

Curriculum Content Matrix

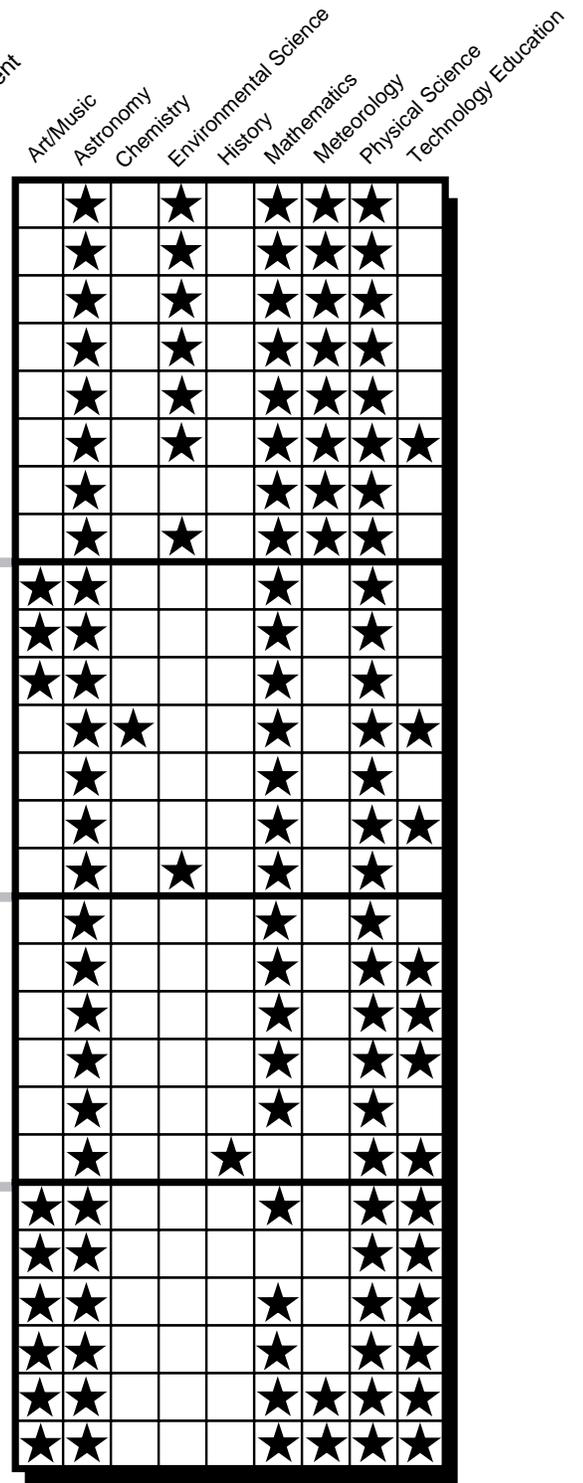
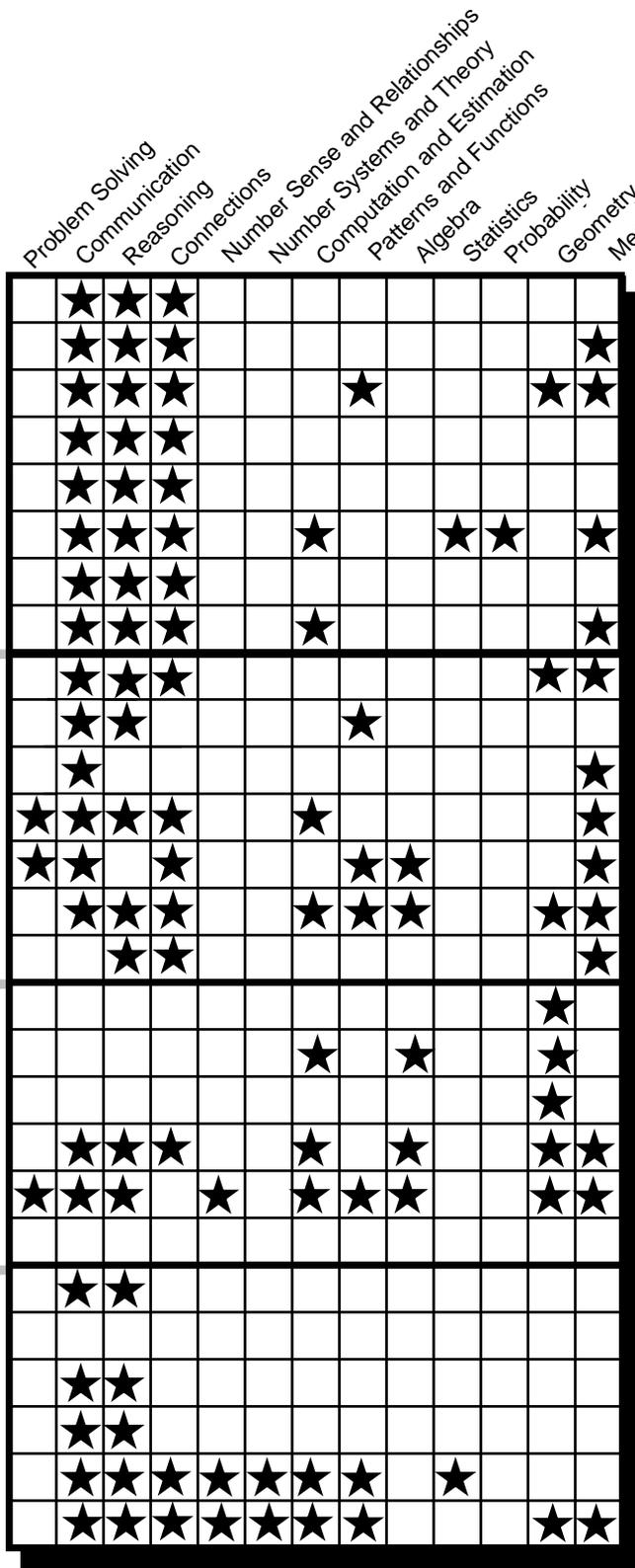
Activities

