

MAKE EL NIÑO PUDDING AND FALL INTO A BLACK HOLE: AN INTEGRATED, MULTI-VECTOR APPROACH TO NASA EDUCATIONAL OUTREACH

By

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ABSTRACT

The Space Place is a NASA educational outreach program that disseminates a suite of attractive, educational, inter-related products through partnerships that form a highly leveraged infrastructure. Products include a web site for children and teachers, with space science and technology related activities, contests, and fun facts; display materials; hands-on activities; articles in print media; and collectible card games. Through partnerships with local community organizations, as well as national organizations, and various print media, these products reach large audiences, many of whom are not usually included in other NASA outreach efforts.

INTRODUCTION

Learning about space science and technology is fun. Thus goes the first principle of The Space Place, a coordinated NASA educational outreach program that uses the internet and print media, as well as partnerships with professional educator associations, national youth organizations, and community organizations to deliver rich and innovative messages about space science and technology. The Space Place was begun in 1998 as a child-oriented web site (<http://spaceplace.jpl.nasa.gov>) to present ideas for simple "make and do" activities and fun facts related to the technology validation space missions of NASA's New Millennium Program. The outreach effort has now grown to include many other space science and Earth observing missions.



By forming partnerships with existing organizations, The Space Place educational outreach program has a potential of nearly 70 million contact opportunities per year. It provides cross-disciplinary, innovative content to enrich more formal science and technology curricula, and creates for NASA a youth-oriented, personalized reach that extends into the home and local community.

THE SPECIAL CHALLENGE OF REACHING CHILDREN

In addition to the obvious challenges of reaching adults with NASA's overall message, as well as specific program or project messages, reaching children presents some special challenges.

For one thing, children need personal attention. To feel involved and motivated, they need to be allowed to encounter and participate in the space program in their everyday lives. They need to understand in a

personal way how space exploration relates to them. They need to have ideas broken into digestible, child-sized chunks and presented as concretely as possible.

They need ways to share ideas and experiences with the adults and other children already in their lives, so they understand that space science and technology are normal parts of life, tangible and attainable . . . not intimidating abstractions they hear about only on the evening news, hovering totally beyond their reach.

INVITING THEM INTO THE SPACE PLACE

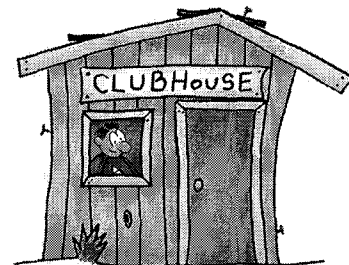
The approach we have taken has been twofold: develop a suite of highly attractive products designed to appeal to children; then negotiate relationships with existing channels for dissemination of these products.

We call this suite of products “The Space Place.” The products include:

- an activity-based web site for kids (<http://spaceplace.jpl.nasa.gov>)
- articles describing activities for teachers to do with the students in the classroom
- event-related news articles written for kids
- display materials
- structured program and project-related activities and contests
- collectible Space Place card games, with mission description cards that can stand alone.

Distribution channels, detailed later, currently include

- The Internet (visitors to web site)
- Publications of the International Technology Education Association
- Over 150 partner museums, planetariums, and libraries
- Boys & Girls Clubs of America
- YWCA
- 21st Century Learning Centers
- Civil Air Patrol
- Weekly Reader, 3rd and 4th grade editions
- Five large daily newspapers, children’s pages



THE ARCHITECTURE OF THE SPACE PLACE



The hub of The Space Place outreach program is the website, with its “especially for kids” look and feel. It describes and illustrates activities for kids (target age range 8-13) to do either by themselves, with a friend or two, or with an adult. Most of the activities are not designed for classroom use, although some may be adaptable. Rather the site is intended to be a “place” a child can take ownership of and have fun with, and just so happen to learn something interesting in the process.

