

RESOURCE LIBRARY | ACTIVITY : 45 MINS

# Extreme Weather in Our Solar System

Students discuss how scientists learn about weather on other planets, brainstorm characteristics of extreme weather on other planets, and use a video to identify new information about weather in our solar system. Then students compare and contrast weather conditions for planets in our solar system.

## GRADES

6, 7, 8

## SUBJECTS

*Earth Science, Astronomy, Meteorology*

## CONTENTS

1 Video, 2 PDFs

## OVERVIEW

Students discuss how scientists learn about weather on other planets, brainstorm characteristics of extreme weather on other planets, and use a video to identify new information about weather in our solar system. Then students compare and contrast weather conditions for planets in our solar system.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/extreme-weather-in-our-solar-system/>

## Program



## DIRECTIONS

### **1. Build background on how scientists learn about weather on other planets.**

Ask: *How do we know about weather in our solar system? If manned space flights have only traveled to the moon, how do we know about environmental conditions on other planets?*

Explain to students that, for decades, NASA has been sending space probes—unmanned spacecraft—to measure and record conditions on the inner and outer planets of our solar system. Before that, scientists analyzed conditions on other planets with observations made by telescope. Tell students that in this activity they will look at the information scientists have gleaned about these distant destinations. They will learn more about space probes in later activities.

### **2. Have students brainstorm characteristics of extreme weather on other planets.**

Explain to students that Jupiter and Saturn are mostly made up of gas. They are millions of miles farther from the sun than Earth. Ask: *How do you think these conditions affect weather there? How do you think extreme weather on other planets compares to extreme weather on Earth?* Record students' responses on the board.

### **3. View and take notes on the video “Solar System 101.”**

Show students the National Geographic video “Solar System 101.” If needed, show the video more than once. Allow students time to record notes about new information that gives them insight into weather in our solar system.

### **4. Have students complete the worksheet Planet Investigation.**

Distribute a copy of the handout Environmental Conditions in Our Solar System to each student. Read aloud the directions and answer any questions students may have. Have them use the information in the handout to compare and contrast weather in our solar system. Then distribute a copy of the worksheet Planet Investigation to each student. Read aloud the directions and answer any questions students may have. Have them use the information in the handout to complete the worksheet. Emphasize that in worksheet questions five and six, there are no right answers, but students should use what they learned from the video and the handout to think carefully about their ideas. Make sure students understand that weather on other planets may be dramatically different from weather on Earth.

## **Informal Assessment**

Ask students to orally explain which planets they think may be good candidates for weather study. Have them list the factors that support their answers.

## **Extending the Learning**

You can use this series of activities to prepare students to design their own space probe. If so, let students know that each of these activities is leading to that goal and encourage them to note any probe design ideas as they move through the activities.

## OBJECTIVES

# Subjects & Disciplines

### Earth Science

- Astronomy
- Meteorology

# Learning Objectives

Students will:

- identify atmospheric conditions of the planets in our solar system
- determine which weather conditions may be possible given the atmospheric conditions on other planets

# Teaching Approach

- Learning-for-use

# Teaching Methods

- Brainstorming
- Discussions
- Multimedia instruction
- Visual instruction

# Skills Summary

This activity targets the following skills:

- Critical Thinking Skills
  - Analyzing
  - Understanding

# National Standards, Principles, and Practices

## NATIONAL SCIENCE EDUCATION STANDARDS

- (5-8) Standard A-1:

Abilities necessary to do scientific inquiry

- (5-8) Standard D-3:

Earth in the solar system

### Preparation

### What You'll Need

#### MATERIALS YOU PROVIDE

- Pencils
- Pens

#### REQUIRED TECHNOLOGY

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

#### PHYSICAL SPACE

- Classroom

#### GROUPING

- Large-group instruction

#### OTHER NOTES

In 2006, the status of Pluto was changed from a planet to a dwarf planet. A dwarf planet is not gravitationally dominant. It shares orbital space with other bodies of similar sizes.

## RESOURCES PROVIDED: UNDEFINED

- [Solar System 101](#)

## RESOURCES PROVIDED: HANDOUTS & WORKSHEETS

- [Environmental Conditions in Our Solar System](#)
- [Planet Investigation](#)

## BACKGROUND & VOCABULARY

### Background Information

Scientists and astronomers are interested in learning more about our solar system. Before any exploration can be done, even via remote sensing by probes or satellites, weather must be considered. Data must be collected through observations from Earth to determine the possible environmental conditions the hardware must be able to withstand.

### Prior Knowledge

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### Recommended Prior Activities

- [Design a Space Probe](#)
- [Extreme Weather on Earth](#)
- [Landing a Space Probe or Rover](#)
- [Measuring Weather](#)
- [Space Probes](#)

### Vocabulary

Term	Part of Speech	Definition
extreme weather	<i>noun</i>	rare and severe events in the Earth's atmosphere, such as heat waves or powerful cyclones.

Term	Part of Speech	Definition
<b>mantle</b>	<i>noun</i>	middle layer of the Earth, made of mostly solid rock.
<b>mean</b>	<i>noun</i>	mathematical value between the two extremes of a set of numbers. Also called the average.
<b>planet</b>	<i>noun</i>	large, spherical celestial body that regularly rotates around a star.
<b>solar system</b>	<i>noun</i>	the sun and the planets, asteroids, comets, and other bodies that orbit around it.
<b>space probe</b>	<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.
<b>unmanned</b>	<i>adjective</i>	lacking the physical presence of a person.
<b>weather</b>	<i>noun</i>	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.

## For Further Exploration

### Websites

- [NASA: Solar System Exploration](#)
- [NASA: Welcome to the Planets](#)
- [Windows to the Universe: Space Weather](#)
- [Nat Geo Movies: Wildest Weather in the Solar System](#)

## FUNDER



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