

NASA Teaching From Space Project

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Administered via Cooperative Agreement between JSC and OSU
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PROGRAM DESCRIPTION

Teaching From Space (TFS) activities facilitate education opportunities that use the unique environment of spaceflight utilizing the Space Shuttle, the International Space Station (ISS), and other flight platforms. These activities are national in scope involving formal and informal education communities and other NASA Education projects. TFS involves K-12 educators, students, and higher education audiences. These educational opportunities are designed to inspire, engage, and educate educators and students in science, technology, engineering, and mathematics (STEM) disciplines using NASA unique content and resources. TFS provides K-12 educators and students with instructional and learning experiences utilizing NASA missions, content, people, and facilities. TFS on-orbit activities include Education Payload Operations (EPO), Education Demonstration Activities (EDA), ISS EarthKAM, Amateur Radio on the International Space Station (ARISS), and In-flight Education Downlinks. Ground based TFS activities include educational support to the Astronaut Office, facilitation of educational product content, and educator professional development. TFS also manages the Network of Educator Astronaut Teachers (NEAT), a national network of highly motivated educators.

PROGRAM RELEVANCE TO NASA

NASA believes that the “key” to future exploration is the ability to provide educators and students with tools, experiences, and opportunities to increase interest in and knowledge of STEM. NASA’s unique resources, including people, facilities, and content, can stimulate students to pursue higher levels of study in STEM related fields, which can ensure NASA’s future workforce.

PROGRAM BENEFITS TO SOCIETY

TFS addresses the critical shortage in STEM fields that the Nation is facing by providing tools, experiences, and opportunities to elementary and secondary educators and students to further their education and participation in unique NASA learning experiences that enhance their interest in STEM.

PROGRAM GOALS

All TFS activities are designed to support the NASA Education Strategic Framework. TFS works to attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.

TFS focuses its efforts to meet the following goals:

- Develop and provide NASA-unique experiences, opportunities, content, and resources to educators and students to increase K-12 student interest in STEM disciplines using the unique environment of spaceflight.
- Develop and facilitate a NEAT-like group of highly motivated educators.
- Build internal and external partnerships with NASA Program Offices and formal and informal education communities to create unique learning opportunities and professional development experiences.

PROGRAM ACCOMPLISHMENTS

The key TFS accomplishment in FY07 was successfully leading the Agency-wide education component of STS-118, the first flight of an Educator Astronaut. After spending years laying the groundwork, TFS brought together NASA Mission Directorates, 10 NASA Centers, numerous NASA

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Education projects, the Space Grant Consortium, the formal education community, and the informal education community to deliver a focused, comprehensive education campaign that used STS-118 to engage teachers and students throughout the nation.

On behalf of the Agency, TFS facilitated a multi-layered approach to deliver education activities and experiences that tied to the mission. This was accomplished in three phases:

Pre-Mission Phase

- Provided Professional Development sessions for educators that connected the STS-118 mission objectives to education activities
- Created and provided a workshop model and a toolkit to internal and external educators to support their efforts to engage formal and informal education communities in STS-118
- Developed an Engineering Design Challenge in partnership with the International Technology Education Association (ITEA)
- Collaborated with NASA Educational Technology Services to build and create content for an STS-118 website for educators
- Worked with NASA Centers to promote the mission and associated education engagement plan within their regions
- Promoted upcoming STS-118 opportunities including conferences and live In-flight education downlinks
- Utilized the Digital Learning Network to train and update the education community on mission content and opportunities
- Designed and implemented a proposal solicitation and selection process for STS-118 education downlinks

Mission Phase

- Coordinated all aspects of three major downlink events and one amateur radio contact with high profile host organizations across the country
- Successfully executed the complex task of flying an Education Payload that included two small collapsible plant growth chambers and 10 million basil seeds
- Planned and supported on-orbit operations that connected the education payload hardware with the ground based activities
- Represented NASA during numerous media interviews and press events

Post-Mission Phase

- Implemented the NASA Engineering Design Challenge: Lunar Plant Growth Chambers that provided educators and students the opportunity to design and build a lunar plant growth chamber and test their designs using space flown basil seeds. TFS coordinated every aspect of this STS-118 flagship activity including nationwide promotion, seed packaging and distribution, evaluation, and facilitating major events to showcase student achievement. Promotion and registration continues in FY08.

