NASA content offerings aligned with state and/or national standards in Math, Science, and Technology on an ongoing basis. The webinar series being offered through NEON – hour-long webcasts offered to teachers to introduce them to NASA products – is operational. Recent offerings have included a tour of the Solar System, solar system mathematics aimed at middle school teachers, the sun, earth, and moon, animals in space, and meteor showers. These webinars serve as introductions to teachers who may not be familiar with NASA Educational resources and, as importantly, provide hands-on demonstrations that each could put to use in their classrooms.
12. AESP Education Steve Culivan was awarded the NASA Frontline Award this past year

for his work in developing the “Mass vs. Weight” curriculum out of Stennis Space Center. Culivan’s work was representative of the work AESP education specialists do in developing new products to assist in both educational goals as well as public outreach efforts

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

14,121 teachers, both inservice and preservice, participated in AESP short-duration professional development opportunities in FY 2010. 69% of the teachers surveyed 120 days after attending a 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.

3,310 preservice and inservice teachers participated in AESP long-duration professional development opportunities in FY 2010. Based on the results from the 120-day follow-up surveys, 65% of educators use NASA resources after participating in a long duration teacher professional development workshop. Majority of these teachers are pre-service teachers and would not be able to answer most of the questions on the 120-day follow-up surveys.

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

110,468 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 was renewed for a 2nd year, which demonstrates our ability to leverage other resources and, in turn enable other projects to take advantage of AESP to deliver services nationwide.

Summer of Innovation – AESP has been involved in this initiative primarily to provide professional development for educators who later conducted student programs. Education Specialists also helped NASA Centers identify partners with whom they could work to meet their targets and identified appropriate NASA resources to use in student programs.

NASA Explorer Schools and NASA Educator Resource Centers are exploring ways to use the NEON community to enhance their programs.

Management

A new Principal Investigator joined the AESP Project in January of 2010 and a new Director, a former AES Specialist, in April of 2010. The addition of a Deputy Director to PSU AESP staff has improved day-to-day management and project execution and reporting.

PROJECT PARTNERS

- AESP has collaborated state space grants (e.g., Oregon, New Mexico, and the Rocky Mountain Consortium), state departments of education (New Mexico, MA Governor's STEM Advisory Council, Kentucky, and the 21st Century Skills Ohio), museums (Franklin Institute, Wings of Eagles, and the Columbia Memorial Space Center)
- 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. This subcontract is in it's last year.
- AESP works closely with the NES project and other NASA Education Office and mission-originated EPO efforts, in addition to the following other projects:
 - The Global Learning and Observations to Benefit the Environment (GLOBE)
 - Simulation based Aeronautics Educator professional development pilot
 - Science Mission Directorate Education and Public Outreach Forums
 - *Learning Environments and Research Network (LEARN)*
 - Teaching from Space
- 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
 - Global Climate Change Education Grant with Queens College
 - Texas STEM Centers (funded from a Math and Science Partnership Grant
 - Energy Education Grant Proposal funded by the state of Kentucky