Plate Tectonic Drawings

Name: Teacher Guide **Date:** _____

Trial #1: Divergence

*Student answers will vary. We've provided some suggestions below based on the performance expectations.

1. Gather your supplies; shaving cream can, tub, cards, spoon, mesh screen, and towels. The shaving cream is magma and the cards and mesh screen are Earth's plates.

2. Create your model by squirting a layer of magma into the bottom of the pan or tub.

3. Use your spoon to flatten the magma so it's evenly distributed.

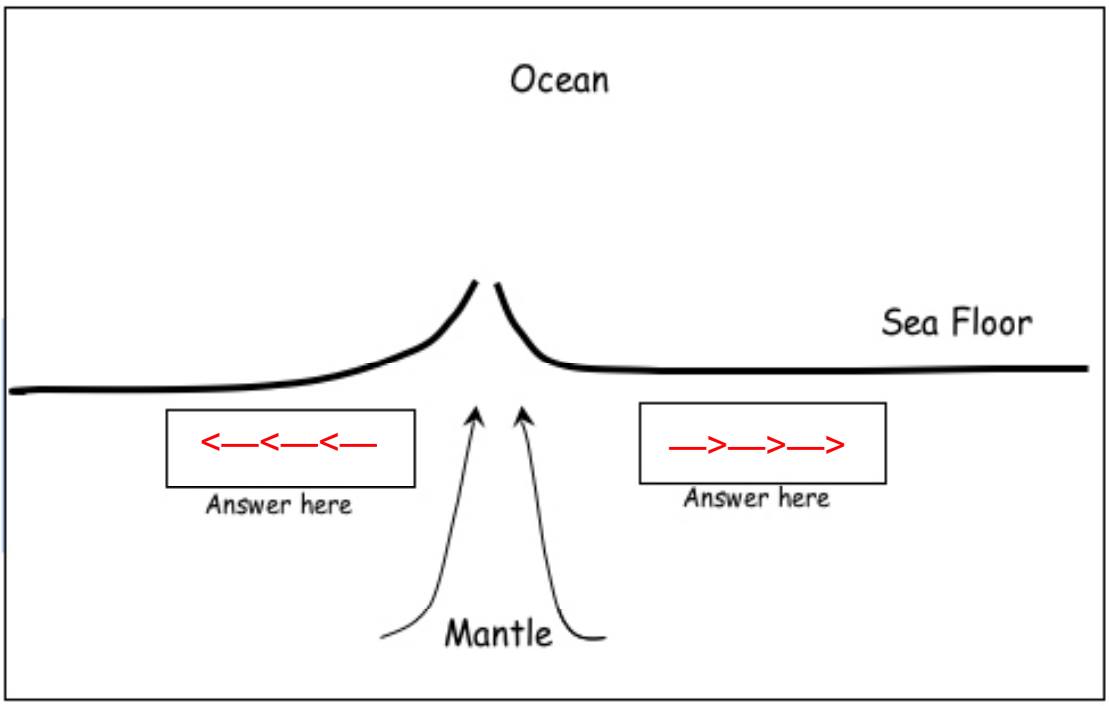
4. Gently place two of your plates on top of the magma so that they form a rectangle.

5. What do you think will will happen when you pull the plates apart?
   - Magma (shaving cream) will come up through the gap.

