Student Exploration: Plate Tectonics

**Vocabulary:** collisional boundary, convergent boundary, crust, divergent boundary, earthquake, lithosphere, mantle, plate, plate tectonics, subduction zone, transform boundary, volcano

**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

**Volcanoes** are openings in Earth’s **crust** where lava, gas, and ash can erupt. Where are active volcanoes located? **Volcanos** are usually near the ocean or land.

1. **An earthquake** is a violent shaking of Earth’s surface. Where are earthquakes common? **Along the plate crust and usually near the land of the crusts.**

**Gizmo Warm-up**
Volcanoes, earthquakes, mountains, and other features of Earth’s surface owe their origin to the movements of **plates**: enormous, slowly-moving sections of Earth’s crust. At plate boundaries, plates collide, move apart, move under or over each other, or slide past one another. The theory of **plate tectonics** describes how the plates move, interact, and change the physical landscape.

The *Plate Tectonics Gizmo™* shows a cross-section, or side view, of Earth. (Not to scale.) Above the cross section is a bird’s-eye view of the same location.

1. **Turn on Show labels.** What are the layers of Earth that you can see? I can see the crust, lithosphere, and mantle.
2. **Turn on Boundary name,** and click on each boundary. What four boundaries do you see? **Transform Boundary, Convergent Boundary (Collision and Subduction), and Divergent Boundary**

![Plate Tectonics Gizmo](image)

<table>
<thead>
<tr>
<th>Activity A: Sliding plates</th>
<th>Get the Gizmo ready:</th>
</tr>
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<tbody>
<tr>
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<td>• Select BOUNDARY A.</td>
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</table>

**Question:** What happens when plates slide past one another?
1. **Observe**: Boundary A is a **transform boundary**. The arrows below the BOUNDARY A label will move the plates. Click the left arrow once to see how the plates move.

   How would you describe the motion of plates in a transform boundary? It moves farther away.

2. **Sketch**: Draw a bird’s-eye view of the plate boundary before and after the plate motion. Draw an arrow to show which way the plate moved.

   ![Before movement](image1) ![After movement](image2)

3. **Locate**: Turn on **Show location**. Where on Earth can you find this type of boundary? (Note: You can refer to a world map or atlas for location names.)

   Near the California coastline, above/below South America, above Africa, and on the sides of India.

   Highlight these locations on the map below.
Question: What happens when two continents collide?

1. **Observe:** Boundary B is an example of a **convergent boundary**, where two plates are moving toward one another. When the two plates both contain continental crust, it is called a **collisional boundary**. Click the left arrow four times to see how the plates move.

   How would you describe the motion of plates in a collisional boundary? **The plates are going towards each other.**

2. **Sketch:** Draw a side view of the plate boundary before and after the plate motion. Draw an arrow to show which way the plate moved.

   ![Before movement](image1) ![After movement](image2)

3. **Locate:** Turn on **Show location**. Where on Earth can you find this type of boundary? (Note: You can refer to a world map or atlas for location names.)

   **Above India, above the Middle East, and on the NW side of Eurasia**

   Highlight these locations on the map below.
Activity C: Oceanic crust meets continental crust

Get the Gizmo ready:
- Turn off Boundary name and Show location.
- Select BOUNDARY C.

Question: What happens when ocean crust collides with continental crust?

1. **Observe:** Boundary C is another type of convergent boundary called a **subduction zone.**
   
   Click the left arrow four times to see how the plates move.
   
   How would you describe the motion of plates in a subduction zone? They are coming towards each other.

2. **Sketch:** Draw a side view of the plate boundary before and after the plate motion. Draw an arrow to show which way the plate moved.

   ![Before movement](image1.png)
   ![After movement](image2.png)

3. **Locate:** Turn on Show location. Where on Earth can you find this type of boundary? (Note: You can refer to a world map or atlas for location names.)
   
   Western side of South America, bottom of Alaska, All around the Filipino plate, South/SE/Eastern side of the Australian Plate, and Western side of the Pacific plate
   
   Highlight these locations on the map below.
Activity D: Spreading plates

Get the Gizmo ready:
- Turn off Boundary name and Show location.
- Select BOUNDARY D.

Question: How is new crust formed?

1. Observe: Boundary D is a **divergent boundary**. Click the right arrow four times to see how the plates move.

   How would you describe the motion of plates in a divergent boundary? **The plates are moving away from each other**

2. Sketch: Draw a side view of the plate boundary before and after the plate motion. Draw an arrow to show which way the plate moved.

   Before movement  
   After movement

3. Locate: Turn on **Show location**. Where on Earth can you find this type of boundary? (Note: You can refer to a world map or atlas for location names.)

   The western side of the South American Plate, ¾ of the African Plate, Most of the Antarctic Plate, and Eastern side of the North American Plate/Eurasian Plate

Highlight these locations on the map below.