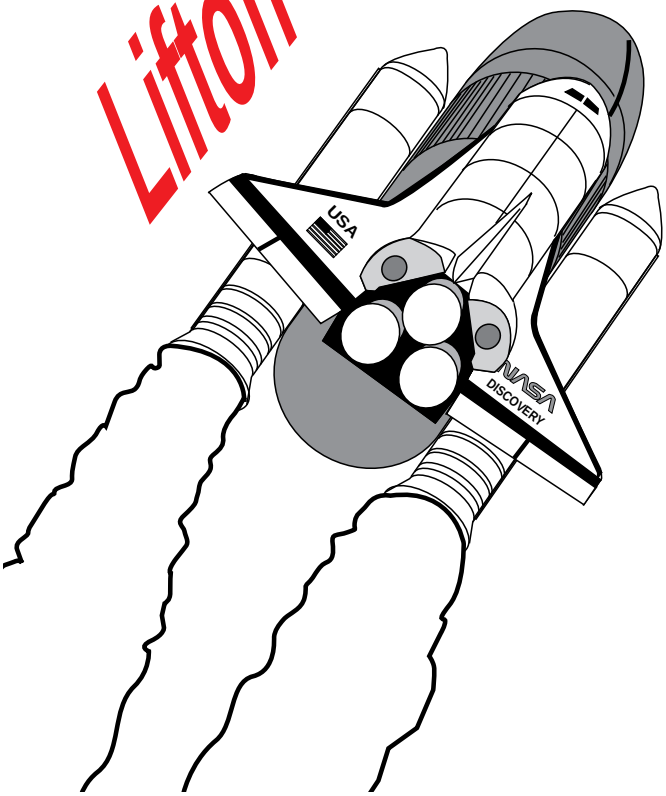
Educational Product	
Teachers	Grades K - 12

National Aeronautics and
Space Administration

Liftoff To Learning



Educational Videotape Series

SpaceLink

Video Resource Guides to the *Liftoff to Learning Educational Videotape Series* are available in electronic format through NASA Spacelink—NASA's electronic information system for education.

The system may be accessed by computer through direct-dial modem or the Internet.

Modem line:	(205) 895-0028
Terminal emulation:	VT-100 required
Data format:	8-N-1
Telnet:	spacelink.msfc.nasa.gov

Spacelink fully supports the following Internet services:

World Wide Web:	http://spacelink.msfc.nasa.gov
Gopher:	spacelink.msfc.nasa.gov
Anonymous FTP:	spacelink.msfc.nasa.gov
Internet TCP/ IP address:	192.149.89.61

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Liftoff to Learning
Educational Videotape Series

Every liftoff of the Space Shuttle is the beginning of a voyage of exploration and discovery. The experiences of Shuttle astronauts capture the imagination of students of all ages. Students study science, mathematics, and technology with crew members aboard Space Shuttle flights. Space becomes the departure point for learning, integrating many other subject areas, bringing them to life.

Recognizing the potential of the Space Shuttle experience in the classroom, NASA's Education Division and the Johnson Space Center's Flight Crew Operations Directorate have joined forces to create a dynamic videotape series to support teachers in the classroom. *Liftoff To Learning* captures the excitement of space flight and explains, in basic and practical terms, the scientific, mathematical, and technologic concepts that make space flight possible. These learning tools also provide concrete examples of the global perspective space flight offers and the new frontiers of research and exploration space flight has created.

Taking advantage of state-of-the-art video production facilities and computer animation capabilities of the NASA Johnson Space Center, *Liftoff To Learning* programs combine the stunning visual images of space flight with clear and entertaining graphics. Each program comes with a printed video resource guide that provides valuable background information for teachers, resources for additional study, and practical hands-on demonstrations of some of the concepts presented in the videotapes. Currently, the series contain eleven programs; however, new titles are under development and will be added to the series as they become available.

Obtaining *Liftoff To Learning* Videotapes and Video Resource Guides

All programs and publications in the *Liftoff To Learning* series are available at little cost from the NASA Teacher Resource Center (TRC) Network. See the TRC list in this brochure for details on the center that serves your state.