Page Numbers

Collecting Data
Observing
Classifying
Communication
Measuring
Inferring
Predicting
Hypothesizing
Experimenting
Constructing Models
Interpreting Data
Extending Data
Arriving at Conclusions

Activities	Page Numbers	Collecting Data	Observing	Classifying	Communication	Measuring	Inferring	Predicting	Hypothesizing	Experimenting	Constructing Models	Interpreting Data	Extending Data	Arriving at Conclusions
Clear Air	Unit 1 11		★		★		★			★				★
Water In The Air	12	★	★		★		★		★	★	★	★	★	★
Red Sky, Blue Sky	14		★		★	★	★	★		★				★
Ultraviolet Absorption	The Atmospheric Filter 16		★		★		★		★					★
Particle Pollution	18		★		★		★		★					
Particulate Sampler	19	★	★		★	★	★		★		★	★		
Heat Currents	20		★		★									★
Day and Night	22		★		★		★	★	★		★			★
Water Prism	Unit 2 28		★		★					★				
Projecting Spectrums	30		★		★					★				
Simple Spectroscope	32		★	★	★	★	★	★	★	★				
Analytical Spectroscope	The Electromagnetic Spectrum 34	★	★	★	★	★				★				
Red Shift, Blue Shift	40	★	★		★	★	★	★	★	★	★	★	★	★
Wavelengths and Energy	43		★		★					★				
Resonance Rings	44		★		★		★	★		★				★
Pinhole Viewer	Unit 3 49		★		★					★				
Build Your Own Telescope	51		★		★	★				★				
Reflecting Telescopes	Collecting Electromagnetic Radiation 53		★		★									
Lenses and Mirrors	54		★		★		★	★	★		★	★	★	
Light Gathering Power	56	★	★		★				★			★	★	
Liquid Crystal IR Detector	59		★		★				★					
Magic Wand	Unit 4 64		★		★		★			★				
Persistence of Vision Tube	66		★		★		★			★				★
Color Recognition	Down To Earth 67		★	★	★		★			★				★
Colored Shadows	69		★		★		★			★				
Binary Numbers	71	★	★		★		★	★	★					
Paint By The Number	76	★	★		★			★		★	★	★	★	★

Science Process Skills¹

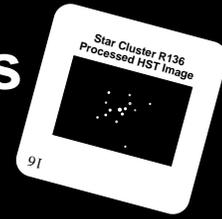


Mathematics Process Skills²

Connections

1. Adapted from Virginia Department of Education Science Textbook Evaluation Instrument.
 2. Curriculum Standards, Grades 5-8, National Council of Teachers of Mathematics, 1989.

Astrophysics Division Missions Slide Set



Many astronomy spacecraft have orbited above Earth over the last 30 years. The data collected by these satellites have changed and enlarged our conceptions of the universe.

NASA's Astrophysics Division has assembled a colorful set of 35 mm slides on its astrophysics spacecraft and some of their results. Each slide is accompanied with abbreviated and detailed captions.

