

RESOURCE LIBRARY  
ACTIVITY : 50 MINS

## Resources in the Deep Sea

Students learn about the three ocean light zones, make predictions about deep-sea resources, and read about those resources and their value to science and businesses.

### GRADES

6 - 8

### SUBJECTS

*Biology, Earth Science, Geography, Human Geography, Physical Geography*

### CONTENTS

1 Link, 2 PDFs

## OVERVIEW

Students learn about the three ocean light zones, make predictions about deep-sea resources, and read about those resources and their value to science and businesses.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/resources-in-the-deep-sea/>

## DIRECTIONS

### 1. Introduce the three ocean light zones.

Display the NOAA/National Weather Service Profile of the Ocean page. Tell students that there are different ways to describe the layers of the ocean. One way to classify the ocean is in zones. Point out the light zones, labeled in parentheses, in the diagram: The sunlight zone, the twilight zone, and the midnight zone. Ask: *How do you think the ocean waters might vary from zone to zone? How do you think the animal life varies from zone to zone?* Explain to students that the sunlight zone has enough light that it's difficult for animals to conceal themselves. The twilight zone has light levels low enough that they allow animals to conceal

themselves. And the midnight zone, which comprises 90% of the ocean, is dark.

## **2. Have students use sentence strips to learn about the different zones.**

Invite a volunteer to cut up the sentence strips in the worksheet Ocean Zone Sentence Strips. Draw four horizontal lines on the board to represent the three light zones. Be sure to match the proportion of each zone to the diagram on the Profile of the Ocean page. Distribute the pre-cut strips to students at random. Have each student read their statement aloud and then come up to the board and tape it in the zone where they think it belongs. Ask the rest of the class to agree or disagree with the placement of each strip and state their reasoning. After all of the sentence strips are placed, ask the class to label the Mariana Trench in the most appropriate zone. They should label it at the bottom of the Midnight Zone. Check that students placed the sentence strips correctly. The sentences should be placed in the following zones:

- sunlight zone: 1, 3, 5, 7, 9, 12, 13, 15
- twilight zone: 4, 11, 14, 16
- midnight zone: 2, 6, 8, 10, 17, 18

## **3. Have students make predictions about deep-sea resources.**

Remind students that the conditions seven miles below the ocean's surface include cold temperatures, darkness, and extreme pressure. Ask: *What important resources might exist in the deep sea?* Elicit responses such as: strange creatures, minerals, ingredients for medical use, and bioluminescent fish. List students' ideas on the board.

## **4. Have students read about deep-sea resources and discuss their value to science and business.**

Distribute the handout The Value of the Deep Sea and Its Resources. Have students read it independently. Discuss each resource from the handout using the following questions to guide the discussion:

- *How are we able to access the resource? Explain.*
- *What is the real or potential value of the resource to society?*
- *How would extracting the resource impact the environment?*

# OBJECTIVES

# Subjects & Disciplines

Biology

Earth Science

Geography

- [Human Geography](#)
- [Physical Geography](#)

## Learning Objectives

Students will:

- identify the three ocean light zones and what zone the Mariana Trench is in
- describe the conditions in each light zone
- make predictions about deep-sea resources
- identify deep-sea resources and describe their value to science and business

## Teaching Approach

- Learning-for-use

## Teaching Methods

- Discussions
- Hands-on learning
- Reading
- Visual instruction

## Skills Summary

This activity targets the following skills:

- Critical Thinking Skills
  - Analyzing
  - Understanding

- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information
  - Organizing Geographic Information

# National Standards, Principles, and Practices

## NATIONAL GEOGRAPHY STANDARDS

- Standard 16:

The changes that occur in the meaning, use, distribution, and importance of resources

## NATIONAL SCIENCE EDUCATION STANDARDS

- (5-8) Standard C-4:

Populations and ecosystems

### **Preparation**

### **What You'll Need**

## MATERIALS YOU PROVIDE

- Pencils
- Pens
- Scissors
- Transparent tape

## REQUIRED TECHNOLOGY

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

## PHYSICAL SPACE

- Classroom

## GROUPING

- Large-group instruction

## OTHER NOTES

There are several ways to divide the ocean into zones and various names for the same zones.

## BACKGROUND & VOCABULARY

### Background Information

The ocean can be divided into three light zones, which vary in temperature, light, pressure, and habitat. In the deepest and darkest zone, the midnight zone, lies the ocean bottom and hydrothermal vents teeming with unique species and natural resources. Scientists, governments, and private companies are just beginning to explore what the deep sea has to offer.

### Prior Knowledge

### Recommended Prior Activities

- [Protecting the Mariana Trench](#)
- [The Mariana Trench: Earth's Deepest Place](#)

### Vocabulary

Term	Part of Speech	Definition
Mariana Trench	<i>noun</i>	deepest place on Earth, located in the South Pacific Ocean at 11,000 meters (36,198 feet) at its deepest.
midnight zone	<i>noun</i>	zone of the open ocean, starting at about 914 meters (3,000 feet) deep. Also known as the bathypelagic or aphotic zone.
ocean light zone	<i>noun</i>	division of depth in the ocean, based on how much sunlight is received. There are five major ocean light zones, from shallowest to deepest: epipelagic, mesopelagic, bathypelagic, abyssopelagic, and hadalpelagic.
sunlight zone	<i>noun</i>	The upper zone of the ocean. This zone goes down to about 200 meters (660 feet). Also called the photic, euphotic, or epipelagic zone.

Term	Part of Speech	Definition
twilight zone	<i>noun</i>	middle zone of the open ocean. On average, this zone extends from about 200 to 1,000 meters (660 to 3,300 feet) deep. Also known as the dysphotic or mesopelagic zone.

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## For Further Exploration

### Websites

- [Marine Conservation Biology Institute \(MCBI\): From Sea to Shining Sea—Places in the Sea](#)

PARTNER



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