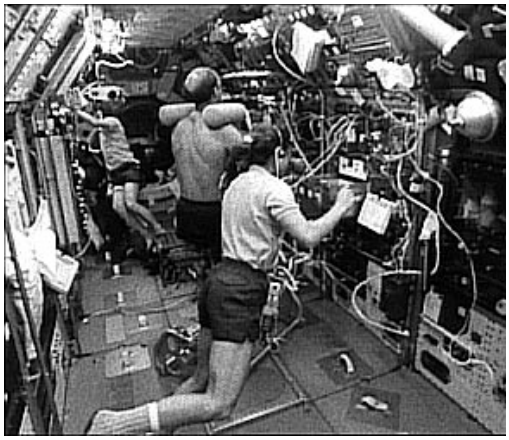
The *Liftoff to Learning* series programs are also available by mail order nationally and internationally through NASA's Central Operation of Resources for Educators (CORE). CORE is NASA's audiovisual educational materials distribution center. Educators can obtain a catalogue of these materials and an order form by written request on school letterhead. Write or call:

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

Access *NASA Spacelink*, NASA's electronic information service for educators to download Video Resource Guides to the *Liftoff to Learning* videotapes. As new programs are added to the series, the Video Resource Guides will appear on NASA Spacelink. See the inside cover of this brochure for details on accessing Spacelink by computer.

All Systems Go!

Grade Level	Application
5-12	Biology Life Sciences



All Systems Go! examines human physiologic changes that occur in astronauts while they are in microgravity and attempts to answer important questions on how the body readapts to Earth's environment. The videotape shows research conducted aboard the Space Shuttle that examines the heart, lungs, blood, muscles, cells, and the immune system as part of six physiological systems. This program is segmented, enabling teachers to extract topics that are most relevant to current classroom studies.

Length: 33:34

Assignment: Spacelab!

Grade Level	Application
5-12	Life Sciences Physical Science

Assignment: Spacelab! demonstrates how proper laboratory procedures are as important in space as they are on Earth. This video emphasizes safety as well as reasons for experimental controls and other laboratory procedures. The program begins in a school science classroom where students are conducting an experiment without wearing eye protection. From the orbiter astronauts reinforce the teacher's message and expand the explanation as to why proper laboratory procedures are critical to all scientists.

Length: 16:05

The Atmosphere Below

Grade Level	Application
5-12	Earth Sciences

The Atmosphere Below illustrates the research scientists are conducting from Earth orbit to help understand changes that are taking place in Earth's atmosphere. Space Shuttle astronauts explain the questions scientists hope can be answered by studying Earth's atmosphere from space. Experiments discussed in this videotape focus on infrared detection of atmospheric remnants from volcanic eruptions, ozone concentration levels, and incoming solar ultraviolet radiation in respect to global warming, among others.

Length: 16:00

From Undersea to Outer Space

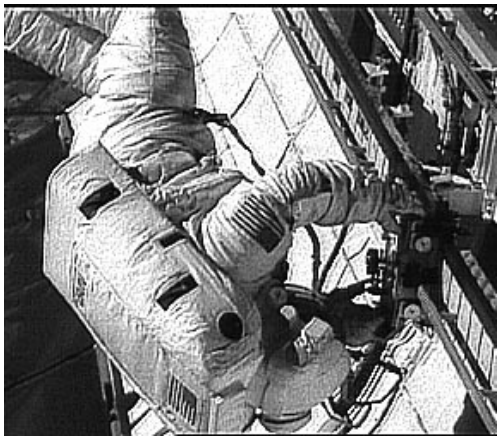
Grade Level	Application
5-8	Life Sciences

From Undersea to Outer Space is the story of a life sciences experiment conducted on the first Spacelab Life Sciences Mission flown on the Space Shuttle. More than 2,000 jellyfish were sent into space to learn about how living things adapt to the microgravity environment of Earth orbit. Scientists examined how microgravity affects the development of young jellyfish, especially their gravity receptors. The gravity receptors of jellyfish serve a purpose similar to the inner ear of human beings for balance and orientation.

Length: 15:06

Go For EVA!

Grade Level	Application
K-8	Life Sciences, Physical Science, Technology, History, Social Studies



Go For EVA! discusses how spacesuits protect astronauts from the hostile space environment, explains what the components of the spacesuit are, describes how the suit functions, and shows what types of work astronauts perform while spacewalking. Actual footage of spacewalks–also known as Extravehicular Activities (EVAs)–illustrates how spacesuits allow astronauts to operate scientific apparatus, assemble equipment and structures, pilot the Manned Maneuvering Unit, take pictures, and service satellites and space hardware.

Length: 13:48

Living In Space

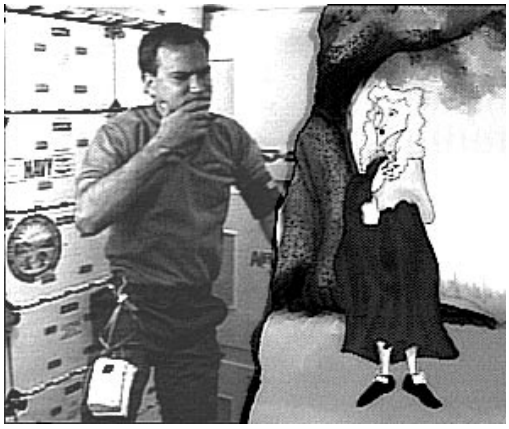
Grade Level	Application
K-4	Life Sciences Physical Science

Living In Space demonstrates what it is like to live and work in space. Viewers are invited to join the astronauts as they go through their daily routine living onboard the Space Shuttle. This program answers many of the basic questions students ask astronauts about living in space. Students gain insight into the similarities and differences in eating, exercising, relaxing, maintaining personal hygiene, sleeping, and working in space versus on Earth.

