

If you do not have access to the Internet, please consider seeking out someone who does so that you can take better advantage of the exciting resources on the World Wide Web!

# Resources

## Audiovisual

### *NASA Television (NTV)*

(Cable TV) Offers the public a front-row seat for launches and missions, as well as informational and educational programming, historical documentaries, and updates on the latest developments in aeronautics and space science. NTV is transmitted on the GE-2 satellite, transponder 9C at 85 degrees west longitude, vertical polarization, with a frequency of 3880 megahertz and audio of 6.8 megahertz.

Apart from live mission coverage, regular NASA Television programming includes a Video File from noon to 1:00 pm, a NASA Gallery File from 1:00 to 2:00 pm, and an Education File from 2:00 to 3:00 pm (all times Eastern). This sequence is repeated at 3:00 pm, 6:00 pm, and 9:00 pm, Monday through Friday. The NTV Education File features programming for teachers and students on science, mathematics, and technology. NASA Television programming may be videotaped for later use. For more information on NASA Television, contact:  
 NASA Headquarters  
 Code P-2  
 NASA TV  
 Washington, DC 20546-0001  
 Phone: (202) 358-3572  
 Website: <http://www.hq.nasa.gov/ntv.html>

### *The Cosmos Television Series*

(Videotape) Thirteen episodes on seven 2-hour tapes. Available through the Astronomical Society of the Pacific, telephone 1-800-335-2624.

### *The Planets*

(Videotape and videodisc) Patrick Stewart's narration and Holst's classic score. Dramatizes an incredible array of images from the robotic

spacecraft that have toured the planets. Available through the Astronomical Society of the Pacific, telephone 1-800-335-2624.

### *Powers of Ten*

(Videotape) Charles and Ray Eames. A 10-minute masterpiece introducing the 40 orders of magnitude between the scale of the observable Universe to the scale of a proton inside the nucleus of a carbon atom. Available through the Astronomical Society of the Pacific, telephone 1-800-335-2624.

### *Worlds in Comparison*

(Slide set) A set of 20 dramatic slides, comparing planets, satellites, and their geographical features with those of Earth, the Moon, and terrestrial features (for all grades). Available through the Astronomical Society of the Pacific, telephone 1-800-335-2624.

## Catalogs

### *Association for Supervision and Curriculum Development (ASCD) Resources Catalog*

Contains numerous books, audio cassettes, videos, and multimedia titles covering a broad range of educational topics, including products dealing with curriculum, instruction, assessment, classroom management, and educational leadership. Call 1-800-933-ASCD or visit the ASCD Online Store at <http://www.ascd.org/>. Click on "ASCD Online Store."

### *Astronomical Society of the Pacific Catalog*

Contains a vast array of current, scientifically accurate astronomy products, including posters, videotapes, slide sets, hands-on teaching aids, software and CD-ROMs. Call the Astronomical



Society of the Pacific (ASP) information and customer service department at 1-800-962-3412. You can browse the catalog at the ASP website at <http://www.aspsky.org/>. Click on "Catalog" to find the online version and information about requesting a free catalog.

### *Membership & NSTA Publications Catalog*

Contains various science resources and standards, products dealing with teaching strategies, software, CD-ROMs, and NSTA releases. Call 1-800-722-NSTA, or browse the NSTA Science Store on line at <http://www.nsta.org/scistore/>.

### *NASA Central Operation of Resources for Educators (CORE)*

Established for the national and international distribution of NASA-produced educational materials. Educators can obtain a catalog and order form by mail, phone, fax, e-mail, or through the website:

NASA CORE

Lorain County Joint Vocational School

5181 Route 58 South

Oberlin, OH 44074

Phone: (440) 774-1051, Ext. 249 or 293

Fax: (440) 774-2144

E-mail: [nasaco@leeca.esu.k12.oh.us](mailto:nasaco@leeca.esu.k12.oh.us)

Website: <http://spacelink.nasa.gov/CORE>

### *Sky Publishing Corporation Catalog*

This catalog contains astronomy books and products such as star atlases, observing guides, videotapes, posters, slide sets, and software, all of which are selected by the editors of *Sky & Telescope* magazine. For a printed copy of the catalog, send a request by e-mail to [catalog@skypub.com](mailto:catalog@skypub.com), or call 1-800-253-0245 (US and Canada only) or +1-617-864-7360, or fax 1-617-864-6117. Browse the online version of the catalog by visiting <http://www.skypub.com/index.shtml> and clicking on "SPC Catalog."