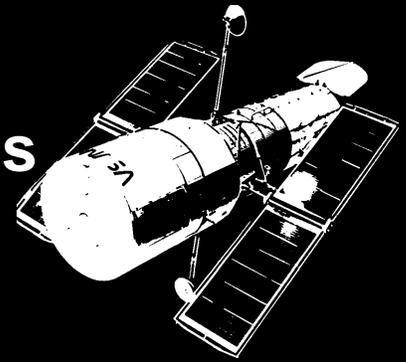
While the activities in this guide address the technologies used in studying the universe from above Earth's atmosphere, little attention has been paid to what those instruments have actually accomplished. The best way to study astrophysics results is by examining the actual data and imagery collected. Pictures taken in visible wavelengths and enhanced through computer processing are stunning in their beauty as well as their scientific value.

It is easy to obtain a copy of the slides. They are available from the Central Operations of Resources for Educators

(CORE) in Ohio or from NASA's Teacher Resource Centers. Please refer to pages 90 and 91 of this guide for details on how to contact CORE or the NASA Teacher Resource Center that serves the state you live in.



NASA's Great Observatories Paper Model Kits



NASA's Great Observatory Paper Model Kits permit students to construct detailed spacecraft models in the classroom or at home. Completed models may be used in space dioramas or hung from the ceiling. The kit contains background information on the mission of the observatories and their instruments. The kit contains reproducible masters for the models that should be copied on to paper stock 60 pounds or

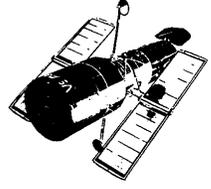
greater. Models may be enlarged on a copier if bigger models are desired. The pieces of each observatory are labeled with detailed, step-by-step instructions and a listing of additional materials required for assembly. To obtain a kit, contact the NASA Teacher Resource Center that serves your region. See pages 90-91 for a list of these centers.



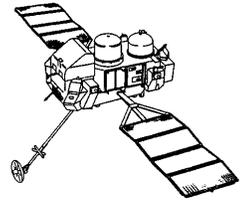
NASA's Great Observatories

Educational Product	
Teacher and Students	Grades 5-12

Paper Model Kits

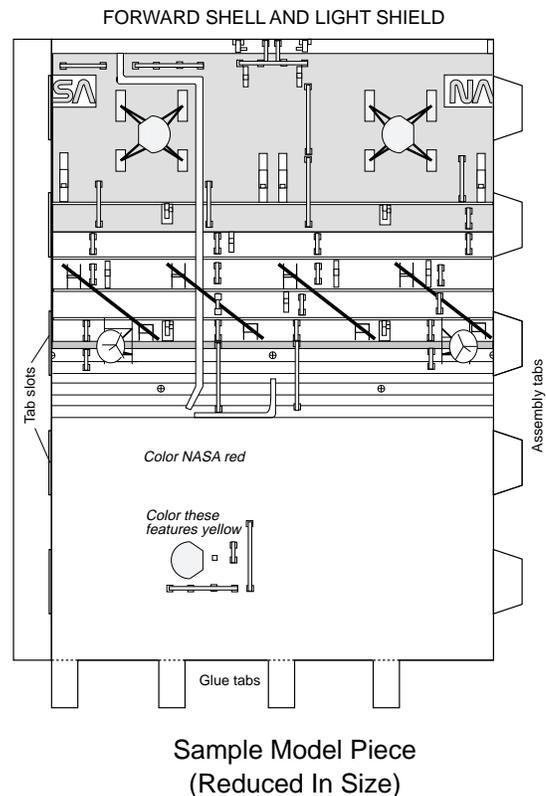


Hubble Space Telescope



Compton Observatory

STEP 1. Copy these model plans onto white 60 pound coverstock paper. Save these pages as printing masters.



Glossary

Absorption lines - Dark lines that are produced in a spectrum because intervening atoms absorbed photons of specific wavelengths.

Angstrom - A unit of measure equal to 10^{-12} meters.

Astronomy - The branch of science focusing on celestial objects, dealing with their size, location, composition, dynamics, origin, etc.

Astrophysics - Investigation, through remote sensing, of the physical principles of astronomical objects.

Binary numbers - A system of numbers that has two as its base and can be used for numerical coding of data.

Black hole - A body (usually a collapsed star) whose surface gravity is so great that neither matter nor light can escape from it.

Charged coupled device (CCD) - An electronic device that consists of a regular array of light sensitive elements that emit electrons when exposed to light. CCDs are used as the light-detecting element in telescopes, television cameras, etc.

Concave lens or mirror - A lens or mirror with an inward curvature.

Continuous spectrum - A spectrum unbroken by absorption or emission lines.

