Name _____ Date _____ Class _____

Lab Investigation

PRE LAB

Modeling Sea-Floor Spreading

Reviewing Content

Mid-ocean ridges are long, underwater mountain chains that rise up from the ocean floors. New ocean crust is continually added to Earth along these ridges in a process called sea-floor spreading. During sea-floor spreading, two tectonic plates move apart, forming a crack in the ocean floor. Molten material from inside Earth rises, erupts through the crack, cools, and hardens to form new oceanic crust. As it forms, the new crust records the direction of Earth's magnetic field at that time.

As new crust forms along a ridge, older sections of crust move outward from either side of the ridge. Over long periods of time, the ocean crust eventually plunges down into the mantle along deep-ocean trenches. The process by which the ocean floor sinks into a deep-ocean trench and back into the mantle is called subduction.

do the math!

Sea-floor spreading takes place at different rates. For example, between Europe and North America, spreading is occurring at about 3.6 cm/y. Along an area in the East Pacific Rise, it's occurring at about 15 cm/y. About how many times faster is sea-floor spreading taking place in this part of the Pacific Ocean than in that part of the Atlantic Ocean?

Reviewing Inquiry Focus

Because scientists are not able to directly observe sea-floor spreading or subduction, they often use models to study these processes. Making models allows scientists to simulate these unobservable movements of Earth's crust or crustal plates.

1. In this investigation, what two tectonic processes will you be modeling?

_____

_____

2. What will you be able to infer from this investigation about how the overall size of Earth's ocean floor changes over time? Explain.

_____

_____

Name _____ Date _____ Class _____

DIRECTED Inquiry

30 min

Modeling Sea-Floor Spreading

Problem

INQUIRY FOCUS
Make Models, Observe, Infer

How does sea-floor spreading add material to the ocean floor and what happens to this material over time?

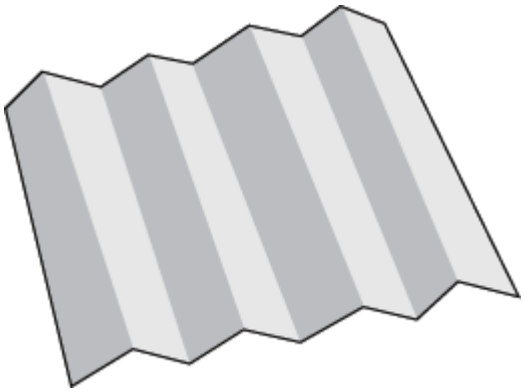
Materials

scissors
colored marker
metric ruler
2 sheets of unlined paper

Procedure

1. Use the ruler and marker to draw stripes across one sheet of paper, parallel to the short sides of the paper. The stripes should vary in spacing and thickness as shown below. Fold the paper in half lengthwise and write the word "Start" at the top of each half of the paper.

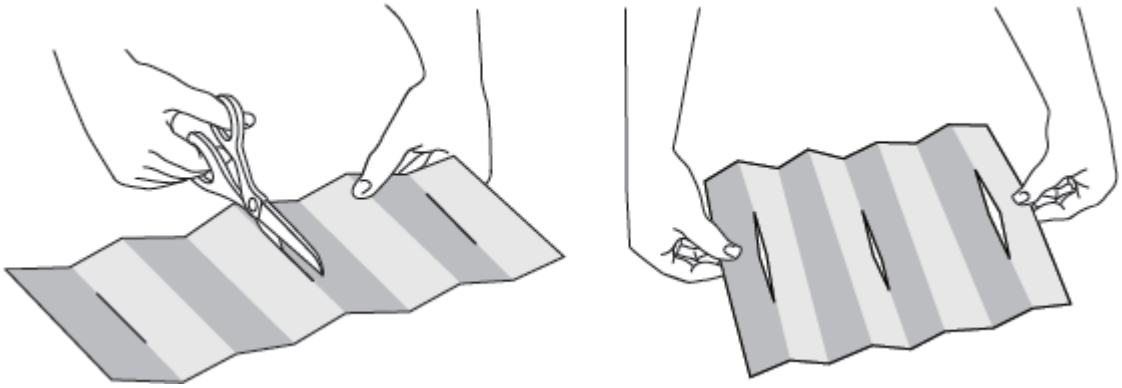
2. Using the scissors, carefully cut the paper in half along the fold line to form two strips.
3. Lightly fold the second sheet of paper crosswise into eighths as shown. Then unfold it, leaving creases in the paper.



Name _____ Date _____ Class _____

MODELING SEA-FLOOR SPREADING *continued*

4. Now fold the second sheet of paper in half crosswise. Starting at the center fold, draw lines 5.5 cm long on the middle crease and the two creases closest to the ends of the paper. Carefully cut along the lines you drew. Unfold the paper. There should be three slits, each 11 cm long, in the center of the paper as shown below.



5. Put the two striped strips of paper together so their stripes face each other and their Start labels touch one another. Insert the Start ends of the strips up through the center slit and then pull them toward the side slits. (See the diagram below.)

6. Insert the Start ends of the strips into the side slits as shown below. Pull the ends of the strips and watch what happens at the center slit.

7. Practice pulling the strips until you can make the two strips come up through the center and go down through the sides at the same time.