

# OOI Data Lab Lesson Plan: Plate Tectonics and the Sea Floor

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**Time required:** This lab requires a minimum of 45 minutes. With additional optional discussions and demonstrations, this lab could take up to 1.5 hours.

**Assumed prior knowledge:** This lesson is appropriate for 100-level undergraduate students or advanced high school students who are taking or have completed an introductory oceanography course. Students should be familiar with the basic concept of plate tectonics.

**Equipment required:** Access to computers with internet connection, preferably one computer per student or per pair of students.

**Pre-class prep:** Print out the Plate Tectonics Worksheet

## **Pre-class assignment:**

If students are unfamiliar with plate tectonics, assign [this video](#) before class to provide some background information.

1. Mid-ocean ridges tend to have the oldest ocean floors.
  - a. True
  - b. False**
2. As the sea floor moves away from the mid-ocean ridges it:
  - a. Cools and thickens**
  - b. Heats and thickens
  - c. Cools and thins
  - d. Heats and thins
3. What causes the slab-pull gravity force?
  - a. Gravity pulls more on older, denser lithospheric blocks**
  - b. Younger, hotter lithospheric blocks move faster due to Brownian motion
  - c. Bubbling magma pushes younger lithospheric blocks
  - d. Continental plates prevent the movement of older lithospheric blocks

## **Lesson Overview:**

### **Part 1: Invitation**

- Ask students if they've ever heard of "The Big One". Most students living on the west coast have likely heard of this.
- If students are not familiar with The Big One you can ask them where in the US most earthquakes happen (California), then explain what The Big One is. Some interesting facts include:

- The Big One is a high magnitude earthquake predicted to hit the west coast
- A large magnitude earthquake is predicted to happen every 190 – 12,000 years in this area. The last big earthquake was a 9.0 magnitude earthquake in 1700 that dropped the coastline several feet and set a tsunami to Japan.

### Part 2: Data Lab Exploration

- Hand out Page 1 of the Data Lab Worksheet
- Direct students to the [OOI Data Lab: Plate Tectonics and the Sea Floor](#)
- Give students 5 – 10 minutes to explore the map and fill out Page 1.
- Briefly go over the answers as a group to make sure students get the correct answer.

### Part 3: Plate Boundary Observations

- Hand out Page 2 of the Data Lab Worksheet.
- Have students work in pairs to record their observations.
- Discuss as a class and make sure students got roughly the right answers. It's ok if there are some slight discrepancies since the categories are qualitative, as long as students understand the overall trends.
- Ask students what they put for Question 5, but do not give away the answer yet. Many students will likely put Area A.

### Part 4: Researching Plate Boundary

- Hand out Page 3 of the worksheet.
- In pairs, have students research online and fill out the table in Question 6. Walk around classroom and check that students are getting the right answers.
- Have each pair of students compare their answers for Question 7 with another pair, then discuss as a class.
- In pairs, have students research online and fill out the table in Question 8 and answers Questions 9 and 10. Be sure to point out how rare events often do not show up in datasets.

### **Homework:**

Students will explore the [Ocean Observatories Initiative \(OOI\) website](#) to learn more about how the data used in this activity, and other valuable oceanographic data, is collected.

1. From the homepage, select “Watch Live Video.” Describe what is being streamed on the live video feed.
2. From the homepage, select “What’s New” and find an article that interests you. Summarize your article.
3. From the homepage, select the options menu in the upper left corner and review the “About OOI” section. Summarize what OOI is and any other information you found interesting.