



Educational Product

Teachers

Grades 5-8

SUITED FOR SPACEWALKING

TEACHER'S GUIDE WITH ACTIVITIES FOR PHYSICAL AND LIFE SCIENCE



1965 GEMINI

1969 APOLLO



1973 SKYLAB

1993 SHUTTLE



About the Cover

Gemini-Titan 4 EVA View (1965) - Astronaut Edward H. White II, floats in space outside of the Gemini-4 spacecraft. White was the first Gemini astronaut to leave his vehicle, tumbling and rolling in space for 21 minutes. He is secured to the spacecraft by an umbilical line and a tether line, both wrapped in gold tape to form one cord. In his right hand he carries a Hand-Held Self-Maneuvering Unit which allows him to control his movements in space.



Skylab 3 EVA View (1973) - Astronaut Owen K. Garriott is engaged in an EVA on the Skylab space station cluster in Earth orbit. Skylab spacesuits remained attached to the station by an umbilical tether that supplied oxygen and cooling water. A life-support assembly was worn on the chest and emergency oxygen was attached to the right upper leg.



Apollo 11 EVA View (1969) - Astronaut Edwin E. Aldrin, Jr. descends the steps of the Lunar Module ladder as he prepares to become the second person to walk on the moon. Apollo spacesuits were tetherless,



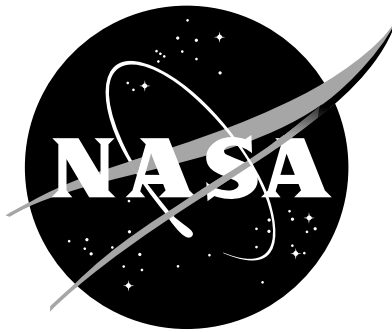
providing a self-contained life support system to allow sample collection and operation of scientific equipment at great distances from the landing site.



STS-61 EVA View (1993) - This image captures Astronaut Kathryn C. Thornton on her first STS-61 extravehicular activity (EVA) session servicing the Hubble Space Telescope. Thornton wears a spacesuit designed solely for EVA. In past programs spacesuits, had to serve as backup systems for cabin pressure failure, possible ejections during launches, the microgravity environment, and during liftoff and reentry. Shuttle suits are only worn during EVAs, at other times, crewmembers wear comfortable shirts and slacks, or coveralls.

Suited for Spacewalking

**Teacher's Guide With Activities
for Physical and Life Science**



**National Aeronautics and Space Administration
Office of Human Resources and Education
Education Division**

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Glossary

AMU	Astronaut Maneuvering Unit
Apollo	NASA project that landed astronauts on the Moon
CCA	Communications Carrier Assembly
CCC	Contaminant Control Cartridge
DACT	Disposable Absorption and Containment Trunk (female urine-collection system)
DCM	Displays and Control Module
EEH	EMU Electrical Harness
EMU	Extravehicular Mobility Unit
EVA	Extravehicular Activity; Extravehicular Visor Assembly
Gemini	NASA project that pioneered space flight technologies for spacecraft rendezvous and docking and spacewalking
HHMU	Hand-Held Maneuvering Unit
HUT	Hard Upper Torso
IDB	In-Suit Drink Bag
LCVG	Liquid Cooling-and-Ventilation Garment
Microgravity	The floating-like condition that occurs when objects are in freefall
MMU	Manned Maneuvering Unit
Mercury	The NASA project that launched the first U.S. astronauts into space and demonstrated that humans could live and work in space
PLSS	Primary Life-Support System
RMS	Remote Manipulator System
SCU	Service and Cooling Umbilical
Skylab	First U.S. space station
SOP	Secondary Oxygen Pack
Space Shuttle	Reusable spaceship currently used for all U.S. manned space missions
UCD	Urine Collection Device (male urine-collection system)

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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
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For more information, contact:
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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
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300 North Cordell
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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
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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
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The Jet Propulsion Laboratory (JPL) serves inquiries related to space and planetary exploration and other JPL activities.

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

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Go For EVA!

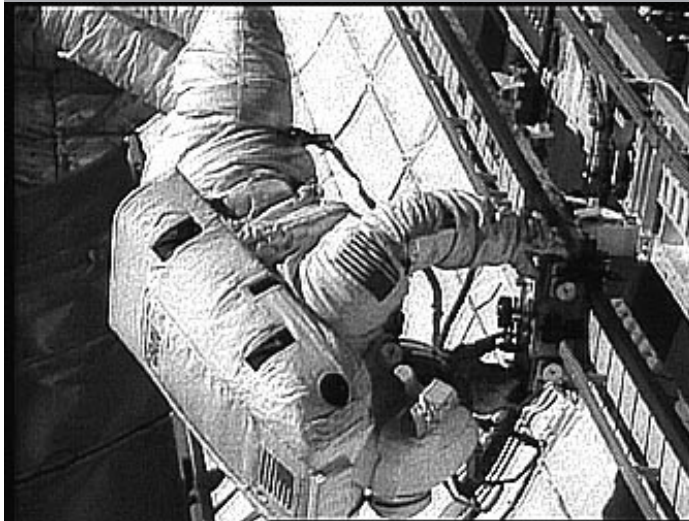


Image from the videotape **Go For EVA!** of the *Liftoff To Learning Videotape Series*

Go For EVA! is from the *Liftoff to Learning Educational Videotape Series*, which allows students to study science, mathematics, and technology with crewmembers aboard Space Shuttle Flights.

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 show what types of work astronauts perform while spacewalking. Actual footage of spacewalks—also known as Extravehicular Activities (EVAs)—illustrate 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

To obtain a copy of the **Go For EVA!** videotape and accompanying Video Resource Guide, or for more information on the *Liftoff to Learning Educational Videotape Series*, contact NASA Central Operation of Resources for Educators (CORE). See page 61.

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Educators and scientists at the National Aeronautics and Space Administration would appreciate your taking a few minutes to respond to the statements and questions below. Please return by mail.

SA	-	Strongly Agree
A	-	Agree
D	-	Disagree
SD	-	Strongly Disagree

Suited for Spacewalking-Teacher's Guide with Activities for Physical and Life Science

1. The teaching guide is easily integrated into the curriculum.

SA	A	D	SD
----	---	---	----

2. The procedures for the activities have sufficient information and are easily understood.

SA	A	D	SD
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3. The illustrations are adequate to explain the procedures and concepts.

SA	A	D	SD
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4. Activities effectively demonstrate concepts and are appropriate for the grade level I teach.

SA	A	D	SD
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5. a. What features of the guide are particularly helpful in your teaching?

b. What changes would make the guide more effective for you?

6. I teach _____ grade. Subjects _____

7. I used the guide with _____ (number of) students.

Additional comments: _____

Cut along line



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