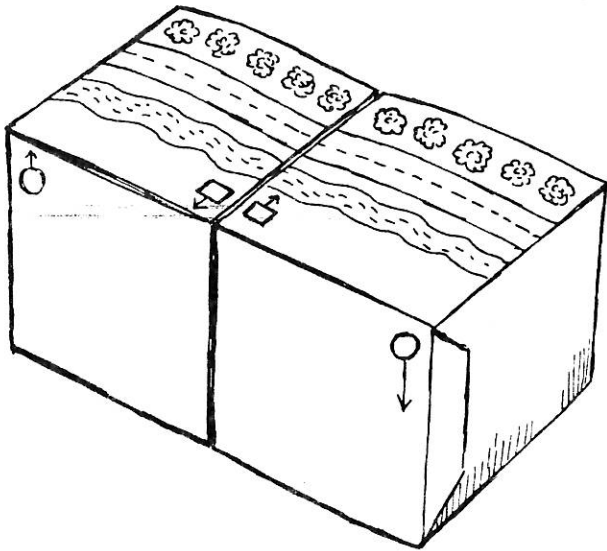


EARTHQUAKES

At a Fault



Rock Blocks

This model shows how rocks move along faults during an earthquake.

SCIENCE CONCEPTS & OBJECTIVES

- ◆ Infer that earthquakes occur when rock snaps apart and moves along a fault
- ◆ Understand the difference between the focus and the epicenter of an earthquake

VOCABULARY

earthquake a sudden shift in Earth's crust

epicenter the point on Earth's surface directly above the focus

fault a break, or fracture on Earth's crust

focus the place where an earthquake begins

For Your Information

An earthquake is a sudden shift in Earth's crust. It's caused by great blocks of rocks abruptly snapping apart. Most earthquakes take place along breaks in Earth's crust called *faults*. At a fault, great blocks of rock may stress and strain under pressure for hundreds or thousands of years. But when the pressure finally becomes too great, the rock blocks suddenly move past each other. This releases tremendous amounts of stored energy and produces an earthquake. After the rocks slide past each other, the pressure is released and they spring back to their original shape.

The place along the fault break where the earthquake starts is called the *focus*. All the shock waves travel out from the focus, which is underground. The point on the surface

directly above the focus is the earthquake's *epicenter*. More than a million earthquakes take place every year around the world.

TEACHING WITH THE MODEL

Rock Blocks

1. Ask students: If the ground beneath this building started to shake, what would you think was happening? Has anyone ever experienced an earthquake or do you know about one? What happened?
2. Invite students to make the model (see page 101).

(continued on page 102)

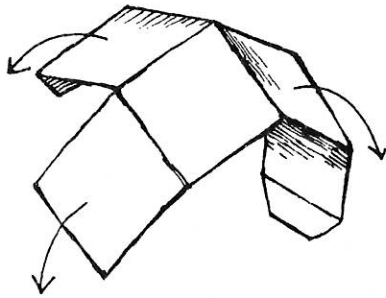


Making the Model

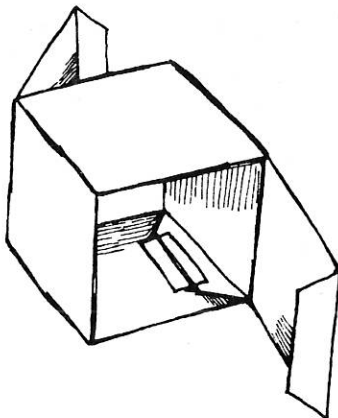
Rock Blocks

MATERIALS: reproducible pages 104 and 105
● scissors ● tape ● crayons, markers, or colored pencils (optional)

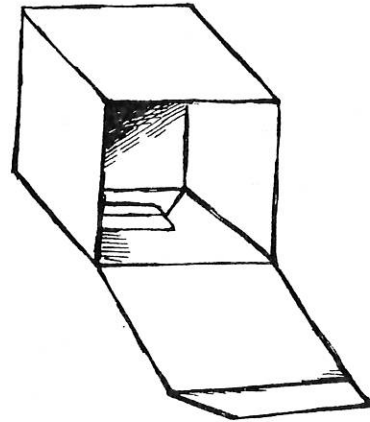
1. Photocopy pages 104 and 105.
2. Cut out each page's piece along its heavy black line. Color each, if desired.
3. Select one of the pieces and fold all the dashed lines away from the printed side, as shown. Crease the folds well.



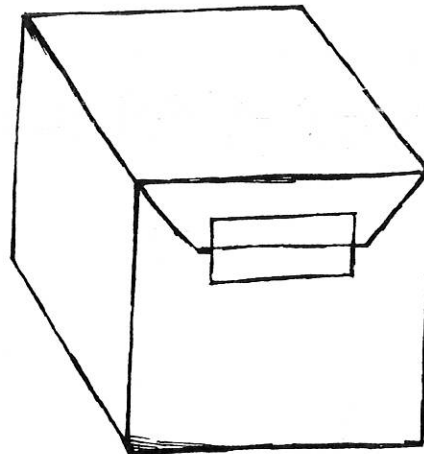
4. Fold the long strip of four squares upon itself to form a closed square and tape the tab, as shown.



