NATIONAL GEOGRAPHIC

RESOURCE LIBRARY
ACTIVITY : 30 MINS

Discover Space Probes

Students watch a video about space probes and discuss the function of space probes. They use a photo gallery to compare and contrast different structures and equipment of probes, and make connections between the different structures and purposes of space probes. Then students use an interactive diagram of the Cassini space probe to imagine what instruments they might include on a probe of their own design.

GRADES

2 - 5

SUBJECTS

Earth Science, Astronomy, Engineering

CONTENTS

1 Video, 9 Images, 1 Link, 1 PDF

OVERVIEW

Students watch a video about space probes and discuss the function of space probes. They use a photo gallery to compare and contrast different structures and equipment of probes, and make connections between the different structures and purposes of space probes. Then students use an interactive diagram of the Cassini space probe to imagine what instruments they might include on a probe of their own design.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/discover-space-probes/

Program

WILDEST WEATHER IN THE SOLAR SYSTEM

DIRECTIONS

1. Build background about space probes.
Show students the National Geographic video "Space Probes." Then explain to students that a space probe is an unpiloted, unmanned device sent to explore space. A probe may operate far out in space, or it may orbit or land on a planet or a moon. It may make a one-way journey, or it may bring samples and data back to Earth. Most probes transmit data from space by radio. Ask: *Why don't we just send people to these places in our solar system?* Students may respond that it would be more expensive or dangerous to send a person. Provide students with examples. Explain that it would cost over $100 billion for a six-person crew to land on Mars, while the space probe *Mars Science Laboratory*, scheduled to launch in 2011, will cost about $2.3 billion. A manned space device would need to be larger to carry the people, equipment, and supplies needed for the trip, and it would also need to return home. In addition, manned space transport would involve unknown conditions with many risks to the crew.

2. View and discuss a variety of space probe images.
Display the photo gallery Space Probes. Read aloud each caption as you scroll through. Then, as a class, discuss and list on the board how structures of probes are different. Ask: *What different types of equipment do you see on different probes? How do you think equipment would be protected from different weather conditions?*

3. Explore space probe measurement on the Cassini probe.
Explain to students that a space probe records observations of temperature, radiation, and objects in space. Different probes have different mission objectives. There are lunar (moon) probes, solar (sun) probes that measure solar radiation, and probes that investigate the terrain on rocky planets or the gases on gaseous planets. Introduce the *Cassini* space probe. Display the web page NASA: Cassini Solstice Mission—Inside the Spacecraft and explore the diagram together. Ask:

- *What types of instruments does this probe have?*
- *Why do you think information collected by this probe may be important to scientists?*
- *Which instruments would you include on a probe of your own design to observe weather on other planets?*

Informal Assessment

Have students write their ideas about instruments they would want to include on a probe of their own design.

Extending the Learning

Use National Geographic *Explorer* Magazine's poster Saturn's Wildest Weather to give students more information about the *Cassini* space probe and weather conditions on Saturn.

OBJECTIVES

Subjects & Disciplines

Earth Science

- Astronomy
- Engineering

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Multimedia instruction
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Learning and Innovation Skills
    - Critical Thinking and Problem Solving
- Critical Thinking Skills
  - Analyzing
  - Understanding

National Standards, Principles, and Practices

NATIONAL SCIENCE EDUCATION STANDARDS

• **(K-4) Standard E-1:**
Abilities of technological design
• **(K-4) Standard E-2:**
Understanding about science and technology

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Paper
- Pencils
- Pens

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction

BACKGROUND & VOCABULARY

Background Information

Scientists and astronomers are interested in learning more about our solar system. A space probe is an unpiloted, unmanned device sent to explore space. Most probes transmit data from space by radio.

Prior Knowledge

["extreme weather conditions","tools used to measure weather"]

Recommended Prior Activities

- Design Your Own Space Probe
- Extreme Weather on Other Planets
- Extreme Weather on Our Planet
- Measuring Weather with Tools

Vocabulary

Term	Part of Speech	Definition
lander	*noun*	space probe designed to land on a moon, planet, asteroid, or other celestial body.
orbit	*noun*	path of one object around a more massive object.
orbit	*verb*	to move in a circular pattern around a more massive object.
solar radiation	*noun*	light and heat from the sun.
solar system	*noun*	the sun and the planets, asteroids, comets, and other bodies that orbit around it.
space probe	*noun*	set of scientific instruments and tools launched from Earth to study the atmosphere and composition of space and other planets, moons, or celestial bodies.
temperature	*noun*	degree of hotness or coldness measured by a thermometer with a numerical scale.
terrain	*noun*	topographic features of an area.
transmit	*verb*	to pass along information or communicate.
unmanned	*adjective*	lacking the physical presence of a person.
weather	*noun*	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.

For Further Exploration

Websites

- NASA: About the SOHO Mission
- NASA: Cassini-Huygens
- NASA: Galileo to Jupiter
- NASA: Mariner 1-2 to Venus
- NASA: SAGE
- NASA: Mars Climate Orbiter
- NASA: Mars Exploration Rovers
- NASA: Mars Reconnaissance Orbiter
- NASA: New Horizons

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