



Service and Leadership in Aerospace Education: Narrative

In operation since 1990 the primary goal of aerospace education in Delaware has been to focus on applied learning hands-on training and experiences through all of the programs offered. All participants are continually challenged to think, create, solve, build, and work cooperatively. All programs are standards based and designed to integrate the study of science, technology, engineering, and mathematics using Earth and Space Education as the unifying framework.

The vision is to create an exceptional learning environment that inspires teachers, students, children and their families and the general public with a sense of appreciation for the Earth and its place in the universe

Workshops, school field trips, events, summer aerospace academies are designed to use STEM resources and programs to provide exposure and experiences for teachers, students and their parents and the general public to support the enhancement of knowledge and skills, and to provide access to information in science, mathematics, technology, engineering, and geography. STEM based content directly affects the tone, credibility, and motivation of the participants in planning their own curriculum and programs. Participants receive interdisciplinary educational materials and training, current resources and information that can immediately be applied in their classrooms and learning environments. All programs strive to build strategic linkages between STEM formal and informal education providers that promote STEM literacy and awareness of aerospace education.

Venue: Workshops, Saturday Explorations, STEM Events and Astronomy Programs are coordinated throughout the year. Information about NASA missions is communicated and aerospace resource materials are distributed. Cooperative challenges are used in all sessions. They are supplemented by presentations, lectures, on-site training and tours, large group team building, computer simulations, videos, discussions, storytelling and some Language Arts activities.

Outcome Build strategic linkages between STEM formal and informal education providers that promote STEM literacy and awareness of aerospace education.

Objectives of the informal Educator and Student programs:

- Highlight STEM resources, opportunities and activities
- Focus on the very latest and current Earth and space science and technology information.
- Provide a systemic network that enhances and enriches classroom, standards-based experiences during the school year and summer.

- Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.
- Provide long-duration and/or sustained professional development training opportunities to educators that result in deeper content understanding and/or competence and confidence in teaching STEM disciplines
- Provide K-12 students with authentic first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers, as well as provide opportunities for family involvement in K-12 student learning in STEM areas
- Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.
- Provide curricular support resources that use STEM/NASA themes and content to a) enhance student skills and proficiency in STEM disciplines; b) inform students about STEM career opportunities; and c) communicate information about NASA's mission activities.

Objectives of the Partnership and Linkage Programs

- Provide STEM programs in conjunction with diverse organizations in the state: AAUW, 4-H, Girl and Boy Scouts, Girl's Inc., Girl's and Boy's Clubs, STEM Family Days, Department of Energy, Delaware Department of Natural Resources, DE Technical and Community College, CAP Education Programs, State and County Parks, corporate sponsors.
- Provide informal education support resources that use aerospace themes and content to a) enhance participant skills and proficiency in STEM disciplines; b) inform participants about STEM career opportunities; and 3) communicate information about NASA's mission activities. In addition, develop a significant pool of qualified presenters of aerospace content interacting with a large number of participants.
- Provide opportunities to improve the competency and qualifications of STEM informal educators, enabling them to effectively and accurately communicate information about STEM/NASA activities and access NASA data for programs and exhibits.

The primary mission of DASEF is to inspire and educate the people of the Delaware Valley in learning about the Earth's environment, space science, mathematics and technology through the use of the academies, presentations, symposiums, professional development, events and activities and the resources of the Environmental Outpost.

Supporting Evidence: Examples more can be found at www.dasef.org

I. Continuing Professional Development: Examples

1. Educator Eyes on the Skies

During this session, educators look back at the Earth and out into the Universe. They experience the StarLab, observe the stars in the Mountjoy Observatory using DASEF's 16" Meade Telescope. Each educator constructs their own Galileoscope telescope and then views the constellations and planets. Aerospace materials and NASA resources are distributed.



2. Earth Systems

The workshop is geared toward K-5th grade and pre-service teachers and focused on the understanding of how the Earth's systems interact and on how we can best manage the world around us without dramatically impacting the planet's ecosystems and disrupting the balance of nature. This workshop introduces educators to earth systems and remote sensing through the investigations and resources provided. The workshop training includes the use of Earth Walk™, a 16' X 20' floor map of the continental United States which features a high resolution satellite image with true life earth colors. Educators learn about DASEF's Planet Earth Outreach Program. NASA materials and resources are distributed.



3. Annual Goddard Space Flight Center Focus Day: Professional development for science educators day's activities can include a science content presentation about discoveries from Hubble Space Telescope and demonstrations of inquiry-based, classroom activities. During the demonstrations participants explored topics such as Light and Color, Infrared Light, Optics and Galaxies.



4. Educator Field Trips: Example

Teachers visit the National Air and Space Museum and have the opportunity to see hundreds of original, historic artifacts on display, 22 exhibition galleries, flight simulators, and the Albert Einstein Planetarium.



II. Continuing Student Programs: Examples

1. Rockets for Schools: School Challenges

This Statewide K-12 rocketry program is designed to assist teachers and CAP instructors as they use rocketry as the unifying theme for teaching STEM and non-traditional career choices, skills and technology. The NASA Rocketry Book is used to teach the Laws of Physics and a “how to guide” to construct the various rockets. Educators and students, Civil Air Patrol squadrons and ROTC cadets participate in the annual Rockets for Schools program held in May at Cape Henlopen State Park in Delaware.



2. **K- 8 School Field Trips** offered at the Environmental Outpost are Standards Based and designed to supplement the Delaware curriculum. Examples

For Kindergarten Classes:

“**In the Sky at Night**” - constellations in the Star Lab planetarium, moon study.

For First Grade Classes:

“**Cool Constellations and 8 1/2 Planets**” - constellations in the Star Lab planetarium, planet presentation.

For Second Grade Classes:

“**Floating and Flying: Moving Through Air**” – fold, fly, observe, record paper airplanes, short film on forces of flight; paper helicopters; make working models of maple seed and other floating seeds; make a simple kite.

For Third Grade Classes:

“**Sun, Wind, and Water: Nature’s Power Plant**” - solar viewer, tour solar-powered building, study the power of water and wind, design a device to harness power

For Fourth Grade Classes:

“**Silent Travelers: Earth, Moon, and the Planets**” - satellite photos of the lunar surface, earth, and the planets; star movement, lunar phases, solar system in the Star Lab planetarium; build a lunar rover

For Fifth Grade Classes:

“**EnLIGHTened by the Sun**”- reflecting with light mazes, prisms & the spectrum, measuring UV light, solar viewer.

For Sixth, Seventh, and Eighth Grade Classes

“Investigating Force and Motion” – Record results of movement of rolling balls of varying materials; calculate and graph their speed; demonstration of the transfer of energy through simple machines; investigate simple machines as used in various tools; small group work to design a device that combines simple machines to accomplish a task.

“Investigating Near Earth Objects” – Lunar study in StarLab planetarium including lunar phases; comparison of earth and lunar geology; Power Point presentation of physical features of planets; DVD - simulated mission to the Moon.

3. In its 22nd year, the **Delaware Aerospace Academy** run every summer has graduated over 5,850 K- 10 grade cadets.



4. **After school, evening and Saturday Exploration programs** are designed to serve all ages: families, organizations and youth agencies in the state.