Convex lens or mirror - A lens with an outward curvature.

Diffraction - The spreading out of light waves as they pass by the edge of a body or through closely spaced parallel scratches in a diffraction grating.

Dispersion - Breaking up of light into its component colors.

Doppler shift (effect) - Changes in the wavelengths of sound or light as the distance between the emitter and the receiver changes.

Earth-based telescope - Telescope mounted on the surface of Earth.

Electromagnetic spectrum - The complete range of all wavelengths of electromagnetic radiation.

Enhancement (computer) - Boosting the color or contrast of a faint image through computer processing.

Excitation - The state that occurs when electrons are raised by an external input, such as light or an electronic current, to higher energy levels.

Fluorescence - A spontaneous emission of a photon of light that occurs when an electron drops down from a higher energy level (See excitation.) to its original level.

Frequency - The number of waves that pass a point in one second. Frequency is usually expressed in units of hertz (waves or cycles per second).

Gamma rays - Electromagnetic radiation with wavelengths shorter than 10^{-12} meters.

Geostationary satellite - A satellite placed in an orbit 35,900 kilometers over Earth's equator that remains in the same place at all times.

Infrared - Electromagnetic radiation with wavelengths ranging from approximately 10^{-4} to 10^{-6} meters.

Light gathering power (LGP) - The ability of an optical instrument to collect light.

Long wave UV - Ultraviolet light with wavelengths (about 10^{-7} meters) just shorter than the optical range of the electromagnetic spectrum.

Microwaves - Electromagnetic radiation with wavelengths ranging around 10^{-3} meters.

Nanometer - One billionth of a meter (10^{-9} m).

Neutron stars - A star about 10 kilometers in diameter composed entirely of densely-packed neutrons.

Objective lens or mirror - The large lens or mirror of a telescope. Sometimes referred to as the primary lens or mirror.

Ozone layer - A region in Earth's upper atmosphere (between 15 and 30 kilometers) where small concentrations of ozone absorb ultraviolet radiation from the Sun and other celestial bodies.

Persistence of vision - Momentary visual retention of light.

Photometry - Measurement of the intensity of light.

Photons - A quantum or individual packet of electromagnetic energy.

Photosphere - The visible surface of the Sun.

Pixels - The smallest element of a picture.

Pulsars - A stellar radio source that emits radio waves in a pulsating rhythm.

Radio waves - Electromagnetic radiation with wavelengths ranging from approximately 10^4 to 10^{-2} meters.

Refraction - Bending of light rays as they

pass through the interface between two transparent media.

Resolution - The degree to which fine details in an image can be seen as separated or resolved.

Resonance - Sympathetic vibration of one body when exposed to vibrations or electromagnetic radiation emanating from another.

Scientific Notation - Scientific notation, or powers of 10, which can simplify writing large numbers. Numbers with positive powers mean the decimal point moves to the right (e.g., $3 \times 10^6 = 3,000,000$). A number with a negative power means that the decimal moves to the left (e.g., $3 \times 10^{-6} = 0.000,006$).

Short wave UV - Ultraviolet light with wavelengths nearest the x-ray range (around 10^{-8} meters) of the electromagnetic spectrum.

Space-based astronomy - Astronomical investigations conducted from above Earth's atmosphere.

Spectrograph - An instrument used for dispersing and recording specific wavelengths of the electromagnetic spectrum.

Spectroscopy - The study of spectra.

Speed of light - The speed at which light travels—300,000,000 meters per second.

Supernova - A stellar explosion which increases the brightness of a star by a factor of several million times in a matter of days.

Ultraviolet (UV) - Electromagnetic radiation with wavelengths ranging from

approximately 10^{-7} to 10^{-8} meters.

Visible light - Electromagnetic radiation with wavelengths ranging from approximately 400 to 700 nanometers.

Wavelength - The distance between one wave crest to the next wave crest (or one trough to the next trough).

White dwarf - A small star that has exhausted its nuclear fuel but continues to shine from residual heat.

X-rays - Electromagnetic radiation with wavelengths ranging from approximately 10^{-8} to 10^{-10} meters.

NASA Educational Materials

NASA publishes a variety of educational resources suitable for classroom use. The following resources specifically relate to spacecraft and space exploration. Resources are available from different sources as noted.

Educational Videotapes

Educational videotapes and slide sets are obtainable through CORE.

Electromagnetic Spectrum: A Symphony of Light

Length: 19:30

Grades: 5-8

Application: Earth Science, Physical Science

The crew of the orbiting Astro-1 Mission (December, 1990) discusses the range of the electromagnetic spectrum and why it is important to climb above Earth's filtering atmosphere to study astronomical objects. Includes a teacher guide. *Available through NASA Johnson Space Center.*

Hubble Space Telescope, "The Best Is Yet To Come . . ."

