

**RESOURCE LIBRARY**  
ACTIVITY : 30 MINS

## 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

6 - 8

### 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/space-probes/>

## Program

# 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 do you think there are so many different types of space probes?* Elicit from students that they collect different science information about very different environments. The probes must be able to withstand the different extreme environments to collect data.

## 2. View and discuss a variety of space probe images.

Display the photo gallery Space Probes. Invite volunteers to 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 types of equipment do different probes include? How do you think equipment would be protected from different weather and environmental 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

Based on information from this activity, have students write a paragraph with ideas about instruments they would want to include on a probe of their own design. Have them include at least one idea from a space probe they have observed today, but encourage them to include new ideas too.

# 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

## Learning Objectives

Students will:

- describe different types of probes and their usefulness in exploring other planets
- discuss instruments that probes use and identify the information probes are able to gather and report

## 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

- (5-8) Standard E-1:

Abilities of technological design

- (5-8) Standard E-2:

Understandings 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 unpowered, 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 a Space Probe](#)
- [Extreme Weather in Our Solar System](#)
- [Extreme Weather on Earth](#)
- [Measuring Weather](#)

## Vocabulary

Term	Part of Speech	Definition
moon	<i>noun</i>	natural satellite of a planet.
orbit	<i>verb</i>	to move in a circular pattern around a more massive object.
orbit	<i>noun</i>	path of one object around a more massive object.
planet	<i>noun</i>	large, spherical celestial body that regularly rotates around a star.
solar radiation	<i>noun</i>	light and heat from the sun.
space probe	<i>noun</i>	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	<i>noun</i>	degree of hotness or coldness measured by a thermometer with a numerical scale.
terrain	<i>noun</i>	topographic features of an area.
transmit	<i>verb</i>	to pass along information or communicate.
unmanned	<i>adjective</i>	lacking the physical presence of a person.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>weather</b>	<i>noun</i>	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.

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## For Further Exploration

### Websites

- [NASA: Phoenix Mars Lander](#)
- [NASA: About the SOHO Mission](#)
- [NASA: Cassini Solstice Mission](#)
- [NASA: New Horizons](#)
- [Nat Geo Movies: Wildest Weather in the Solar System](#)

## FUNDER



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