

#9112

ESCAPE FROM EARTH: THE FINAL FRONTIER

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Grade Levels: 9-12

55 minutes



DESCRIPTION

Though manned space flight began in 1961, any kind of off-earth colonization remains a dream. Astronauts and scientists speculate about the possibilities, dangers, and problems to be overcome.

ACADEMIC STANDARDS

Subject Area: Earth and Space Sciences

- Standard: Understands the composition and structure of the universe and the Earth's place in it
 - Benchmark: Knows ways in which technology has increased our understanding of the universe (e.g., visual, radio, and x-ray telescopes collect information about the universe from electromagnetic waves; space probes gather information from distant parts of the Solar System; mathematical models and computer simulations are used to study evidence from many sources in order to form a scientific account of events in the universe)

Subject Area: Technology

- Standard: Understands the relationships among science, technology, society, and the individual
 - Benchmark: Knows that technology and science have a reciprocal relationship (e.g., technology drives science, as it provides the means to access outer space and remote locations, collect and treat samples, collect, measure, store, and compute data, and communicate information; science drives technology, as it provides principles for better instrumentation and techniques, and the means to address questions that demand more sophisticated instruments)

INSTRUCTIONAL GOALS

1. To review the technological progress made in space exploration.
2. To illustrate plans for space exploration.
3. To realize that the surface and surrounding area in outer space challenge existing technologies to create a habitable planet.

BEFORE SHOWING

1. Speculate what steps need to be taken in the process of exploring space.
2. What progress have we made?
3. What ability have we now?
4. What will we need to survive?
5. What are the limitations?
6. Where will we be a century from now?
7. Describe life on a space station.

AFTER SHOWING

Discussion Items and Questions

1. What is a *geosynchronous* orbit?
2. Why was it said that a space plane was the "holy grail" of astrological engineering?
3. What is the difference between *centrifugal* and *centripetal force*? How do those apply to gravity on Earth and an I.S.S?
4. Lifting a vehicle into orbit costs \$20,000 a pound. Should we be spending resources this way? Are there problems at home which should be addressed before exploring space?
5. What did Cernan mean by "six degrees of freedom"?
6. What is *ionizing radiation*?
7. Explain Lunar "Lagrange" points.
8. How does helium 3 compare to ordinary helium? How does nuclear fusion differ from nuclear fission?
9. What are some of the problems not mentioned in the film that space colonists might take with them?
10. What is the *asteroid belt* and where is it?
11. What implications will space exploration and colonization have on future national and international relations?
12. What other countries are currently exploring space? Which are putting satellites into orbit?
13. Explain how water could be distilled from rock.
14. Beyond Mars are only gas planets but one has a moon which might sustain life. Find out which planet and which moon. Why do astronomers think it is possible?
15. What is the current opinion about Pluto being a planet?
16. What is *terraforming*? Why would it be mandatory?
17. In the film, some of the space scientists were using laptops. What do you think of the likelihood of that?
18. The film's transport from Earth was an L.E.O. What does that mean? Its destination was the I.S.S. What is that?
19. Explain the variations in artificial gravity on the I.S.S.

Applications and Activities

Write your interpretation of the following comments:

"Curiosity itself is a hallmark of human existence." --Binder

"Humans will now attempt to do what nature intended any species to do---expand its habitat for occupation." --Schmitt

"I think the next twenty years will see us going permanently into space." --Schmitt

"Space is a world built on dreams but one sustained by economics." --Film's narrator

"Mars colonization will be like the Europe-New World relationship of my grandparents' time." --Cernan

RELATED RESOURCES



Captioned Media Program

- Martian Mission #9294
- Rocketships #9380
- Space Exploration in the Millennium #9422



World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **SPACE-AGE LIVING**

<http://school.discovery.com/schooladventures/spacestation/index.html>

Watch how all the pieces come together to build the International Space Station. Find answers to "What is it?" "Why is it being built?" "When will it be complete?" and many more.

- **LIFTOFF TO SPACE EXPLORATION**

<http://liftoff.msfc.nasa.gov/>

The Human Journey portrays what it would be like living in space; find out how the Station will get its power for living in space; and click on other buttons to read more about space exploration.

- **NASA**

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

The home page of the National Aeronautics and Space Administration—NASA—click on "Human Exploration and Development of Space," "Aerospace Technology," and other topics that pertain to space exploration and current activities of this organization.

- **THE MARS MILLENNIUM PROJECT**

<http://www.mars2030.net/>

Available in Spanish as well, this site provides numerous resources. These include "Astrobiology," "Basics of Space Flight," "NASA Human Spaceflight," "Exploring the Moon and Mars: Choices for the Nation," and more. Become a weather reporter for the Martian Sun-Times newspaper!