Length: 07:15

Grades: 5-12

Application: Astronomy, Physical Science

This program focuses on the human endeavor involved in restoring the *Hubble Space Telescope* to

its original scientific potential on the STS-61 mission. It features the most visually striking moments and interweaves stories from the astronauts.

Starfinder Series

Length: 30 minutes

Grades: 5-12

Application: Earth Science, Physical Science

This 30 part series covers science concepts in a timely and interesting fashion, based on discoveries by the *Hubble Space Telescope*.

Space Classroom: Assignment the Stars

Length: 27:00

Grades: 5-8

Application: Astronomy, Physical Science

The crew of the orbiting Astro-1 Mission (December, 1990) deliver a live astronomy lesson to middle school students. Students learn about the electromagnetic spectrum and how it relates to an astronomy mission. Includes a teacher guide.

Hubble Space Telescope Slide Set

Astrophysics Division Missions

(1992 and yearly installments)

This slide set features images taken from the *Hubble Space Telescope* and the *Cosmic Background Explorer*. Slides also explain NASA's current and future Great Observatories: the *Hubble Space Telescope* (HST), the *Compton Gamma Ray Observatory* (CGRO), the *Advanced X-ray Astrophysics Facility* (AXAF), and the *Space Infrared Telescope Facility* (SIRTF).

Astro 1: Seeing the Hidden Cosmos

Grades: 5-8

This slide set describes the story of *Hubble Space Telescopes's* deployment, mirror problem and discoveries. Includes slides on NASA's Great Observatories and *Cosmic Background Explorer*. Updated with 1992 and 1993 discoveries.

Educational Software

Educational software is available through the NASA Teacher Resources Center Network and CORE.

Astronomy Village; Investigations in Astronomy, a NASA Educational Product by Classroom of the Future

Software: CD-ROM, Macintosh-based

Grades: 9-12

Application: Astronomy

This multimedia program provides teachers and students with ten investigations in astronomy. Students conduct a scientific inquiry working in teams of three, interfacing in a village setting with a

mountain top observatory. The resources available to the team on CD-ROM include: full motion video clips; images from the *Hubble Space Telescope* and other instruments, audio clips by astronomers, NASA publications, information from astronomy journals and books; and computer animation and graphics.

Hubble Space Telescope Educational Software
by Oklahoma State University (1990)

Software: Apple II and Macintosh (PageMaker 3.02)

Grades: 5-8

Application: Astronomy, Physical Science

This software package chronicles the history of astronomical observations culminating in the *Hubble Space Telescope*, examines the design and science of telescopes, describes *Hubble's* instruments, and illustrates how *Hubble* captures and transmits images from space. Includes fact sheets, lithographs, software, activities, bibliography, models, and evaluation materials.

Publications

Educational and background information publications are available from NASA Headquarters. Please address requests to:

NASA Headquarters

Code FEO-2

Space-Based Astronomy Teacher's Guide

300 E Street, SW

Washington, DC 20546-0001

NASA (1993) Black Holes, Educational Brief, EB-114, NASA Headquarters, Washington, DC.

NASA (1987) The Death of a Star: Supernova 1987a, Educational Briefs, EB-88-1 (S), NASA Headquarters, Washington, DC.

NASA (1992) The Extreme Ultraviolet Explorer Mission, Educational Briefs, EB-108, NASA Headquarters, Washington, DC.

NASA (1992) What is Space Physics? Educational Briefs, EB-106, NASA Headquarters, Washington, DC.

NASA (1992) A Career in Space Physics, Educational Topic, ET-101, NASA Headquarters, Washington, DC.

NASA (1993) Corrective Optics Space Telescope Axial Replacement (COSTAR), NASA Facts, NF-181, NASA Goddard Space Flight Center, Greenbelt, MD.

NASA (1993) The Cosmic Background Explorer: Looking Back to the Beginning of Time, NASA Fact Sheet, NASA HqL-354, NASA Headquarters, Washington, DC.

NASA (1991) The Gamma-Ray Observatory, NP-124, NASA Goddard Space Flight Center, Greenbelt, MD.

NASA (1991) The Gamma-Ray Observatory: Exploring the Mysteries of Time, NASA Goddard Space Flight Center, Greenbelt, MD.

NASA (1990) The Great Observatories for Space Astrophysics, NP-128, NASA Headquarters, Washington, DC.