Length: 10:00

Newton In Space

Grade Level	Application
5-8	Physical Science

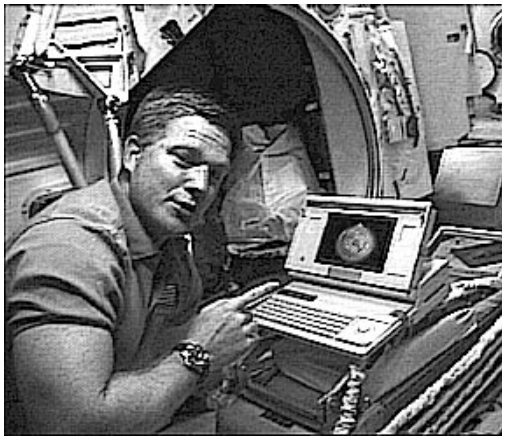


Newton In Space offers an introduction to Isaac Newton's Laws of Motion and how these laws apply to space flight. The program explains the difference between weight and mass, the basic principles of balanced and unbalanced forces, action and opposite reactions, and how the three laws of motions affect the way a rocket operates. Using the microgravity environment of Earth orbit, Space Shuttle astronauts conduct simple force and motion demonstrations in ways not possible on Earth.

Length: 12:37

Space Basics

Grade Level	Application
5-8	History Physical Science Technology



Space Basics answers basic questions about space flight including: how spacecraft travel into space; how spacecraft remain in orbit; why astronauts float in space; and how spacecraft return to Earth. Viewers learn how English scientist Isaac Newton formulated the basic science behind Earth orbit more than 300 years ago.

Length: 20:55

Tethered Satellites

Grade Level	Application
9-12	Physical Science

Tethered Satellite - Forces and Motions demonstrates the principle behind a unique scientific satellite that the Space Shuttle deployed into space attached to the Shuttle by a thin line. Crew members on this joint mission between the United States and Italy describe the project and the many physical principles involved that permit it to work, such as angular momentum, center of mass Coriolis Effect, and more.

Length: 21:12

Toys In Space II

Grade Level	Application
K-12	Mathematics Physical Science Technology

Toys In Space II provides a hands-on way for students to investigate principles of mathematics and science that make many common toys function. The Space Shuttle crew invite students to experiment with similar toys in their classroom and hypothesize how these same toys will operate in microgravity. Scenes of the astronauts operating the toys in space serve as data for students to confirm or reject their hypotheses.

Length: 37:49

Voyage of* Endeavour *Then and Now

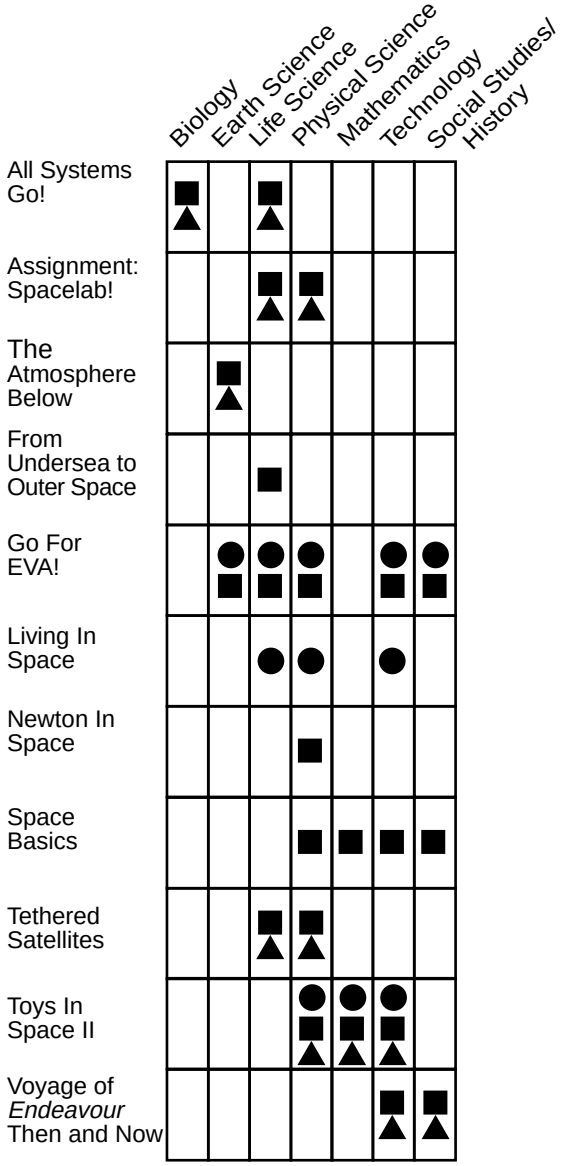
Grade Level	Application
5-12	History Social Studies Technology

