

National Center for Earth and Space Science Education

Promoting Achievement. Inspiring Communities.

At a time when there is a great disparity in educational preparedness for students across America...

At a time when it should be the birthright of all students to an education that allows them to successfully enter the job markets of the 21st century...

At a time when America must inspire the next generation of scientists and engineers if we as a nation are to compete in the emerging technology markets of the 21st century...

Welcome to the future of science education. A future in which communities, educators, and the heroes of science join forces to instill the joys of learning in young minds. A future that promotes achievement, generates results, and kindles dreams of exploration in our children.

The National Center for Earth and Space Science Education is the nation's only institution that takes an entire community—thousands of grade K-12 students, their teachers, their families, and the public—to the frontiers of research. It is a cutting-edge approach reflecting the Center's core belief that it takes a community to educate a child. Programs are tailored to the educational needs of the community, provide an authentic view of science as a human endeavor, and are designed to both inspire and educate.

Bringing Heroes into the Classroom

Through the Center's programs, a new breed of heroes is born. The explorers of today—the current generation of scientists and engineers—provide a window on how science is really

done through personal visits to communities, and curricula they help develop. Gifted communicators, they inspire students, parents, and educators with their stories of real-world science and engineering. These are heroes who create a lasting appreciation for the majesty of the Universe and provide a pathway for the next generation to follow.

Delivering Excellence

The National Center for Earth and Space Science Education's programs reflect a commitment to strategic national needs in science, technology, engineering, and mathematics (STEM) education and workforce development through content designed to national standards in the Earth and space sciences, and customizable to local curricula; and an ability to address requirements of the No Child Left Behind Act (NCLB) of 2001, with special emphasis on underserved communities.

A Framework for Partnership

The Center's programs offer a vibrant framework for sustained partnerships at the local level, engaging school districts, museums/science centers, civic and business organizations, colleges and universities, and research organizations. Education and learning are woven into the fabric of a community, with parent and child, student and teacher, exploring the majesty of the Universe together.

The National Center for Earth and Space Science Education reflects a nearly 20-year heritage of programs at the local and national levels. Partners include the Smithsonian Institution, NASA, the Universities Space Research Association and its over one-hundred member universities, the Arthur C. Clarke Foundation, the Carnegie Institution of Washington, the American Association for the Advancement of Science, and communities across the country.



Programs that Inspire and Educate



Journey through the Universe

Delivered by national teams of dynamic scientists and engineers from research organizations across the nation, and master science educators, *Journey through the Universe* engages entire communities. This remarkable suite of programs for students, teachers, families, and the public is designed to provide multiple and mutually leveraged experiences for student learning.

Resources available to each community include: grade K-12 lessons in the Earth and space sciences, professional development programs for educators, visits from scientists and engineers to thousands of students—one classroom at a time, programs designed for family learning and for the public, distance learning, and experiences delivered via the web.

Communities small and large can combine these resources to create a *Journey through the Universe* program that meets their unique needs in Science, Technology, Engineering, and Mathematics (STEM) education. *Journey* can be delivered across an entire school district and is designed for sustainability.

Voyage: A Journey through our Solar System

On a visit to the National Mall in Washington, DC, one can see monuments of a nation—Memorials to Lincoln, Jefferson, and World War II, the Vietnam Veterans Memorial

Wall, and the Washington Monument. Standing among them is *Voyage*—a one to 10-billion scale model of our Solar System—spanning 2,000 feet from the National Air and Space Museum to the Smithsonian Castle. *Voyage* celebrates what we know about Earth's place in space and our ability to know it. It reveals the true nature of humanity's existence—six billion souls occupying a tiny, fragile, beautiful world in a vast space.

Created in partnership with Challenger Center for Space Science Education, the Smithsonian Institution, and NASA, *Voyage* was approved by the U.S. Commission of Fine Arts for permanent placement on the National Mall.

The Center is making replicas of *Voyage* available for permanent installation in communities world-wide. A seamless fusion of sculpture and science education, *Voyage* is appropriate for a park, college campus, or along a main thoroughfare. Grade K-12 lessons on Solar System science and exploration, professional development for teachers, a national team of planetary scientists visiting thousands of students, and family and public programs place the exhibition at the center of a sustainable community-wide learning experience.



MESSENGER Education and Public Outreach

On August 3, 2004, NASA launched the MESSENGER spacecraft to Mercury, the second mission to the planet.

Unlike its predecessor Mariner 10, which flew by Mercury in 1973 and 1974, MESSENGER will enter orbit in 2011 and begin a full year of observations.



MESSENGER is destined to change our view of Mercury—and how our Solar System was born.