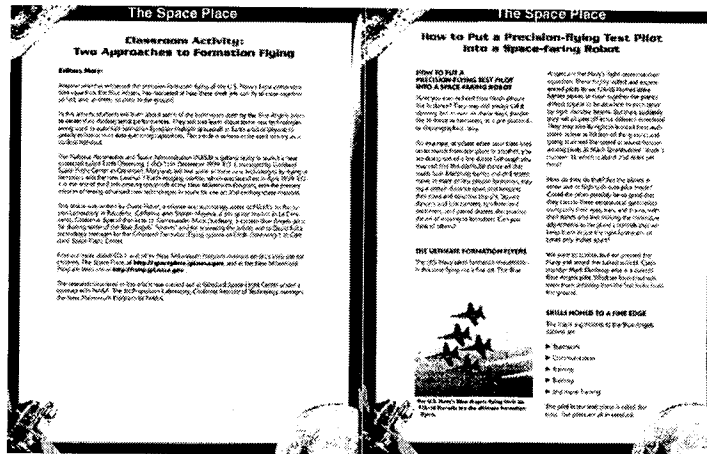
Each activity or fun fact on the web site relates to the science or technology behind one of NASA’s missions. So far, over 25 different missions are represented, including those doing planetary exploration, Earth observation, space technology development and validation, studies of the origin and fate of the universe, and probing the fundamental laws of physics. With the participation of each additional project, a new activity or “fun fact” module enriches the content and breadth of website, which now averages around 1800 visitors per day.

Some fairly complex and challenging topics are introduced in a very clear and easy to understand way, using simple language, analogies to everyday things, and compelling illustrations. Some of the topics presented on the site so far include why stars are different colors, binary and hexadecimal notation, orbits and launch trajectories, the electromagnetic spectrum and the instruments we use to see different wavelengths, gravitational waves, ion engine technology, stereoscopic machine vision, artificial olfaction, and topographical mapping.

THE EDUCATION CONNECTION

The Space Place has partnered with the International Technology Education Association (ITEA). ITEA has around 8000 members, consisting of teachers of science and technology to children of primary grades through high school. As part of this partnership, we produce and submit original curriculum support articles for publication in each of the 8 issues per year of *The Technology Teacher*, ITEA’s journal for teachers of upper-elementary through high school science and technology. Each of these articles describes an original classroom activity related to space science and technology and one or more of NASA’s missions or programs. These articles appear in a distinctive “The Space Place” border each issue, and always mention and provide the URL for The Space Place website. The previously published ITEA articles are also available in .pdf format to all teachers at the “Teachers Only” link on The Space Place home page.

In 2000, the ITEA published its *Standards for Technological Literacy*, intended to guide educators in preparing our youth for the realities of our complex, technological world. All Space Place classroom activity articles published by ITEA, as well as website activities, support these ITEA standards.



Sample page spread from a Space Place article published in ITEA's *The Technology Teacher*. This one compares formation flying as done by the Blue Angels with the technology used on EO-1.

EXTENDING INTO THE LOCAL COMMUNITY



Space Place has formed partnerships with local community education resources, including museums (science, air, children's, and art), planetariums, and libraries. Each museum, planetarium, or library partner agrees to transform a bulletin board or wall into "The Space Place" display and regularly update it. The outreach team initially sends the Space Place partner a set of distinctive Space Place borders to define the space, as well as various NASA posters, lithographs, emblems, and other relevant materials. After that, the partner receives quarterly shipments of the latest NASA materials. The partner agrees to supplement the display with such items as news clippings, children's art or writing, models,

relevant book recommendations, and announcements of local related events.

The primary criterion for becoming a Space Place partner is to be situated in a small community. The intention is to offer the partnerships to communities that otherwise have little or no direct contact with the space program. Also, partners are scattered geographically to maximize the reach. Space Place partners are generally at least 100 miles apart.

Over 100 museums in 40 states and 50 libraries in 31 states are now Space Place partners. In all, 47 states and 2 U.S. territories are represented. We estimate total annual visitors to these facilities at over 22 million.

JOINING THE CLUB

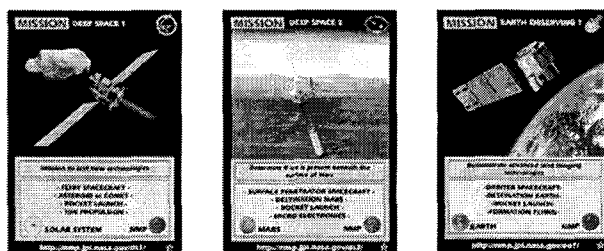
Patrons of Space Place partners also have the opportunity to participate in "Club Space Place." Four times per year, we create and provide the partners an activity to involve both children and adults. Activities are uniquely cross-disciplinary (as well as cross-generational), thus attracting non-traditional NASA audiences, such as those patronizing libraries and art museums.