## CD-ROMs

### *Astronomy Village: Investigating the Universe*

(1998). A CD-ROM-based multimedia program developed for the NASA Classroom of the Future by Wheeling Jesuit College that provides teachers and students with 10 complete investigations in astronomy intended to complement and extend the science curriculum in 9th and 10th grade classes. It can also be used at other grade levels. *Astronomy Village* is a Macintosh or Power Macintosh program; minimum system requirements are listed at <http://www.cotf.edu/AV/av1.html>. Copies can be picked up for free from a NASA Educator Resource Center or ordered from NASA CORE or from <http://www.cotf.edu/AV/order.html> for a minimal fee.

*Planetary Images* (1996). A multiplatform resource of over 200 digital images of the planets, satellites, asteroids, and comets from planetary and lunar missions. Information: National Space Science Data Center, NASA/GSFC, Code 633, Greenbelt, MD 20771. Telephone (301) 286-6695, or send e-mail to [request@nssdca.gsfc.nasa.gov](mailto:request@nssdca.gsfc.nasa.gov).

*Views of the Solar System* (1996). A hypertext-formatted Mac/Windows CD-ROM by Calvin J. Hamilton featuring comprehensive, up-to-date information on major aspects of the Solar System. Contains special teacher section. Available through the NSTA Publications Catalog; call 1-800-722-NSTA to order.

*Welcome to the Planets* (1994-95), Version 1.5. Solar System information from NASA's Planetary Data System. Information: National Space Science Data Center, NASA/GSFC, Code 633, Greenbelt, MD 20771. Telephone (301) 286-6695; e-mail: [request@nssdca.gsfc.nasa.gov](mailto:request@nssdca.gsfc.nasa.gov).



See  
<http://www.mcrel.org/standards-benchmarks/standardslib/science-1.html>  
 for Earth and Space  
 Science standards/  
 benchmarks, and  
 links to all other  
 standards.

## NASA Educational Products

NASA-produced educational materials are available through Educator Resource Centers (ERCs — see below) or through NASA Central Operation of Resources for Educators (CORE). The NASA CORE catalog can be obtained by mail, telephone, fax, e-mail, or website (see the *Catalogs* section). See the NASA Spacelink website for downloadable materials and more information on NASA educational products: <http://spacelink.nasa.gov/>.

*How to Access NASA's Education Materials and Services* is an annual brochure that serves as a guide to accessing a variety of NASA materials and services for educators. Copies are available through the ERC network, or electronically via NASA Spacelink.

## NASA Educator Resource Centers

To make additional information available to the education community, the NASA Education Division has created the NASA Educator Resource Center (ERC) network. ERCs contain a wealth of information for educators: publications, reference books, slide sets, audio cassettes, videotapes, telelecture programs, computer programs, lesson plans, and teacher guides with activities. Educators may preview, copy, or receive NASA materials at these sites. Because each NASA Field Center has its own areas of expertise, no two ERCs are exactly alike. Phone calls are welcome if you are unable to visit the ERC that serves your geographic area. Here is a list of the centers by regions they serve:

**AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, WY**

NASA Educator Resource Center  
 Mail Stop 253-2  
 NASA Ames Research Center  
 Moffett Field, CA 94035-1000  
 Telephone: (650) 604-3574

**CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT**

NASA Educator Resource Laboratory  
 Mail Code 130.3  
 NASA Goddard Space Flight Center  
 Greenbelt, MD 20771-0001  
 Telephone: (301) 286-8570

**CO, KS, NE, NM, ND, OK, SD, TX**

JSC Educator Resource Center  
 Space Center Houston  
 NASA Johnson Space Center  
 1601 NASA Road One  
 Houston, TX 77058-3696  
 Telephone: (281) 483-8696

**FL, GA, PR, VI**

NASA Educator Resource Laboratory  
 Mail Code ERL  
 NASA Kennedy Space Center  
 Kennedy Space Center, FL 32899-0001  
 Telephone: (407) 867-4090