The Center's education programs for the MESSENGER mission take the nation along for the ride. A corps of the best science educators in the nation—the MESSENGER Fellows—train 3,000 teachers a year on grade K-12 lessons addressing Solar System science and engineering. MESSENGER scientists and engineers take part in the Center's community learning programs *Journey through the Universe* and *Voyage*, sharing their first-hand experiences with students, families, educators, and the public.

Family Science Night at the Smithsonian's National Air and Space Museum

The Center's *Family Science Night* program takes place at the most visited museum on the planet. Millions of visitors a year come to the National Air and Space Museum to see the machines that gave life to human dreams of flight in air and space.

Designed for family learning, *Family Science Night* is held after hours so that hundreds of students, parents, and teachers from area schools may have the museum to themselves. Attendees explore galleries, experience the universe through IMAX® films, and hear a presentation by a space scientist. The presentation is the program's centerpiece, providing a very personal view of exploration and the spellbinding, wondrously human stories behind the machines that changed the world.



Solar System Research

The Center is committed to ensuring that all its science education programs fully reflect the research experience and are accurate in both scientific content and process. To this end, the Center maintains researchers on staff. They split their time between Solar System research and the development and delivery of national education programs. The Center's research initiatives include:

- **Terrestrial Planetary Atmospheres**

Research: the winds, temperature, and composition of the upper atmospheres of Venus and Mars are studied to gain a richer understanding of the physics and chemistry driving meteorology and atmospheric evolution. These comparative planetary studies also provide invaluable insight into atmospheric processes here on Earth. Studies are undertaken using ground-based infrared spectrometers.



- **Cooperative Research in**

Planetary Astronomy: research in support of NASA planetary flight missions, conducted in collaboration with the Laboratory for Extraterrestrial Physics at NASA's Goddard Space Flight Center. The atmospheres of the planets are studied through observations of the infrared light they emit, using spectrometers attached to large ground-based telescopes.

- **Studies of Star Formation and the**

Origins of the Solar System: testing and refinement of theories proposing that solar systems begin forming when shock waves pass through clouds of gas and dust in interstellar space. Theoretical modeling and computer simulations are conducted that explore how material from a shock wave can be mixed and transported into a forming solar system.

What People Have to Say about Voyage: A Journey Through our Solar System

“Through this exhibition, NASA hopes to share what has been discovered, and the strangeness, wonder and beauty of these newly revealed worlds, with the public.”

—Dr. Jeffrey D. Rosendhal, Director of Education and Outreach,
Office of Space Science, NASA Headquarters

“We are thrilled to have played a role in developing this new outdoor educational experience. Millions of visitors to the Smithsonian will have the opportunity to learn about our Solar System through this dynamic experience.”

—J. Dennis O'Connor, Under Secretary of the Smithsonian Institution

“The *Voyage* lessons provide a frame of reference for discussing space travel and distances to other astronomical objects, such as the nearest star.

These are wonderful educational tools and a great experience for all.”

—Maureen Kerr, Chief of Education, Smithsonian's National Air and Space Museum

What People Have to Say about Journey through the Universe

“It is staggering to realize the cumulative effect *Journey* is having on communities.”

—Tom Nolan, Visiting Researcher, Engineer, Jet Propulsion Laboratory

“Since *Journey through the Universe* came to our community, thousands of everyday people have found new ways to look at space. Teachers have learned how to bring the universe, human exploration and the process of science alive in their classrooms. We will never look at the heavens in quite the same way again.”

—Dr. Jim Sisney, Superintendent of Broken Arrow Public Schools, Oklahoma

“Our local team was able to easily integrate Hawai'i Content and Performance Standards with the *Journey* curriculum. What an enriching experience *Journey* has been for the educators within the Department of Education and for the Hilo community and business organizations.”

—Valerie Takata, Superintendent, Hilo/Laupahoehoe/Waiakea Complex, Hawai'i District

“After the program, the children were able to approach the scientist for autographs and to ask questions. I had a very difficult time getting my oldest to sleep that night as he was so excited.”

—Louise M. Thomas, Parent, Wallace, Michigan

What People Have to Say about Family Science Night

“I attended your presentation at the Smithsonian with my children. It really is amazing how much we learn as parents while being parents. Your scientist managed to speak to several levels of understanding – simultaneously – so that we all learned. Thank you for reminding me of what it was like to be a boy with an unlimited imagination, gazing upward with excitement, beyond the limitations of what is known.”

—Carl Parker, Parent, Takoma Park, Maryland

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Download this document: <http://ncesse.org/overview>

Our programs on the web:
<http://journeythroughtheuniverse.org>
<http://voyagesolarsystem.org>

Also of interest: <http://blogontheuniverse.org>