

Liftoff Into Space

Teacher's Guide

Grade Level: 4-5

Curriculum Focus: Science, History

Lesson Duration: 1-2 class periods

Program Description

Discover the history of *Rockets* (5 min.), from their origins as Chinese fireworks to powering the space shuttle. Find out about weightlessness and other challenges faced in space and what scientists have discovered to make *Exploring Space* (6 min.) possible. Even from Earth, you can see what makes the moon glow and the sun rise and set in *Night and Day* (6 min.). *Life on Mars?* (3 min.) traces the history of man's fascination with life on Mars from Lowell's observations to modern video images.

Onscreen Questions

Segment One: Rockets

- When do you think rockets were invented?
- What does the term "space race" mean?
- What kind of technology helped the U.S. space program?

Segment Two: Space Exploration

- What are the challenges of living in space?
- How do astronauts prevent muscle and bone loss in space? Why is this important?

Segment Three: Day and Night

- What do you know about the sun?
- Why does the Earth experience day and night?
- Why does the sun always shine on some part of Earth?
- Does the sun really rise and set?

Segment Four: Life on Mars?

- What do you know about Mars?
 - Why do scientists think life might have existed on this planet?
 - What conditions on Mars may have allowed life to develop?
 - Where are scientists looking for clues to life on Mars?
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Lesson Plan

Student Objectives

- Understand the history of the space race and space exploration as a whole.
- Create a timeline detailing important events in the history of space exploration.
- Write a descriptive article about an important event in space exploration.

Materials

- *Liftoff Into Space* video and VCR, or DVD and DVD player
- 6-inch strips of white construction paper, 1 per student
- Pencils, erasers, and rulers
- Lined writing paper
- Computer with Internet access

Procedures

1. Review the history of space exploration with the class by watching *Liftoff Into Space*. After watching the video, talk about the important events that led up to the current space program. How did space exploration begin? What were some significant events in the history of space exploration? What was the space race?
2. Have students create a timeline detailing the history of rockets and space exploration. Ask students to use their rulers to make one-inch marks on their construction paper. Each inch represents a 10-year period, beginning with 1950 and ending with 2000. Using *Liftoff Into Space*, print materials, and the Internet for research, have students write in at least one important event relating to space exploration that took place during each 10-year period. The following Web sites have helpful information:
<http://www.solarviews.com/eng/history.htm>
<http://www.nasa.gov/home/index.html>
<http://www.nasm.si.edu/exhibitions/gal114/gal114.htm>
http://news.bbc.co.uk/onthisday/hi/themes/science_and_technology/space/default.stm
3. Once students have completed their timelines, ask them to choose one event they would like to research further. Tell students to imagine that they are journalists writing at the time this event took place and have students then write a one-page article about it. Each article must include the date of the event, details of what happened, and why it is important. Students may use print resources and the Internet to research their articles.
4. After students have finished their articles ask for volunteers to read theirs aloud to the class. Talk about some of the events that students used on their timelines and discuss the space race.

What was it? Why did it happen? How has space exploration changed since the 1960s? What have we learned through space exploration?

5. Have students hypothesize about the future of space travel. What will we learn about outer space in the future? How will space exploration be different in 2010? In 2020?
6. Display student timelines and articles in the classroom so that students may examine the events at their leisure.

Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students were highly engaged in class discussions; produced a complete timeline, including all of the requested information; and wrote an interesting and informative news article that met all the listed criteria.
- **2 points:** Students participated in class discussions; produced an adequate timeline, including most of the requested information; and wrote a somewhat informative news article that met some of the listed criteria.
- **1 point:** Students participated minimally in class discussions; created an incomplete timeline; and wrote an incomplete or uninformative news article that met only one of the listed criteria.

Vocabulary

atmosphere

Definition: The gases that surround Earth or other planets

Context: The Earth's atmosphere protects us by blocking harmful rays from the sun.

exploration

Definition: The concept of traveling through unfamiliar territory to learn more about it

Context: A new era of Mars exploration is about to begin.

gravity

Definition: The force that pulls objects towards the center of the Earth, or towards any other physical body having mass

Context: Because there is little gravity to tug on the human body in outer space, it doesn't need to work as hard.

spacecraft

Definition: A vehicle used for traveling in space

Context: The Viking One and Viking Two spacecrafts landed on Mars in the late sixties.

satellite

Definition: An object that orbits Earth or another object in space

Context: Satellites orbiting Earth provide communication services, weather information, and perform scientific research.

technology

Definition: The application of scientific knowledge for practical purposes

Context: Scientists are developing the technology to recycle air and water on a spacecraft.

Academic Standards

National Academy of Sciences

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit <http://www.mcrel.org/compendium/browse.asp>.

This lesson plan addresses the following science standards:

- Science as Inquiry: Understandings about scientific inquiry
- Physical Science: Motions and Forces
- Earth and Space Science: Changes in earth and sky; Objects in the sky

Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit

<http://www.mcrel.org/compendium/browse.asp>

This lesson plan addresses the following national standards:

- Technology: Understands the relationships among science, technology, society, and the individual
- Science: Nature of Science—Understands the nature scientific inquiry
- Historical Understanding—Understands the historical perspective
- Language Arts: Writing—Uses the general skills and strategies of the writing process, gathers and uses information for research purposes

Support Materials

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit



- <http://school.discovery.com/teachingtools/teachingtools.html>
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