**KY, NC, SC, VA, WV**

Virginia Air and Space Museum  
 NASA Educator Resource Center for  
 NASA Langley Research Center  
 600 Settler's Landing Road  
 Hampton, VA 23669-4033  
 Telephone: (757) 727-0900 x 757

**IL, IN, MI, MN, OH, WI**

NASA Educator Resource Center  
 Mail Stop 8-1  
 NASA Lewis Research Center  
 21000 Brookpark Road  
 Cleveland, OH 44135-3191



**AL, AR, IA, LA, MO, TN**

US Space and Rocket Center  
 NASA Educator Resource Center for  
 NASA Marshall Space Flight Center  
 PO Box 070015  
 Huntsville, AL 35807-7015  
 Telephone: (205) 544-5812

**MS**

NASA Educator Resource Center  
 Building 1200  
 NASA John C. Stennis Space Center  
 Stennis Space Center, MS 39529-6000  
 Telephone: (228) 688-3338

**CA**

NASA/JPL Educator Resource Center  
 Village at Indian Hill  
 1460 E. Holt Ave., Suite 20  
 Pomona, CA 91767  
 Telephone: (909) 397-4420

**CA cities near the center**

NASA Educator Resource Center for  
 NASA Dryden Flight Research Center  
 45108 N. 3rd Street East  
 Lancaster, CA 93535  
 Telephone: (805) 948-7347

**VA and MD's Eastern Shores**

NASA Educator Resource Lab  
 Education Complex, Visitor Center  
 Building J-1  
 NASA Wallops Flight Facility  
 Wallops Island, VA 23337-5099  
 Telephone: (757) 824-2297/2298

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**Periodicals*****Astronomy***

Kalmbach Publishing, 21027 Crossroads Circle,  
 PO Box 1612, Waukesha, WI 53187. Includes  
 monthly reports of what's visible in the night  
 sky. Website: <http://www.kalmbach.com/astro/astronomy.html>.

***Mercury, the Journal of the Astronomical Society of the Pacific***

The Astronomical Society of the Pacific, 390  
 Ashton Avenue, San Francisco, CA 94112.  
 Website: <http://www.aspsky.org/mercury.html>.

***Odyssey***

Cobblestone Publishing, Inc., 30 Grove Street,  
 Peterborough, NH 03458-1454. An astronomy  
 magazine for children. Website: <http://www.odysseymagazine.com/>.

***Planetary Report, The***

Published by the Planetary Society, 65 North  
 Catalina Avenue, Pasadena, CA 91106-2301.  
 For information on Planetary Society publica-  
 tions, visit the website at <http://planetary.org>.  
 Click on "Publications."

***Sky & Telescope***

Sky Publishing Corporation, 49 Bay State  
 Road, Cambridge, MA 02138. Includes  
 monthly reports of what's visible in the night  
 sky. Website: <http://www.skypub.com/>.

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**Publications*****Astronomy***

Beatty, J. Kelly, Carolyn Collins Petersen, and  
 Andrew Chaikin (1999), *The New Solar Sys-  
 tem*, Sky Publishing, Cambridge, MA. Beauti-  
 fully illustrated, with articles on all aspects of  
 planetary astronomy.



Chaisson, Eric, and Steve McMillan (1993), *Astronomy Today*, Prentice Hall, Englewood Cliffs, NJ.

Ferris, Timothy (1988), *Coming of Age in the Milky Way*, Doubleday, New York. A colorful story of how humanity's perspective on the Universe has evolved through time.

Fraknoi, Andrew, David Morrison, and Sidney Wolff (1997), *Voyages Through the Universe*, Saunders College Publishing, Harcourt College Publishers, Orlando, FL. An enjoyable, readable introductory astronomy text.

Morrison, David, Sidney Wolff, and Andrew Fraknoi (1995), *Abell's Exploration of the Universe*, Saunders College Publishing, Philadelphia, PA. An introductory astronomy text with a systems approach.

Raymo, Chet (1982), *365 Starry Nights: An Introduction to Astronomy for Every Night of the Year*, Simon and Schuster, New York. A delightfully illustrated way to learn about astronomy and skywatching.

