



## Earth's Waters

### Subject

Earth Science

### Grade level

5-8

### Duration

Two to three class periods

### Objectives

Students will

- map the geography of the ocean floor;
- describe the different topographic features of the ocean floor; and
- compare the topography of the ocean floor to the topography of Earth above sea level

### Materials

- Paper and pencils
- Fine-tip black markers
- Clay
- Toothpicks
- 8\_ X 11-inch sheets of cardboard, 1 per student
- Newspaper or paper for covering desks
- Computer with Internet access (optional)
- Science texts with pictures and maps of the ocean floor
- *Earth's Waters* video and VCR or DVD and DVD player

### Procedure

1. Introduce the lesson by talking about the Earth's oceans. What is an ocean? Why are oceans important to life on Earth? Talk about the ocean floor. What does it look like? How is the topography at the bottom of the ocean similar to the topography above sea level? View the segment "The Ocean Floor" of *Earth's Waters* to introduce this topic.
2. After viewing, tell students they will pretend to be explorers of the ocean floor. They make relief maps of the ocean floor and write a descriptive essay about their travels to the bottom of the ocean.
3. For the relief maps, give each student a ball of clay and a cardboard sheet. Have students flatten the clay on the cardboard. Using the information

provided from the maps and pictures in print or Internet resources, have students create their relief maps. Explain that it is not possible to map the entire ocean floor, so students will map the continental margin. Each map should include the continental shelf, continental slope, abyssal plain, and continental rise. Students should identify at least one trench and seamount. Have students create labels for each of the geographic features. The labels can be attached to toothpicks and inserted into the correct features.

4. Set the finished maps aside to dry for at least 24 hours and have students write their descriptive essays. Talk about the items students may include in their essays, such as plant and animal life they encountered in the ocean, adventures or mishaps, interesting observations, etc. Each essay must include information about the major oceanographic landforms they identified and labeled on their maps, what these features look like, and how they formed. The following Web sites have maps of the ocean floor or descriptions of the ocean:

<http://www.platetectonics.com/oceanfloors/index.asp>

<http://www.intelecom.org/theendlessvoyage/tevelesson5/activities/activity5.2.htm>

<http://www.divediscover.whoj.edu/about.html>

<http://pubs.usgs.gov/publications/text/exploring.html>

<http://oceanexplorer.noaa.gov>

5. Have students share their essays with the class. Discuss the features of the ocean floor and how they differ or are similar to the geography of land above sea level. Display the essays with their maps in the classroom so that students get a chance to see one another's work.

## Evaluation

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

**3 points:** Students actively participated in class discussions; used the research materials wisely and without teacher guidance; created relief maps that correctly identified the continental shelf, continental slope, abyssal plain, continental rise and at least one seamount and trench; and wrote informative, well written, and creative essays that correctly addressed the established criteria.

**2 points:** Students somewhat participated in class discussions; used the research materials somewhat wisely with little teacher guidance; created relief maps that correctly identified most of the physical features of the ocean floor; and wrote informative, somewhat creative essays that correctly addressed most of the established criteria.

**1 point:** Students somewhat participated in class discussions; were unable to use the research materials without teacher guidance; created unfinished relief maps or failed to identify most of the physical features of the ocean floor; and wrote disorganized essays that did not meet the established criteria.

## Vocabulary

### hydrothermal vents

**Definition:** Underwater geysers that form when cold seawater rushing into cracks in the seafloor is heated by the magma below

**Context:** Water temperatures above 350° Celsius (662° Fahrenheit) have been recorded inside some hydrothermal vents.

### **seamount**

**Definition:** A submarine mountain rising above the ocean floor

**Context:** Seamounts, or underwater mountains, dot the geography of the ocean floor.

### **sediment**

**Definition:** Small pieces of rock and soil

**Context:** The abyssal plain appears featureless because a thick layer of sediment covers areas that were once hills and valleys.

### **subduction**

**Definition:** The action or process of the edge of one tectonic plate descending below the edge of another plate

**Context:** Subduction takes place when two of Earth's plates collide, and the heavier plate plunges beneath the other.

### **trench**

**Definition:** A long, narrow, and usually steep-sided depression or canyon in the ocean floor

**Context:** The Marianas Trench is the deepest spot in any ocean of the world.

## **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://books.nap.edu>.

This lesson plan addresses the following national standards:

- Earth and Space Science: Structure of the earth system
- Unifying Concepts and Processes: Evidence, models, and explanation

The National Council for Geographic Education (NCGE) provides 18 national geography standards that the geographically informed person knows and understands. To view the standards online, go to [www.ncge.org](http://www.ncge.org).

This lesson plan addresses the following standards:

- Physical Systems: The physical processes that shape the patterns of Earth's surface
- The World in Spatial Terms: How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information

## **Credit**

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