



Educational Product	
Teachers	Grades 5-8

SUITED FOR SPACEWALKING

TEACHER'S GUIDE WITH ACTIVITIES FOR PHYSICAL AND LIFE SCIENCE



1 9 6 5 G E M I N I

1 9 6 9 A P O L L O



1 9 7 3 S K Y L A B

1 9 9 3 S H U T T L E



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,

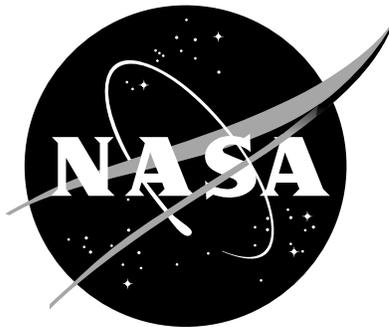
providing a self-contained life support system to allow sample collection and operation of scientific equipment at great distances from the landing site.



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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Acknowledgments

Writer

Gregory L. Vogt, Ed.D.

Teaching From Space Program
NASA Johnson Space Center
Houston, TX

Managing Editor

Cheryl A. Manning

Teaching From Space Program
NASA Headquarters
Washington, DC

Revision Editor

Carla B. Rosenberg

Teaching From Space Program
NASA Headquarters
Washington, DC

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NASA Headquarters

Washington, DC

Education Division

Elementary and Secondary Branch
Technology and Evaluation Branch
Educational Publications Branch

NASA Johnson Space Center

Houston, Texas

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Astronaut Office

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Oklahoma State University

Stillwater, Oklahoma

Aerospace Education Services Program

Special thanks also go to the following individuals for their assistance.

James W. McBarron

Chief, EVA Branch
Crew and Thermal Systems Division
NASA Johnson Space Center

Joseph J. Kosmo

Subsystems Manager for Spacesuit Development
Crew and Thermal Systems Division
NASA Johnson Space Center

Charles E. Whitsett

Manager for Projects
Automation and Robotics Division
NASA Johnson Space Center

Shirley Sirota Rosenberg

Consulting Editor
SSR, Inc.

Samuel Haltom

Cover Designer
Another Color, Inc.

Marco G. Zambetti

Animator
McDonnell Douglas Space Systems Company

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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
192.149.89.61

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
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
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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
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NASA Ames Research Center
 Moffett Field, CA 94035-1000
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 Educational Programs
 Code 130
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 PHONE: (301) 286-7206

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

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Dr. Robert W. Fitzmaurice
 Center Education Program Officer
 Education and Public Services
 Branch - AP-4
NASA Johnson Space Center
 Houston, TX 77058-3696
 PHONE: (713) 483-1257

NASA Teacher Resource Room
 Mail Code AP-4
NASA Johnson Space Center
 Houston, TX 77058-3696
 PHONE: (713) 483-8696

Florida
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Mr. Steve Dutzak
 Chief, Education Services Branch
 Mail Code PA-ESB
NASA Kennedy Space Center
 Kennedy Space Center, FL 32899-0001
 PHONE: (407) 867-4444

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 Laboratory
 Mail Code ERL
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Center Education Program Officer

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

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

Mr. JD Horne
Director, Executive Staff
Mail Stop DX01
NASA Marshall Space Flight Center
Huntsville, AL 35812-0001
PHONE: (205) 544-2957

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

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

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Mail Stop CS-530
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Grade Level	Application
K-8	Life Sciences, Physical Science, Technology, History, Social Studies

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Go For EVA!

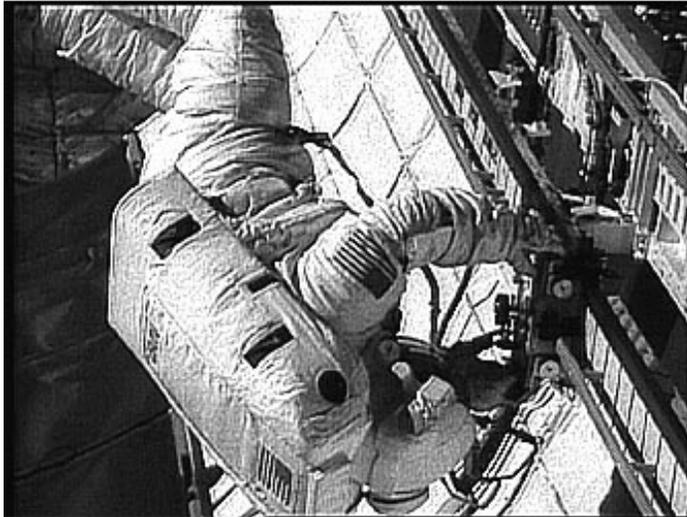


Image from the videotape *Go For EVA!* of the *Liftoff To Learning Videotape Series*

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

3. The illustrations are adequate to explain the procedures and concepts.

SA A D SD

4. Activities effectively demonstrate concepts and are appropriate for the grade level I teach.

SA A D SD

5. a. What features of the guide are particularly helpful in your teaching?

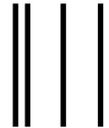
b. What changes would make the guide more effective for you?

6. I teach _____ grade. Subjects _____

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

Additional comments: _____

Cut along line



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