Sagan, Carl (1980), *Cosmos*, Random House, New York. Based on the Emmy Award-winning TV series.

Sagan, Carl (1994), *Pale Blue Dot*, Random House, New York. A beautifully illustrated book offering an eloquent perspective on what we know about the worlds of our Solar System.

Vogt, Gregory (1991), *Voyager, Missions in Space*, Millbrook Press, Brookfield, CT. Grade level: 7–10. An “inside look” at the Voyager 1 and 2 missions. Includes beautiful NASA images of the gas giants, their satellites, and deep space.

Wagner, Jeffrey K. (1997), *Introduction to the Solar System*, Saunders College Publishing, Harcourt College Publishers, Orlando, FL. A college-level introductory text on Solar System astronomy.

### Education Standards & Curriculum Evaluation

*Benchmarks for Science Literacy: Project 2061* (1993), American Association for the Advancement of Science, Oxford University Press, New York. Address: Project 2061 BENCHMARKS, AAAS, 1333 H Street NW, Washington, DC 20005. View the full text of the Benchmarks on line by visiting <http://www.project2061.org/>.

*National Science Education Standards* (1996), National Academy Press, Washington, DC. Available for sale from the National Academy Press, 2101 Constitution Avenue NW, Box 285, Washington, DC 20055. Call 1-800-624-6242 or (202) 334-3313 in the Washington metropolitan area. Also available through the NSTA Publications Catalog; call 1-800-722-NSTA.

### Curriculum and Evaluation Standards for School Mathematics

(1989), National Council of Teachers of Mathematics, Inc., 1906 Association Drive, Reston, VA 22091.

### Educator Guides

*Rockets: A Teacher's Guide with Activities in Science, Mathematics, and Technology* (1996), NASA EG-1996-09-108-HQ. All the excellent activities you could want on rockets using simple materials. Available from NASA Educator Resource Centers or NASA CORE.





*Space-Based Astronomy: Teacher's Guide with Activities*

(1994), NASA EG-102. Includes good activities on color, spectroscopy and receiving data back from space missions. Available from NASA Educator Resource Centers or NASA CORE.

Fraknoi, Andrew, editor (1995), *The Universe at Your Fingertips: An Astronomy Activity and Resource Notebook*, Project ASTRO, Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112, telephone (415) 337-1100 or 1-800-335-2624. An eclectic and comprehensive assemblage of excellent astronomy activities and resources.

*PASS (Planetarium Activities for Student Success)*

(1993), Lawrence Hall of Science, University of California, Berkeley. Also available through the *Eureka!* catalog, Lawrence Hall of Science, University of California, Berkeley, CA 94720-5200, telephone (510) 642-1016.

*Destiny in Space: A Collection of Information, Activities, and Resources about Exploring Space for Teachers of Grades 4–12*

National Air and Space Museum, Teacher Services Coordinator, Educational Services Center MRC-305, Smithsonian Institution, Washington, DC 20560, telephone (202) 786-2524. Especially good for activities involving robotics and teleoperations.

*The Moons of Jupiter*

(1993), Great Explorations in Math and Science (GEMS), Lawrence Hall of Science, University of California at Berkeley, CA 94720, telephone (510) 642-7771.

Schatz, Dennis, and Doug Cooper (1994), *Astro-Adventures: An Activity-Based Astronomy Curriculum*, Pacific Science Center Explore More Store, 200 Second Avenue North, Seattle,

WA 98109-4895, telephone (206) 443-2870, fax (206) 443-3627. Especially good for Moon and Sun observing.

Wright, Russell G., (1996) *ASTEROID!: An Event-Based Science Module*, Event-Based Science Project, 850 Hungerford Drive, Rockville, MD 20850, telephone 1-800-EBS-7252. Very interactive, real world, and hands-on.

Richter, Jessica, and Andrew Fraknoi (1996), *Project ASTRO: How-To Manual for Teachers and Astronomers*, Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112, telephone (415) 337-1100, fax (415) 337-5205.

### History of Science

Launius, Roger (1994), *NASA: A History of the US Civil Space Program*, Krieger Publishing, Malabar, Florida.

Miner, Ellis (1990), *Uranus: the Planet, Rings and Satellites*, Ellis Horwood, London, UK.