6. Very slowly, push down and gently slide the two plates apart.

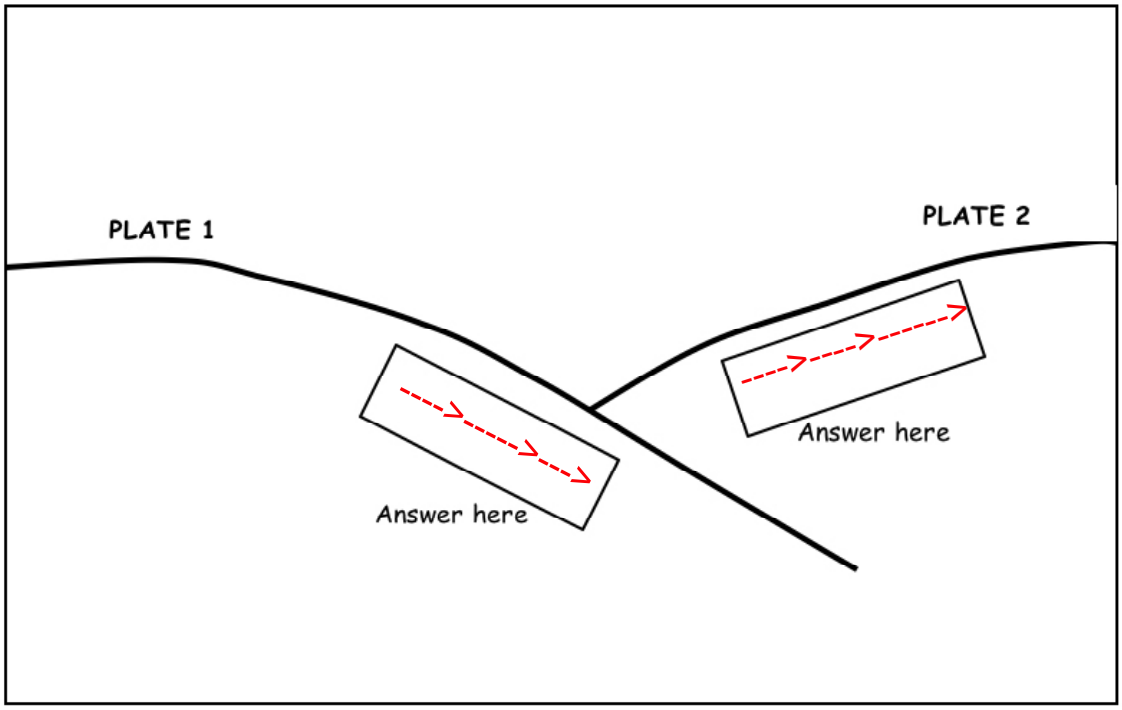
7. What happened?
   - Magma oozed up through the gap.
   - This is modeling the formation of new seafloor material.

8. On the diagram below, draw arrows in the boxes to indicate the direction of plate movement. Then, draw the motion of the "magma."



