



# How deep is the ocean?

## Theme: Science

### Curriculum Connection

This lesson could fit a middle school science or math class, with applications to any of the following subjects:

- Geography
- Geology
- Math
- Biology

### Materials & Resources

- Deep-Sea Trenches Fact Sheet
- Calculators
- *Optional.* Yard stick and ruler, string that is 1 m long, 3 pieces of string that are 1 foot long, tape measure for students to measure their height
- Worksheets can be printed or used as Google Docs

### Learning Objectives

After engaging with this activity, students should:

- Identify the deepest ocean zone as the hadal zone and describe key features of this environment.
- Develop an understanding of the depth of oceans, connecting this understanding to comparisons of familiar objects and distances.
- Build confidence and familiarity with carrying out conversions.

### Links to Next Generation Science Standards

**ESS2A** Earth Materials and Systems, **ESS2C** The Roles of Water in Earth's Surface Processes, **MP.2** Reason abstractly and quantitatively, **MP.4** Model with mathematics, **5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system and use these conversions in solving multi-step, real-world problems

## Lesson Plan

4<sup>th</sup>—6<sup>th</sup> Grade


~1 hour

***Purpose.** This activity combines marine biology and math, showing students how subjects are connected and how they may apply their knowledge across fields.*

For more information on deep-sea habitats, exploration, and science, check out the **Deep Ocean Education Project!**

<https://deepoceaneducation.org/>

Developed through the support of the **National Science Foundation**, Grant IOS#2407551 to Gerring & Daane





# Part I. The Hadal Zone

Read the Deep-Sea Trenches Fact Sheet and answer the following questions.

1. What is the **hadal zone**? Where would you find a deep-sea trench?

2. Draw and describe two organisms that live in the hadal zone. How are these organisms adapted to life in this extreme environment?

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3. Why is it important to understand and protect deep-sea trenches? Explain one reason, as you would to a friend or family member.

4. What questions do you have about the deep ocean? Record three questions you'd like to learn more about.

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# Part II. How deep is the ocean?

We know that the oceans are **deep**, but how deep are they?

1. Based on the fact sheet in Part I, record the **average** depth of the ocean and the **maximum** depth of the ocean.

Average depth: \_\_\_\_\_ feet

Maximum depth: \_\_\_\_\_ feet

- a. *Review.* What is an average? Explain in your own words.

2. **Conversions.** We can write values in different units. For example, lengths can be written in inches, feet, yards, or miles, or in meters and kilometers in the metric system. If we know how many of one unit will go into another unit, we can convert between the two units.

For example, there are three feet in one yard. Measure the string provided to show that this is true.

1 foot	1 foot	1 foot
1 yard		

How many feet are in 3 yards? With a conversion, we can calculate this.

$$3 \text{ yards} \times \frac{3 \text{ feet}}{1 \text{ yard}} = 9 \text{ yards}$$

- a. How many feet are in 5 yards? Show your work.

- b. There are 12 inches in one foot. How many inches are in 2 yards? Show your work.

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## Part II. How deep is the ocean?

6. The oceans are very deep. This number is hard to fathom. Conversions can help us visualize how deep the oceans actually are. We know some distances well. For example, we know what our height feels like.

How tall are you? Record your height in feet.

My height: \_\_\_\_\_ feet

7. How many times does your height go into the average depth of the ocean? How many people of your height, lying foot to head, would it take to make a line that is as long as the ocean is deep?

$$\text{Average Depth of the Ocean (feet)} \times \frac{1 \text{ Me}}{\text{My Height: } \underline{\hspace{2cm}} \text{ (feet)}} =$$

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8. Measure an object in the room with you, such as a pencil, a book, or your backpack. How many of those objects would you need to place end to end to get to the bottom of the Mariana Trench? Show all your work.

Object Name: \_\_\_\_\_

Object Length (inches): \_\_\_\_\_

Calculation:

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