

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

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## Oreo Cookies and Plate Tectonics

Amateur geologists can simulate how plates move on the Earth's surface.

The term **tectonics** originates from the Greek word "tektōn," referring to a builder or architect. **Plate tectonics** suggests that large features on Earth's surface, such as continents, ocean basins, and mountain ranges, result from interactions along the edges of large plates of Earth's outer shell. This outer shell is called the **lithosphere** from the Greek "lithos," meaning hard rock. The plates, composed of Earth's crust and uppermost mantle, ride on a warmer, softer layer of the mantle, called the **asthenosphere**.

In our experiment, the upper cookie will represent the **lithosphere**, the creamy filling the **asthenosphere**, and the lower cookie the **lower mantle**.

Plates move in three basic ways. Let's look at them one by one.

Choose a cookie. Don't eat it...yet!

1. First, carefully remove the upper cookie (a "twisting" motion is required).
2. Slide the upper cookie over the creamy filling. This motion simulates the movement of a rigid lithospheric plate over the softer asthenosphere.
3. Next, break the upper cookie in half. As you do so, listen to the sound it makes.



What sound do you hear? \_\_\_\_\_

What does that breaking represent? \_\_\_\_\_

(An earthquake. Message: it takes cold, brittle lithosphere to make earthquakes – earthquakes do not occur in the soft, flowing asthenosphere.)



4. Let's look at **divergent plate boundaries**. Divergent means \_\_\_\_\_  
(divergent means moving apart)

5. Now push down on the two broken cookie halves and slide them apart. What happens to the creamy filling?  
\_\_\_\_\_

(The creamy filling between the two broken “plates” may tend to flow upward, similar to the rising, decompression, and partial melting of hot asthenosphere at mid-ocean ridges and continental rift zones.)

6. Now let’s look at **convergent plate boundaries**.

Convergent means \_\_\_\_\_  
(convergent means moving together)



7. Take the two cookie halves and slowly push them toward each other. What happens to the filling as the plates slide together? \_\_\_\_\_

What happens to the cookies as they push against each other? \_\_\_\_\_

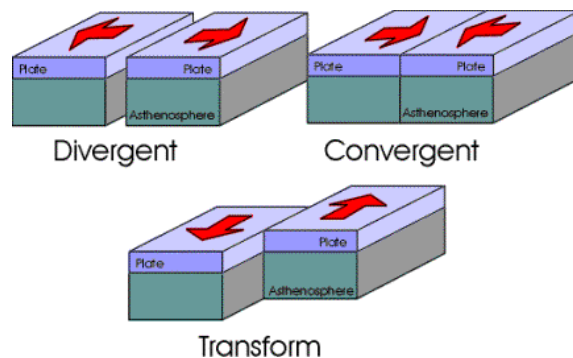
(At convergent plate boundaries, the cold, brittle lithosphere extends to great depths, and deep earthquakes occur. The very largest earthquakes are at subduction zones where two plates get stuck together for centuries, then suddenly let go.)



8. Now let’s look at a **transform plate boundary**. Try sliding the two cookie pieces laterally past one another, over the creamy filling. What do you notice about the cookie edges?

\_\_\_\_\_  
\_\_\_\_\_  
(You can feel and hear that the “plates” do not slide smoothly past one another, but rather stick then let go, stick then let go. The cracking sound you hear each time is like an earthquake occurring along the San Andreas Fault in California.)

9. Some of Earth’s landforms are created by **hotspots** where a plate rides over a fixed “plume” of hot mantle, creating a line of volcanoes. Imagine if a piece of hot, glowing coal were imbedded in the creamy filling – a chain of “volcanoes” would be burned into the overriding cookie.



Adapted from

***FUN WITH FOOD!***  
***PLATE TECTONICS AND OUR NATIONAL PARKS\****

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