The Club activity is described on a handout, which the activity director can photocopy and provide to participants during a structured, scheduled meeting of the Club. Activities have included:

- Making a model Saturn (to be suspended from ceiling or holiday tree) from an unwanted CD-ROM, a small styrofoam ball, glitter, and glue.
- An art contest to portray some aspects of one of the eight advanced new technologies to be flown and tested on Earth-Observing 1.
- Making an origami game that sends participants outside to identify specific objects in the summer night sky.
- Designing and making a model spacecraft from recycled materials.
- A “Cosmic Poetry” contest, expressing the beauty and benefits of space technology.

The beautiful collectible Space Place card game may be used as a prize for local winners, or in other creative ways, as deemed appropriate by the “Club Director.”

Sample mission cards from the collectible Space Place card game.



The Space Place has also partnered with national organizations, which distribute the Club Space Place curriculum four times per year via their vast infrastructures. These partnerships include

- Boys & Girls Clubs of America (BGCA), with 3,000 chapters serving approximately 3,000,000 children, many of them latchkey.
- The YWCA, with 326 chapter serving about 750,000 girls and women.
- 21st Century Learning Centers, providing after-school, week-end, and summer programs to 600,000 children, youth, and their families, also including many latchkey children.
- The Civil Air Patrol, with a membership of 60,000.

THE PAPER BLITZ

Five large city newspapers run monthly Space Place columns on their children’s reading pages. Currently, these publications are *Los Angeles Times*, *Denver Post*, *Columbus (OH) Dispatch*, *Dallas-Ft. Worth Star Telegram*, and the *Hartford (CT) Courant*. Total circulation of these newspapers is 5,800,000. Each of these short, very simply written articles describes a space related event or concept, introduces a NASA mission, and links to The Space Place website for further exploration.

The Kids' Reading Room



The Kids' Reading page is part of the Reading by 9 literacy project.

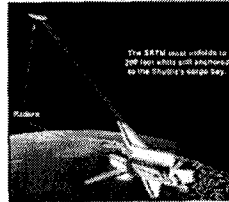
California Classroom

A Learning Link to the Space Place

On Feb. 11, the space shuttle Endeavour blasted off from Cape Canaveral, Fla., carrying with it the largest structure ever to fly in space. The structure is being used for the Shuttle Radar Topography Mission.

As the shuttle Endeavour orbits Earth on its 11-day mission, it is collecting data that will be used to create the most detailed and accurate topographic map of Earth ever made from space. A topographic, or "topo," map shows not only Earth's flat features, but also its mountains and valleys.

Information for the map is being gathered by two radar antennas mounted on opposite ends of a gigantic, 200-foot-long mast. The mast was packed and stowed before launch inside a container in Endeavour's cargo bay and measured only 16 feet long. It is now anchored to Endeavour at one end, with



Endeavour will collect data from the Earth that will be used to create a very detailed topographic map.

the other end extending into space for as long as five city blocks!

The mapping will be done using a technology called synthetic aperture radar. This type of radar works by

bouncing a signal off the ground, then measuring the strength of the signal and how long it takes to come back. The result is a highly detailed map.

The new maps will have many uses. They will help us understand how climate changes around the globe. We will learn more about how humans are affecting the environment. They will help in planning roads and railroads, and in placing transmitter stations for cellular telephones.

In many ways, the new maps will teach us a good deal about our planet and how to take care of it. To participate in a fun Space Place activity and to learn more about this mission, go to http://spaceplace.jpl.nasa.gov/stm_maketop.htm or <http://www.jpl.nasa.gov/stm>.

This information was provided by the Jet Propulsion Laboratory and Caltech, in Pasadena.

KEEPING CHECK ON REALITY

A number of professional advisors have been recruited to form the Space Place Advisory Council. The Council supports The Space Place suite of efforts by

- Helping us identify education needs and opportunities.
- Advising on space-science-related educational challenges.
- Providing informal linkages with professional affiliations and organization.
- Reviewing concepts for programs, activities, and materials.
- Consulting on specific areas of expertise.

WRAPPING IT UP

To summarize, The Space Place is a NASA education program dedicated to fostering in people of all ages in the USA an awareness and practical understanding of space and mission technologies and the benefits of space exploration. Its objectives are

- To make space science educational materials available and accessible to every child, young adult, and adult in America;
- To provide meaningful space science curriculum and activities;
- To advocate for space science education;
- To provide direct and factual space science content.

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