Voyage of* Endeavour *Then and Now captures the excitement of the maiden flight of NASA's Space Shuttle *Endeavour* and contrasts it with its namesake, the seventeenth century research sailing vessel commanded by James Cook. Students will experience *Endeavour's* historic rescue of the stranded *INTELSAT VI* satellite and the first 3-person extravehicular activity (EVA). Cook's voyage provides an apt parallel by charting unexplored land and waters in the South Pacific, New Zealand, and Australia; and by using scientists and artists to collect data on plants, wildlife, and native peoples.

Length: 19:00

Liftoff To Learning
Educational Videotape Series

Subject Matrix



Liftoff to Learning videotapes are available from NASA Teacher Resource Centers

IF YOU LIVE IN:	**Teacher Resource Center**
Alaska Arizona California Hawaii Idaho Montana Nevada Oregon Utah Washington Wyoming	NASA Teacher Resource Center Mail Stop T12-A **NASA Ames Research Center** Moffett Field, CA 94035-1000 PHONE: (415) 604-3574
Connecticut Delaware District of Columbia Maine Maryland Massachusetts New Hampshire New Jersey New York Pennsylvania Rhode Island Vermont	NASA Teacher Resource Laboratory Mail Code 130.3 **NASA Goddard Space Flight Center** Greenbelt, MD 20771-0001 PHONE: (301) 286-8570
Colorado Kansas Nebraska New Mexico North Dakota Oklahoma South Dakota Texas	NASA Teacher Resource Room Mail Code AP-2 **NASA Johnson Space Center** 2101 NASA Road One Houston, TX 77058-3696 PHONE: (713) 483-8696
Florida Georgia Puerto Rico Virgin Islands	NASA Educators Resource Laboratory Mail Code ERL **NASA Kennedy Space Center** Kennedy Space Center, FL 32899-0001 PHONE: (407) 867-4090
Kentucky North Carolina South Carolina Virginia West Virginia	Virginia Air and Space Center NASA Teacher Resource Center for **NASA Langley Research Center** 600 Settler's Landing Road Hampton, VA 23669-4033 PHONE: (804) 727-0900 X 757
Illinois Indiana Michigan Minnesota Ohio Wisconsin	NASA Teacher Resource Center Mail Stop 8-1 **NASA Lewis Research Center** 21000 Brookpark Road Cleveland, OH 44135-3191 PHONE: (216) 433-2017

IF YOU LIVE IN:	**Teacher Resource Center**
Alabama Arkansas Iowa Louisiana Missouri Tennessee	U.S. Space and Rocket Center NASA Teacher Resource Center for **NASA Marshall Space Flight Center** P.O. Box 070015 Huntsville, AL 35807-7015 PHONE: (205) 544-5812
Mississippi	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.	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)	Public Affairs Office (Trl. 42) NASA Teacher Resource Center **NASA Dryden Flight Research Facility** Edwards, CA 93523 PHONE: (805) 258-3456
Virginia and Maryland's Eastern Shores	NASA Teacher Resource Lab Education Complex - Visitor Center Building J-17 **NASA Wallops Flight Facility** Wallops Island, VA 23337 PHONE: (804) 824-2297/2298
NASA's Central Operation of Resources for Educators (CORE) was established to facilitate 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.	**NASA CORE** Lorain County Joint Vocational School 15181 Route 58 South Oberlin, OH 44074 PHONE: (216) 774-1051 x 293/294

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. Contact CORE for a complete listing.

Please take a moment to complete the attached questionnaire,
detach it from the brochure, and mail us your response.

EP-319 August 1995

Liftoff To Learning
Educational Videotape Series

Check the following *Liftoff To Learning Educational Videotape Series* programs that you have used in your classroom.

- ❑ All Systems Go!
- ❑ Assignment: Spacelab!
- ❑ The Atmosphere Below
- ❑ From Undersea to Outer Space
- ❑ Go For EVA!
- ❑ Living In Space
- ❑ Newton In Space
- ❑ Space Basics
- ❑ Tethered Satellites
- ❑ Toys in Space II
- ❑ Voyage of *Endeavour* Then and Now

List the programs you liked best.

_____

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Identify topics of interest for future *Liftoff to Learning* Educational Videotape programs.

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How can we improve the quality of the *Liftoff to Learning* Educational Videotape Series?

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Your name and address:

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