



## **NSTA Position Statement Aerospace Education**

### **Introduction**

The National Science Teachers Association (NSTA) believes that aerospace education is an important component of comprehensive preK–12 science education programs. Space exploration is a source of inspiration and captures our interest and curiosity (Bauman 1997; Fehr 1997; NASA 2006). More significantly, aerospace education provides compelling, powerful, and inherent opportunities to strengthen and support the teaching and learning of science, mathematics, and technology for students (A Journey to Inspire, Innovate, and Discover 2004). The true benefit of aerospace education is that it serves as a motivating theme for teaching these subjects, though not a new content area in and of itself.

“Aerospace” is a very broad term, defined as “aero,” or the atmosphere surrounding the Earth, and “space” as the region beyond the Earth’s atmosphere or beyond the solar system. From aeronautics, to the study of the Earth, to space science and its exploration of objects within the universe, aerospace continues to be a major frontier for discovery. The aerospace industry employs scientists and engineers from a myriad of disciplines and emphasizes teamwork among disciplines and nations. The industry’s commitment to developing the next generation of skilled workers has made its scientists and engineers a rich resource for science educators. Central to aerospace literacy is a student’s ability to gain and master critical-thinking skills that will prepare him or her to pose questions and solve problems. Aerospace offers a relevant context for the learning and integration of core content knowledge, makes numerous multidisciplinary and multicultural connections, and directly addresses content standards in many subject areas (NRC 2006).

Recently, numerous reports from business and government organizations have warned that the United States’ competitive edge among other nations is eroding. These reports—along with a series of bills introduced in Congress—call for an extensive effort to improve K–12 education in science, technology, engineering, and mathematics (STEM) and cultivate the next generation of skilled American scientists, engineers, technicians, and science and mathematics educators (BHEF 2007; Business Roundtable 2005; NAS 2007). Aerospace education provides an extraordinary opportunity to teach, and the context to learn, vital STEM topics. It also can inspire a greater number of our nation’s youth to pursue careers in STEM fields, (NASA 2005) while building a scientifically literate society that is better able to make informed decisions. Thus, aerospace education can be used as a vehicle to deliver the school curriculum.

Our country’s future success in aeronautics and space exploration is also at stake. A 2004 report indicates that the space exploration vision must be a priority for the nation and have a shared commitment from the President, Congress, and the American people (A Journey to Inspire, Innovate, and Discover 2004). Leaders from aerospace organizations, education groups,

government agencies, and members of Congress have requested that aerospace science have a greater presence in schools, with the goal of improving STEM education and revitalizing the aerospace workforce (LCASE 2005; NAA 2002).

## **Declarations**

While the following declarations are intended for preK–12 education, NSTA recognizes that they have direct implications for preservice faculty at the higher education level.

## **Elements of Quality Aerospace Education Programs**

High quality aerospace education programs and curricula should reflect the following features:

- foster observation, investigation, and creative thinking;
- promote scientific inquiry—the process of asking questions and conducting experiments—as a way to develop a deep understanding of the natural world (NSTA 2004);
- be developed with grade-appropriate materials and encompass hands-on, minds-on, and collaborative approaches to learning;
- address student outcomes as specified in various subject-matter standards, be grounded in sound research, and reflect the most current information and understandings in the field;
- Provide opportunities to connect science educators and their students with the broader aerospace science and technology community;
- provide students with interdisciplinary, multicultural, and multi-perspective viewpoints to demonstrate how aerospace exploration and research transcends national boundaries;
- address economic, historical, ethical, and social perspectives;
- use appropriate technologies such as modeling, simulation, and distance learning to enhance aerospace education learning experiences and investigations;
- be presented through both formal and informal learning experiences; and
- present a balance of aeronautics, space exploration, and robotics by offering a relevant context for learning and integrating STEM core content knowledge.

PreK–12 teachers of science, school and district leaders, and other key stakeholders should embrace the following key points:

- PreK–12 teachers of science should recognize the compelling and inherent opportunities of aerospace to strengthen and support the teaching of science and mathematics education, and where possible, integrate aerospace into the curriculum.
- PreK–12 teachers of science should seek out and participate in quality professional development opportunities to enhance their knowledge of aerospace and its application in meeting curricular requirements, and to gain exposure to practicing aerospace professionals.
- PreK–12 teachers of science should locate and use quality resources from NASA, the FAA, and other aerospace organizations to enhance and strengthen their curricula.
- School administrators and principals should support teachers in their efforts to integrate aerospace within science curricula.

- Collaborations among stakeholders in education, government, business, the community, and the media should be encouraged to coordinate the development and availability of aerospace educational resources.

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