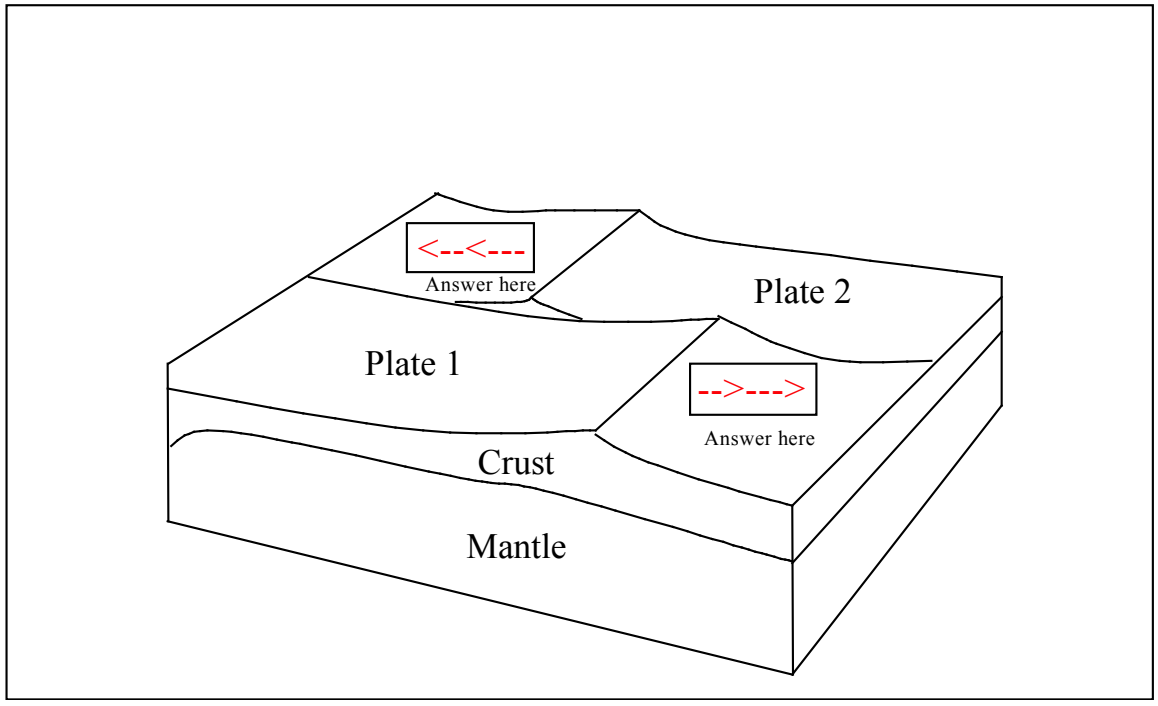
Trial #2: Convergence

1. Wipe your cards clean with a towel to remove excess magma and prepare for the next trial.
2. Use your spoon to flatten the magma again so it's evenly distributed.
3. Put the cards back in place on top of the magma
4. What do you think will happen when you push one plate under the other?
   - Some magma will ooze out, but not as much as when the plates move apart.
   - It might look like a mountain ridge. Volcanoes will come up on the upper plate.
5. This time, push one plate down and under the other plate.
6. What happened? Some magma oozed out. It sort of looked like a mountain ridge.
   - No volcanoes formed. This is a place where the model is not showing all of the real life possibilities. In real life, large volcanoes often form on the upper plate.
7. On the diagram below, draw arrows in the boxes to indicate the direction of plate movement. Then, draw the motion of the "magma."



Trial #3: Transform Fault Movement

1. Wipe your cards clean with a towel to remove excess magma and prepare for the next trial.
2. Use your spoon to make your magma into a long pile.
3. Place your plates back on top and push down gently so a bit of magma comes up between the plates.
4. Put a few small pebbles on the magma in between the plates.
5. What do you think will happen when you slide the plates in opposite directions along side each other?
   - The pebbles and magma will get pushed around as the plates slide.
6. Gently slide the plates in opposite directions along side each other.
7. What happened?
   - Trenches (large faults) form between the two plates.
   - The movement of pebbles and magma represent movement of rocks and earth during earthquakes, which are often caused by plates grinding past each other.
8. Imagine the model scaled up to the size of our Earth's crust. What might occur at these boundaries?
   - The friction and movement would be larger. There might be earthquakes, and landslides. Roads, boulders, and homes could fit inside the large faults.
9. On the diagram below, draw arrows in the boxes to indicate the direction of plate movement. Then, draw the motion of the "magma."



Trial #4: Island Chain Formation

1. Set aside the model of convergent and divergent plates to prepare a new model for island chain formation.

2. Using the mesh material (remember, this also represents one of Earth's plates), hold it flat and free from any surface.

3. With help from another partner, hold the can under the plate and point it upwards.

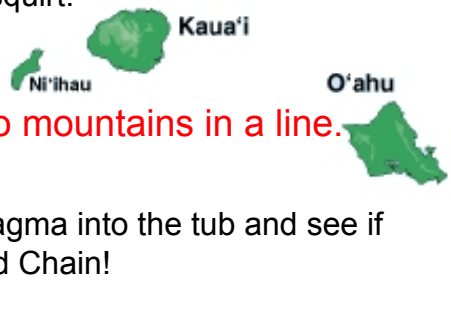
4. What do you think will happen when magma squirts upwards through the plate?

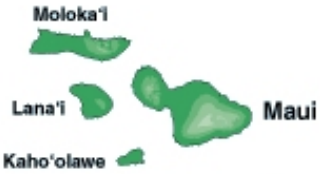
   - It will form a volcano mountain.

5. Gently squirt a small amount of magma three times (stay still as you squirt the can!) and slowly move the plate after each squirt.