NASA (1988), How Big is the Universe? Information Summaries, PMS-019, NASA Lewis Research Center, Cleveland, OH.

NASA (1993) Hubble Space Telescope, Operations Control Center, NASA Facts, NF-206, NASA Goddard Space Flight Center, Greenbelt, MD.

NASA (1993) Hubble vs New Ground-Based Optics, NASA Headquarters, Washington, DC.

NASA (1992) NASA Restructures AXAF Program, NASA Fact Sheet, NASA Headquarters, Washington, DC.

Color Lithographs

Lithographs are available from NASA Headquarters. (See the address listed under publications.)

HqL-323 Scientific Balloons

HqL-336 HST NGC 2440

HqL-338 COBE Big Bang Cosmology

HqL-375 International Ultraviolet Explorer Studies the Universe

HqL-376 Saturn

HqL-377 Pluto

HqL-378 Venus

HqL-380 Uranus

HqL-381 Moon

HqL-382 Jupiter

HqL-386 Our Star—The Sun

HqL-388 Asteroids: Gaspra and Ida

HqL-398 Hubble Reveals Central Region of an Active Galaxy

HqL-399 Hubble's New Optics Probe Core of Distant Galaxy

HqL-400 HST First Servicing Mission

Suggested Reading

Books

These books can be used by students and teachers to learn more about space-based astronomy.

Bishop, P. (1993), Observer's Handbook, 1994, The Royal Astronomical Society of Canada, Toronto, Ontario. (Published annually.)

Bonnet, R. & Keen, G. (1992), Space & Astronomy, 49 Science Fair Projects, TAB Books, Blue Ridge Summit, PA.

Clark, D. (1987), The Cosmos From Space - Astronomical Breakthroughs - The View From Beyond Earth's Atmosphere, Crown Publishers, New York, NY.

DeBruin, J. & Murad, D. (1988), Look to the Sky: The Science of Spaceflight, Orbit Book Company, Malabar, FL.

Dickenson, T. et al (1988), The Edmund Scientific Mag 6 Star Atlas, Edmund Scientific, Barrington, NJ.

Field, G. & Goldsmith, D. (1989), The Space Telescope, Contemporary Books, Chicago, IL.

Lampton, C. (1987), The Space Telescope, Franklin Watts, Inc., New York, NY.

Lampton, C. (1987), Astronomy - From Copernicus to the Space Telescope, Franklin Watts, Inc., New York, NY.

Longair, M. (1989), Alice and the Space Telescope, The Johns Hopkins University Press, Baltimore, MD.

Moeschl, R. (1989), Exploring the Sky: 100 Projects for Beginning Astronomers, Chicago Review Press, Chicago, IL.

Ottwell, G. (1992), The Astronomical Companion, Astronomical Workshop, Greenville, SC.

Paul, R. (1993) A Handbook to the Universe, Chicago Review Press, Chicago, IL.

Pethoud, R. (1993) Pi in the Sky: Hands-on Mathematical Activities for Teaching Astronomy, Zephyr Press, Tucson, AZ.

Porcellino, M. (1991), Young Astronomer's Guide to the Night Sky, TAB Books, Blue Ridge Summit, PA.

Schaff, F. (1992), Seeing the Deep Sky: Telescopic Astronomy Projects Beyond the Solar System, John Wiley & Sons, Inc., New York, NY.

Schaff, F. (1991), Seeing the Solar System: Telescopic Projects, Activities, & Explorations in Astronomy, John Wiley & Sons, Inc., New York, NY.

Schaff, F. (1990), Seeing the Sky: 100 Projects, Activities & Explorations in Astronomy, John Wiley & Sons, Inc., New York, NY.

Schaff, F. (1988, 1990) The Starry Room: Naked Eye Astronomy in the Intimate Universe, John Wiley & Sons, Inc., New York, NY.

Schatz, D. (1991), Astronomy Activity Book, Little Simon, New York, NY.

Smith, P. (1992), Project Earth Science: Astronomy, National Science Teacher's Association, Arlington, VA.

Sneider, C., et al. (1989), Color Analyzers, Lawrence Hall of Science, Berkeley, CA.

Sneider, C., Gould, A. (1988), More than Magnifiers, Lawrence Hall of Science, Berkeley, CA.

Sneider, C. (1988), Earth, Moon, and Stars, Lawrence Hall of Science, Berkeley, CA.

Van Cleave, J. (1991) Astronomy for Every Kid: 101 Easy Experiments that Really Work, John Wiley & Sons, Inc., New York, NY.

Vogt, G. (1992), The Hubble Space Telescope, The Millbrook Press, Brookfield, CT.