Osterbrock, Donald (1984), *James E. Keeler: Pioneer American Astrophysicist*, Cambridge University Press, Cambridge, UK.

### Mathematics

Bennett, Jeffrey O., William L. Briggs, and Cherilynn A. Morrow, (1996), *Quantitative Reasoning: Mathematics for Citizens in the 21st Century*, Addison-Wesley, Reading, MA.

### Websites

#### Saturn and the Cassini Mission

<http://www.jpl.nasa.gov/cassini/>

All about NASA's Cassini mission to Saturn. Click on "Products" [<http://www.jpl.nasa.gov/cassini/products>] to find the latest information



about how to obtain many exciting resources, including fact sheets, posters, lithographs, videos, slides, CD-ROMs, and hologram exhibits.

*[http://lyra.colorado.edu/sbo/mary/Cassini/scale\\_saturn.html](http://lyra.colorado.edu/sbo/mary/Cassini/scale_saturn.html)*

Classroom-tested directions for making a 3-D scale model of Saturn and its main rings using very basic materials.

*[http://lyra.colorado.edu/sbo/mary/Cassini/titan\\_demo.html](http://lyra.colorado.edu/sbo/mary/Cassini/titan_demo.html)*

Directions for a fish tank demonstration of Titan's atmospheric constituents.

### **Other Space Science Websites**

#### *Amazing Space Web-Based Activities*

*<http://amazing-space.stsci.edu>*

A set of Web-based activities for all to enjoy. Click on "Solar System Trading Cards" to see an example of just one of the many activities that can be found at this website.

#### *Astronomical Data Center, The*

*<http://adc.gsfc.nasa.gov/adc.html>*

#### *Astronomy Café*

*<http://www2.ari.net/home/odenwald/cafe.html>*

Dr. Sten Odenwald's award-winning site that answers questions you may have about astronomy. Click on "Ask an Astronomer."

#### *Astrophysics Data Facility, The*

*<http://hypatia.gsfc.nasa.gov/adfladf.html>*

#### *Classroom of the Future, The*

*<http://www.cotf.edu/>*

The Classroom of the Future (COTF) Program at Wheeling Jesuit University is NASA's premier research and development center for educational technologies, and provides technology-based tools and resources to K–12 schools. The

COTF Program is housed in the Erma Ora Byrd Center for Educational Technologies.

#### *Basics of Space Flight Learners' Workbook*

*<http://www.jpl.nasa.gov/basics/>*

A series of training modules that pertain to space and spaceflight operations: a very comprehensive, accessible course that was devised for new JPL employees. There is no prerequisite.

#### *Earth and Space Science by McREL*

*<http://www.mcrel.org/standards-benchmarks/standardslib/science-1.html>*

Presents the Earth and Space Science Standards. Click on "Internet Connections — Science" for a listing of many other excellent sites related to the Earth and Space sciences.

#### *4000 Years of Women in Science*

*<http://www.astr.ua.edu/4000WS/4000WS.html>*

Women are, and always have been, scientists. This website has names, short biographies, and photos of some of the women from our scientific and technical past. The site grew out of public talks given by Dr. Sethanne Howard.

#### *Jet Propulsion Laboratory (JPL)*

*<http://www.jpl.nasa.gov/>*

Learn about all JPL past, present, and future space missions, including Voyager, Galileo, and Cassini.

#### *NASA Headquarters*

*<http://www.hq.nasa.gov/>*

#### *NASA Central Operation of Resources for Educators (CORE)*

*<http://spacelink.nasa.gov/CORE>*

#### *NASA's K–12 Internet Initiative*

*<http://quest.arc.nasa.gov/>*

Provides support and services for schools, teachers, and students to fully utilize the Internet and



its underlying information technologies as a basic tool for learning.

### ***NASA Observatory***

<http://observe.ivv.nasa.gov/nasa/core.shtml>

Earth and space data, with pictures of Earth, the planets, stars, and other cool stuff.