6. What happened?

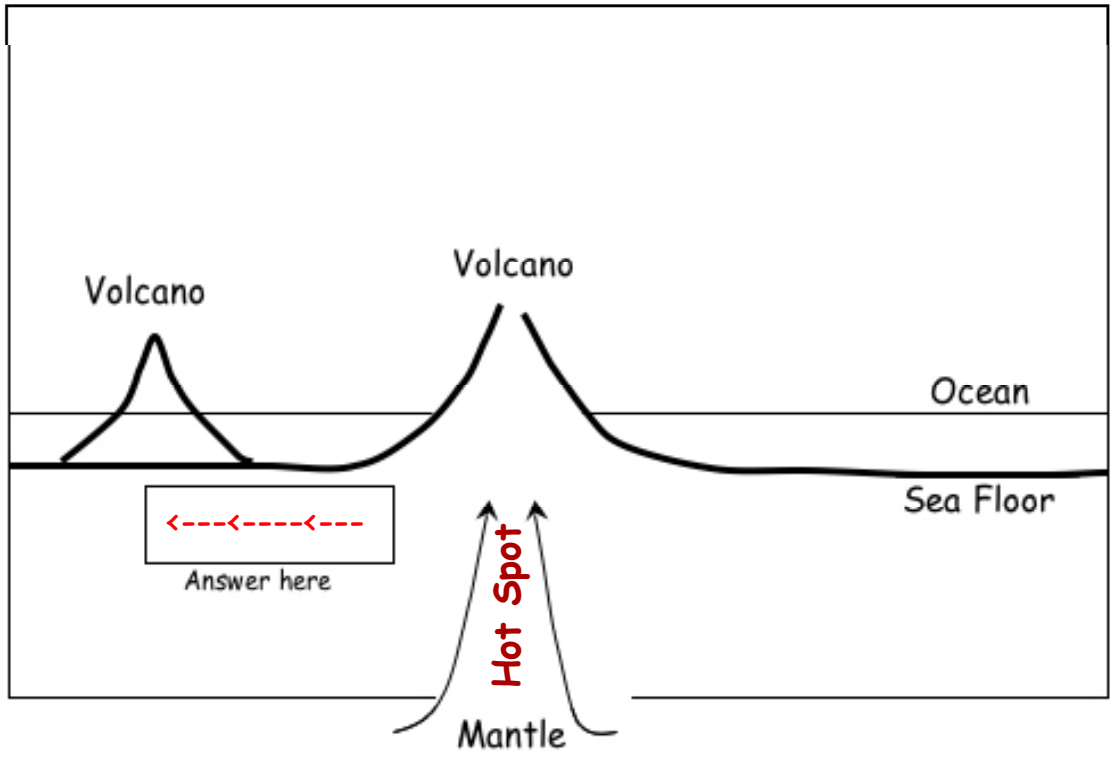
   - We made a series of volcano mountains in a line.





8. **Challenge**: Scrape the excess magma into the tub and see if you can recreate the Hawaiian Island Chain!

9. On the diagram below, draw arrows in the boxes to indicate the direction of plate movement. Then, draw the motion of the "magma."



Map of Earth's Features

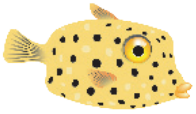
1. Take out the world map, clear acetate sheet, and map of Earth's plates overlay (printed on acetate).

2. Look at the world map and see if you can identify any plate boundaries where convergence, divergence, or transform movement may occur. (hint: start by looking in the middle of the Atlantic Ocean)

3. Place the clear acetate sheet over top of the map.

4. As best you can, trace the plate boundary in the middle of the Atlantic ocean with a dry erase marker.

5. Do you see any more plate boundaries? Continue tracing areas that you think are potential plate boundaries.



6. Trace the Hawaiian Island chain.

7. Place the map of Earth's plates overlay in between yours and the map to compare what you've traced with the official plate boundaries.

8. Continue tracing plates, using the map and plate overlay as a guide.

*Student answers will vary. We've provided some suggestions below based on the performance expectations.

Activity Questions

1. Name one thing you have learned about Earth's features from this activity.
   - Earth's features are changing.
   - The hot, inner core of the Earth affects the surface.
   - I can see evidence of the hot inner core by looking at maps of Earth's surface.
2. Where do earthquakes generally occur?
   - Earthquakes often occur at plate boundaries (the edges of plates) .
   - When plates slide past each other (transform boundaries), there are often earthquakes because pressure builds up as plates push against each other.
3. Are the Hawaiian Islands on a plate boundary?
   - No, the Hawaiian Islands are not on a plate boundary
4. Why does Hawai'i have more volcanic activity than some other locations on Earth?
   - The Hawaiian Islands are located on top of a hot spot.
5. What is a hot spot?
   - A hot spot is an area where hot, molten magma comes through the Earth's surface and erupts. Hot spots form volcanoes. There are about 40 hot spots on Earth. These spots are usually stationary.
6. How did the Hawaiian Islands form?
   - The Pacific crustal plate moved over a hot spot during the process of plate tectonics. The hot spot stayed still and made a line (a series) of mountains in the ocean, which we call the Hawaiian Islands. The youngest peak is closest to the hot spot source. The island chain is clearly visible as a line on maps.