DEEP-SEA GEYSERS

What are hydrothermal vents and where can they be found?

OVERVIEW

Students watch a video about hydrothermal vents and then use a map of plate tectonics to identify and mark where in the world the vents are most likely to be found.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/deep-sea-geysers/

DIRECTIONS

1. Build background on geysers.
   Ask students if they've ever seen a geyser in person, in photographs, or on television. They may have heard of “Old Faithful” in Yellowstone National Park. Explain to students that a geyser is a vent in Earth’s surface that periodically ejects a column of hot water and steam. Geysers erupt because volcanic rock heats the water underground. Water and steam get trapped and eventually escape through fissures in an eruption that releases the pressure. Explain to students that hydrothermal vents are geysers on the ocean floor.

2. Watch the National Geographic video “Hydrothermal Vents.”
   Show students the video “Hydrothermal Vents.” Then check students’ comprehension. Ask:

   - Where are the scientists looking for hydrothermal vents? (on the sea floor, a mile and a half below the ocean’s surface)
   - What is “bizarre” about the animals that live near the vents? (The animals do...
not take energy from the sun. They live in total darkness and take energy from the earth through chemosynthesis.)

- **What is chemosynthesis?** (a process in which bacteria absorb chemicals in the vent water to make organic carbon, or food)
- **What did the scientists learn about the vents that surprised them?** (Life can thrive in the absence of sunlight.)

3. **Have students use a map to identify and mark likely locations of hydrothermal vents around the world.**

Explain to students that hydrothermal vents are usually found at least 2,134 meters (7,000 feet) below the ocean’s surface in both the Atlantic and Pacific Oceans. Tell students that, like volcanoes, hydrothermal vents are most likely to lie along areas where two tectonic plates meet. Display for students the NG Education interactive map with the Plate Tectonics data layer selected. Ask students to point out where they would expect to find hydrothermal vents in the ocean. Have them use the markers tab to place markers on the map at those locations.

**OBJECTIVES**

**Subjects & Disciplines**

- **Geography**
  - Physical Geography

- **Science**
  - Biological and life sciences
  - Earth science

**Learning Objectives**

Students will:
define vocabulary terms
explain where in the ocean the vents can be found and how the animals who live near them survive
analyze a map of plate tectonics to identify where in the world hydrothermal vents are likely to be found

Teaching Approach

• Learning-for-use

Teaching Methods

• Discussions
• Visual instruction

Skills Summary

This activity targets the following skills:

• Critical Thinking Skills
  • Understanding
• Geographic Skills
  • Acquiring Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

• Standard 7:
The physical processes that shape the patterns of Earth's surface

- **Standard 8:**
The characteristics and spatial distribution of ecosystems and biomes on Earth's surface

**NATIONAL SCIENCE EDUCATION STANDARDS**

- **(5-8) Standard C-5:**
  Diversity and adaptations of organisms
- **(5-8) Standard D-1:**
  Structure of the earth system

**PREPARATION**

**What You’ll Need**

**REQUIRED TECHNOLOGY**

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

**PHYSICAL SPACE**

- Classroom

**GROUPING**

- Large-group instruction

**RESOURCES PROVIDED: UNDEFINED**

- Hydrothermal Vents
RESOURCES PROVIDED: MAPS

- NG MapMaker Interactive: Plate Tectonics—World

BACKGROUND & VOCABULARY

Background Information

Hydrothermal vents are geysers located on the ocean floor in the deep sea. They are generally found at least 2,134 meters (7,000 feet) below the ocean surface in both the Atlantic and the Pacific Oceans. They spew hot water for the same reasons that land-based geysers do.

Prior Knowledge

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Recommended Prior Activities

- Hydrothermal Vent Chemistry and Life

Vocabulary

<table>
<thead>
<tr>
<th>Term</th>
<th>Part of Speech</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>chemosynthesis</td>
<td>noun</td>
<td>process by which some microbes turn carbon dioxide and water into carbohydrates using energy obtained from inorganic chemical reactions.</td>
</tr>
<tr>
<td>geyser</td>
<td>noun</td>
<td>natural hot spring that sometimes erupts with water or steam.</td>
</tr>
<tr>
<td>plate tectonics</td>
<td>noun</td>
<td>movement and interaction of the Earth's plates.</td>
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</tbody>
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For Further Exploration
Websites

- National Geographic Environment: The Ocean

FUNDER

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