Wood, R. (1991), Science for Kids: 39 Easy Astronomy Experiments, TAB Books, Blue Ridge Summit, PA.

Magazines

Smith, B. (1994), "New Eyes on the Universe," National Geographic, v185 n1, pp 2-40.

Astronomy Magazine, Kalmbach Publishing Co., 21027 Crossroads Circle, P.O. Box 1612, Waukesha, WI 53187

Mercury. The Journal of the Astronomical Society of the Pacific, The Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112

Odyssey, Cobblestone Publishing, Inc., 30 Grove Street, Peterborough, NH 03458-1454

Sky & Telescope, Sky Publishing Corporation, 49 Bay State Road, Cambridge, MA 02138

NASA Educational Resources

NASA Spacelink: An Electronic Information System

NASA Spacelink is a computer information service that individuals may access to receive news about current NASA programs, activities, and other space-related information, including: historical data, current news, lesson plans, classroom activities, and even entire publications. Although it is primarily intended as a resource for teachers, the network is available to anyone with a personal computer and a modem.

Users need a computer, modem, communication software, and a long-distance telephone line to access Spacelink. The Spacelink computer access number is (205) 895-0028. The data word format for direct and Internet access is 8 bits, no parity, and 1 stop bit. It is also available through the Internet, a worldwide computer network connecting a large number of educational institutions and research facilities. Callers with Internet access may reach NASA Spacelink at any of the following addresses:

spacelink.msfc.nasa.gov
xsl.msfc.nasa.gov
192.149.89.61

For more information, contact:
Spacelink Administrator
NASA Marshall Space Flight Center
Mail Code CA21
Huntsville, AL 35812-7015
Phone: (205) 544-6360

NASA Education Satellite Videoconference Series

During the school year, NASA delivers a series of educational programs by satellite to teachers across the country. The content of each videoconference varies, but all cover aeronautics or space science topics of interest to the educational community. NASA program managers, scientists, astronauts, and education specialists are featured presenters. Broadcasts are interactive: a number is flashed across the bottom of the screen, and viewers may call collect to ask questions or to take part in the discussion. The videoconference series is free to registered educational institutions. The programs may be videotaped and copied for later use. To participate, the institution must have a C-band satellite receiving system, teacher release time, and an optional long-distance telephone line for interaction. Arrangements may also be made to receive the satellite signal through the local cable television system. For more information, contact:

Videoconference Coordinator
NASA Teaching From Space Program
Oklahoma State University
300 North Cordell
Stillwater, OK 74078-0422

NASA Television

NASA Television (TV) is the Agency's distribution system for live and taped programs. It 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.

The educational programming is designed for classroom use and is aimed at inspiring students to achieve—especially in science, mathematics, and technology. If your school's cable TV system carries NASA TV or if your school has access to a satellite dish, the programs may be downlinked and videotaped. Daily and monthly programming schedules for NASA TV are also available via NASA Spacelink. NASA Television is transmitted on Spacenet 2 (a C-band satellite) on transponder 5, channel 8, 69 degrees West with horizontal polarization, frequency 3880.0 Megahertz, audio on 6.8 megahertz. For more information contact:

NASA Headquarters
Technology and Evaluation Branch
Code FET
Washington, DC 20546-0001

NASA Teacher Resource Center Network

To make additional information available to the education community, the NASA Education Division has created the NASA Teacher Resource Center (TRC) network. TRCs 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. Because each NASA field center has its own areas of expertise, no two TRCs are exactly alike. Phone calls are welcome if you are unable to visit the TRC that serves your geographic area. A list of the centers and the geographic regions they serve starts at the bottom of this page.

Regional Teacher Resource Centers (RTRCs) offer more educators access to NASA educational materials. NASA has formed partnerships with universities, museums, and other educational institutions to serve as RTRCs in many states. Teachers may preview, copy, or receive NASA materials at these sites. A complete list of RTRCs is available through CORE.