As a result of TFS efforts related to STS-118:

- Over 350,000 people participated in the live in-flight education downlinks
- 81 STS-118 workshops were held for over 3,000 educators.
- Over 12,000 students participated in STS-118 workshop events
- Over 1,100 students participated in the STS-118 Pennant Design Challenge

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OTHER PROGRAM HIGHLIGHTS

- TFS provided oversight for EarthKAM and Amateur Radio on the International Space Station (ARISS) that resulted in over 80,000 K-12 students experiencing real time engagement with on-orbit ISS crewmembers and hardware.
- TFS partnered with the U.S. Department of Education to facilitate a downlink between DC area high school students and ISS crewmembers. The downlink highlighted International Education Week, a joint initiative of the U.S. Department of Education and the U.S. Department of State. During the downlink, students and crewmembers had conversations in English, Spanish, Russian, and French. The event received wide media coverage and was attended by the U.S. Deputy Secretary of Education Ray Simon, NASA Assistant Administrator for Education Dr. Joyce Winterton, STS 118 Mission Specialist and Educator Astronaut Barbara Morgan, and Educator Astronaut Ricky Arnold.
- TFS supported ISS astronauts as they conducted 5 Education Demonstration Activities (EDAs). These demonstrations provided insight into basic scientific principles in a microgravity environment. Crewmembers described how common objects behave in a microgravity environment as well as how humans can live and work in space. Crewmembers discussed physical fitness activities, the processes and equipment necessary to provide the required life support and environmental controls for astronauts on the ISS, on-orbit free time activities, and the difference between playing sports on Earth and in a microgravity environment. The downlinked video was shared with internal and external education organizations for incorporation into education products.
- In conjunction with the U.S. Department of Education, TFS hosted the Teacher to Teacher Initiative workshop. TFS staff members coordinated NASA content including speakers, workshop presenters, and JSC tours. Workshop highlights included an ARISS contact with the International Space Station, and talks by Astronaut Don Thomas and Flight Director Matt Abbott. In addition to the workshops, tours, and speakers, information was shared on several NASA Education opportunities for students and teachers. Over 200 educators from across the country attended the workshop.
- The TFS Office coordinated five downlinks hosted by the informal education community. Students at the Adler Planetarium in Illinois, the Clay Center for Arts and Sciences in West Virginia, the Challenger Center in Alaska, the Challenger Center in Virginia, and the Discovery Center in Idaho had the opportunity to chat with crewmembers onboard the ISS and the Space Shuttle.
- Through joint efforts between Astronaut Chris Ferguson, TFS, Oklahoma State University, the Student Observation Network and NASA Explorer Schools (NES), 171 NASA Explorer schools and all Aerospace Education Specialists received education solar panels to use with students to increase their understanding of electricity and power and the variables that affect the operation of solar panels.
- In partnership with Oklahoma State University and the Aerospace Education Services Program, TFS provided spacewalking simulation kits to the Aerospace Education Specialists. The kits were the idea of Canadian Space Agency Astronaut Bob Thirsk. These "Teaming With Tethers" activity kits provide an opportunity for students to explore and better understand the challenges in replacing hardware during a spacewalk.
- TFS collaborated with the ISS Program Office and Astronaut Don Pettit to share the excitement of International Polar Year (IPY). The TFS team facilitated an audio contact between Pettit from Antarctica and NES participants in "Winter's Story Teacher Workshop" in Yellowstone National Park; supported a live discussion between Pettit in Antarctica and Sunita Williams onboard the ISS; and assisted with the creation of an IPY video.