

# EXPLORING OUR FLUID EARTH *Teaching Science as Inquiry (TSI)*

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## Activity: Modeling Plate Spreading

NGSS Science and  
Engineering Practices:

Developing and Using Models

NGSS Crosscutting  
Concepts:

Cause and Effect

NGSS Disciplinary  
Core Ideas:

ESS2.B: Plate Tectonics and Large-Scale System Interactions

### Materials

- Hot plate
- Two 500 mL beakers (or larger)
- Two thermometers
- Water
- Food coloring
- Pipet (long enough to reach the bottom of the beaker)

### Procedure

*Safety Note: Use precautions when using a hot plate to avoid burns, and always remember to handle hot instruments with care. Be sure to monitor the beaker at all times, and do not leave it unattended.*

1. Set up your hot water beaker.
  - a. Fill one beaker  $\frac{3}{4}$  full with water.
  - b. Place the beaker on the hot plate.
  - c. Turn the hot plate on. Heat the water to 50 °C.
  - d. Use a thermometer to monitor the water temperature.
2. Set up your room temperature water beaker.
  - a. Fill a second beaker  $\frac{3}{4}$  full with water (the same volume as the beaker in Procedure 1).
  - b. Place the beaker on a flat table surface.
  - c. Use a thermometer to measure the water temperature.

3. Draw a picture of your setup.
4. Predict what will happen when food coloring is placed in the bottom of the beaker with *room temperature* water.
  - a. Consider the effects of convection currents.
  - b. Draw you predictions.
  - c. Use arrows to show how you expect water will move.
5. Predict what will happen when food coloring is placed in the bottom of the beaker with *hot water*. Follow Procedure 4a–c.
6. Use a pipet to place food coloring at the bottom of the room temperature beaker. Record your observations.
7. Use a pipet to place food coloring at the bottom of the heated beaker. Record your observations.

**Activity Questions:**

1. Explain your reasoning for your predictions in Steps 4 and 5.
2. Did your observations match your expectations for either the room temperature water or the hot water? Explain why you think your observations were similar to, or different than, your predictions.
3. Explain how your experiment modeled plate movement.
4. Which beaker setup (room temperature or hot water) do you think modeled plate movement the best? Explain your reasoning.
5. What are the limitations to your model? If you did this experience again, how could you improve your model so it more closely represented plate movement?

**Share and Connect**

We invite you to share your thoughts, ask for help or read what other educators have to say by joining our community.

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