NASA Central Operation of Resources for Educators (CORE) was established for the national and international distribution of NASA-produced educational materials in audiovisual format. Educators can obtain a catalogue of these materials and an order form by written request, on school letterhead to:

NASA CORE
 Lorain County Joint Vocational School
 15181 Route 58 South
 Oberlin, OH 44074
 Phone: (216) 774-1051, Ext. 293 or 294



IF YOU LIVE IN:

Center Education Program Officer

Teacher Resource Center

Alaska	Nevada	Mr. Garth A. Hull	NASA Teacher Resource Center
Arizona	Oregon	Chief, Education Programs Branch	Mail Stop T12-A
California	Utah	Mail Stop 204-12	NASA Ames Research Center
Hawaii	Washington	NASA Ames Research Center	Moffett Field, CA 94035-1000
Idaho	Wyoming	Moffett Field, CA 94035-1000	PHONE: (415) 604-3574
Montana		PHONE: (415) 604-5543	
Connecticut	New Hampshire	Mr. Richard Crone	NASA Teacher Resource Laboratory
Delaware	New Jersey	Educational Programs	Mail Code 130.3
District of Columbia	New York	Code 130	NASA Goddard Space Flight Center
Maine	Pennsylvania	NASA Goddard Space Flight Center	Greenbelt, MD 20771-0001
Maryland	Rhode Island	Greenbelt, MD 20771-0001	PHONE: (301) 286-8570
Massachusetts	Vermont	PHONE: (301) 286-7206	
Colorado	North Dakota	Dr. Robert W. Fitzmaurice	NASA Teacher Resource Room
Kansas	Oklahoma	Center Education Program Officer	Mail Code AP-4
Nebraska	South Dakota	Education and Public Services	NASA Johnson Space Center
New Mexico	Texas	Branch - AP-4	Houston, TX 77058-3696
		NASA Johnson Space Center	PHONE: (713) 483-8696
		Houston, TX 77058-3696	
		PHONE: (713) 483-1257	
Florida		Mr. Steve Dutczak	NASA Educators Resource Laboratory
Georgia		Chief, Education Services Branch	Mail Code ERL
Puerto Rico		Mail Code PA-ESB	NASA Kennedy Space Center
Virgin Islands		NASA Kennedy Space Center	Kennedy Space Center, FL 32899-0001
		Kennedy Space Center, FL 32899-0001	PHONE: (407) 867-4090
		PHONE: (407) 867-4444	

IF YOU LIVE IN:

Center Education Program Officer

Teacher Resource Center

Kentucky
North Carolina
South Carolina
Virginia
West Virginia

Ms. Marchell Canright
Center Education Program Officer
Mail Stop 400
NASA Langley Research Center
Hampton, VA 23681-0001
PHONE: (804) 864-3307

NASA Teacher Resource Center for
NASA Langley Research Center
Virginia Air and Space Center
600 Settler's Landing Road
Hampton, VA 23699-4033
PHONE: (804)727-0900 x 757

Illinois
Indiana
Michigan

Minnesota
Ohio
Wisconsin

Ms. Jo Ann Charleston
Acting Chief, Office of Educational
Programs
Mail Stop 7-4
NASA Lewis Research Center
21000 Brookpark Road
Cleveland, OH 44135-3191
PHONE: (216) 433-2957

NASA Teacher Resource Center
Mail Stop 8-1
NASA Lewis Research Center
21000 Brookpark Road
Cleveland, OH 44135-3191
PHONE: (216) 433-2017

Alabama
Arkansas
Iowa

Louisiana
Missouri
Tennessee

Mr. JD Horne
Director, Executive Staff
Mail Stop DX01
NASA Marshall Space Flight Center
Huntsville, AL 35812-0001
PHONE: (205) 544-8843

NASA Teacher Resource Center for
NASA Marshall Space Flight Center
U.S. Space and Rocket Center
P.O. Box 070015
Huntsville, AL 35807-7015
PHONE: (205) 544-5812

Mississippi

Dr. David Powe
Manager, Educational Programs
Mail Stop MA00
NASA John C. Stennis Space Center
Stennis Space Center, MS 39529-6000
PHONE: (601) 688-1107

NASA Teacher Resource Center
Building 1200
NASA John C. Stennis Space Center
Stennis Space Center, MS 39529-6000
PHONE: (601) 688-3338

The Jet Propulsion Laboratory (JPL)
serves inquiries related to space and
planetary exploration and other JPL
activities.

Dr. Fred Shair
Manager, Educational Affairs Office
Mail Code 183-900
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109-8099
PHONE: (818) 354-8251

NASA Teacher Resource Center
JPL Educational Outreach
Mail Stop CS-530
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109-8099
PHONE: (818) 354-6916

California (mainly cities near
Dryden Flight Research Facility)

NASA Teacher Resource Center
Public Affairs Office (Trl. 42)
NASA Dryden Flight Research Facility
Edwards, CA 93523
PHONE: (805) 258-3456

Virginia and Maryland's
Eastern Shores

NASA Teacher Resource Lab
NASA Goddard Space Flight Center
Education Complex - Visitor Center
Building J-17
NASA Wallops Flight Facility
Wallops Island, VA 23337-5099
Phone: (804) 824-2297/2298