### ***NASA Office of Space Science at Headquarters***

<http://www.hq.nasa.gov/office/oss/>

### ***NASA Office of Space Science Education and Public Outreach Ecosystem***

<http://spacescience.nasa.gov/education/ecosystem.htm>

### ***NASA Online Resources for Educators***

<http://education.nasa.gov/>

Educational information and instructional resource materials for teachers, faculty, and students. A wide range of information is available, including science, mathematics, engineering, and technology education lesson plans, historical information related to the aeronautics and space program, current status reports on NASA projects, news releases, information on NASA educational programs, useful software, and graphics files. Educators and students can also use NASA resources as learning tools to explore the Internet, accessing information about educational grants, interacting with other schools that are already on line, participating in online interactive projects, and communicating with NASA scientists, engineers, and other team members to experience the excitement of NASA projects.

### ***NASA's Planetary Photojournal***

<http://photojournal.jpl.nasa.gov/>

Easy access to over 1,000 publicly released images from various Solar System exploration programs. The site was developed as a collaboration between NASA's Planetary Data System Imaging Node, the Solar System Visualization Project, and JPL's Media Relations Office.

### ***NASA Spacelink***

<http://spacelink.nasa.gov>

An electronic information system providing current educational information to teachers, faculty, and students about the aeronautics and space program. Spacelink offers a wide range of computer text files, software, and graphics. For more information, contact the Spacelink Administrator, Education Programs Office, Mail Code CL01, NASA Marshall Space Flight Center, Huntsville, AL 35812-0001, telephone (205) 961-1225; e-mail address is [comments@spacelink.msfc.nasa.gov](mailto:comments@spacelink.msfc.nasa.gov).

### ***National Science Teachers Association (NSTA)***

<http://www.nsta.org/>

NSTA is the largest organization in the world committed to promoting excellence and innovation in science teaching and learning for all. The current membership of more than 53,000 includes science teachers, science supervisors, administrators, scientists, business and industry representatives, and others involved in science education. This site tells you all about it!

### ***Nine Planets, The — A Multimedia Tour of the Solar System***

<http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets.html>

The Nine Planets, created by Bill Arnett, is an overview of the history, mythology, and current scientific knowledge of each of the planets and moons in our Solar System. Each page has text and images, some have sound and movies, most provide references to additional related information. A special "Just for Kids" version of this page exists at <http://www.tcsn.net/afner/>, created to suit the needs of a younger audience by placing an emphasis on the basic concepts in a "kid-friendly" format.





*Planetary Rings Node, The*

<http://ringside.arc.nasa.gov/>

The Rings Node of NASA's Planetary Data System is devoted to archiving, cataloging, and distributing scientific data sets relevant to planetary ring systems. There are some awesome images of Saturn's rings, and a closeup of Jupiter's rings taken by the Galileo spacecraft.

*Space Science Institute*

<http://www.space-science.org>

The Space Science Institute was co-developer of the *Saturn Educator Guide* in collaboration with the Jet Propulsion Laboratory.

*Space Telescope Science Institute*

<http://www.stsci.edu/>

All the latest pictures and press releases from the Hubble Space Telescope. The images of the Saturn ring-plane crossings in 1995 are spectacular!

*Teacher's Guide for Solar System*

<http://www.cmnh.org:80/education/teacher-guides/solarsystem.html>

Includes information about how to prepare students for a trip to the planetarium and observatory, and also lists several resources available at the Cleveland Museum of Natural History's Science Resource Center.

*Telescopes in Education (TIE)*

<http://tie.jpl.nasa.gov>

Through Telescopes in Education (TIE), students around the world can remotely control research-quality telescopes and CCD cameras from computers in their classrooms.

*Windows on the Universe*

<http://www.windows.umich.edu/>

A fun and different site about the Earth and space sciences. This site is NASA-funded and intended for use by the general public. Users can visit the site in several ways; entry options include beginner, intermediate, and advanced components. For information on an associated CD-ROM, visit [http://www.windows.umich.edu/about\\_windows.html](http://www.windows.umich.edu/about_windows.html).

*Women of NASA*

<http://quest.arc.nasa.gov/women/>

This resource was developed to encourage young women to pursue careers in mathematics, science, and technology. The Women of NASA interactive project showcases outstanding women who are enjoying successful careers and how these women balance personal and professional responsibilities. The site also features profiles, teaching tips, resources, and several other topics. The site has a bilingual component in Spanish.