5. Fold in the tab of one of the remaining sides and tape from the inside, as shown.



6. Close the final side with the tab on the outside and tape, as shown.

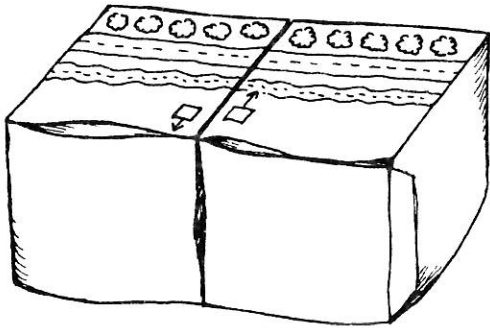


7. Repeat steps 3–6 for the other piece. **HINT:** Taping all the edges will reinforce and strengthen the cubes.

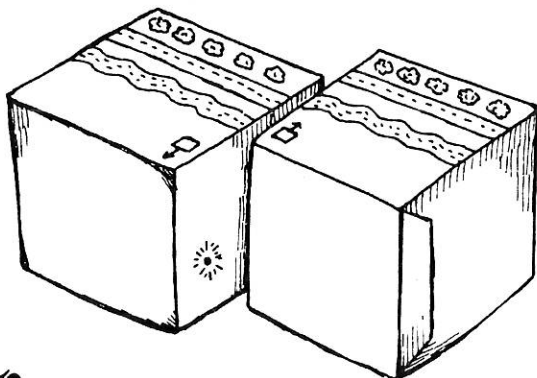


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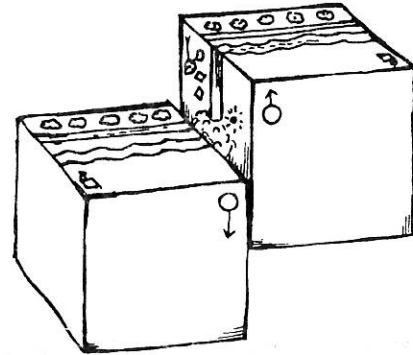
3. Set the two assembled blocks side by side with their RIVER and ROAD printed sides facing up. Place them next to each other so that the tiny squares with arrows are side by side. Explain that students are looking down on trees, a road, and a river. Beneath this land there is a break in Earth's crust called a fault.
4. Place one hand on each block and push them in opposite directions as if you were going to slide them apart according to the directions of the arrows on the little squares. However, don't actually let the blocks move.



5. Ask students if they can see the pressure. Are the blocks bending a little? Now slide the blocks a little past each other. Such movement can happen during an earthquake. Challenge students to describe what happened to the paths of the road and the river. What might have happened to the trees and the pavement if the ground shook violently?



6. The movement of the blocks took place along a crack—a fault. Look for the FOCUS on the side of one of the moved blocks. The focus is the place where the earthquake began. The point on the surface directly above the focus is the epicenter.
7. During earthquakes, blocks of rocks can move up and down in relation to each other. Place the blocks next to each other so the circles with arrows are side by side.
8. Hold up the blocks and move them in the direction of the arrows. Challenge students to describe how the land changed from this upward movement. Point out the side of the upward-moving block. It shows a waterfall and falling trees and rocks.



9. Challenge students to find the focus near the waterfall and to figure out where the epicenter is. Then explain that once the rocks slide past each other and release stored-up energy, they spring back to their original shape, helping to relieve the pressure.



EXTENSIONS

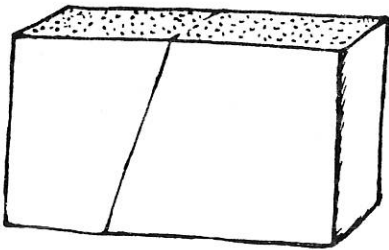
HANDS-ON

Center Split

Students observe how vibrations can split rock along a fault line.

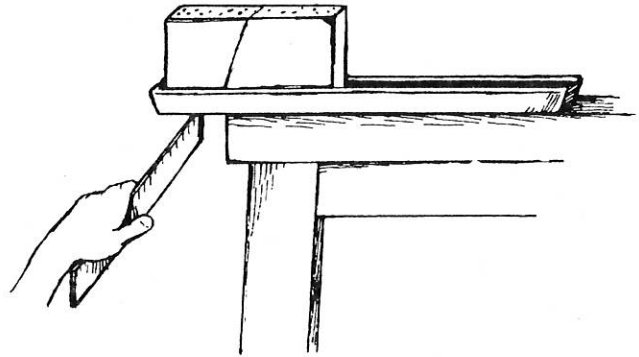
MATERIALS: rectangular block of modeling clay • knife • cookie sheet • sand or topsoil • wooden ruler

1. Set the block of clay on its long narrow side and cut the block in half at an angle. To do this, set the knife on top of the block perpendicular to it. Cut down through the block, angling to the left. This is the fault line in the "rock."



2. Pick up the two "rock" pieces together and set them toward one end of the cookie sheet. Sprinkle sand on top of the "rocks." This is the "ground."
3. Place the cookie sheet on the edge of a table. Pull the cookie sheet out so the beginning edge of the "fault" is just over the edge of the table. Adjust the "rocks" on the sheet until they balance.
4. Start tapping the ruler on the bottom of the cookie sheet, just underneath where the beginning edge of the "fault" is. Stop when a crack in the "ground" is apparent. Ask: What happened? (*The "rock" slipped apart along the fault and cracked open the ground.*) Why? (*vibrations*) How is this like an earth-

quake? (*The ground above a fault shifts when an earthquake produces vibrations.*)



COOPERATE AND CREATE

Famous Fault

Students research the San Andreas fault.

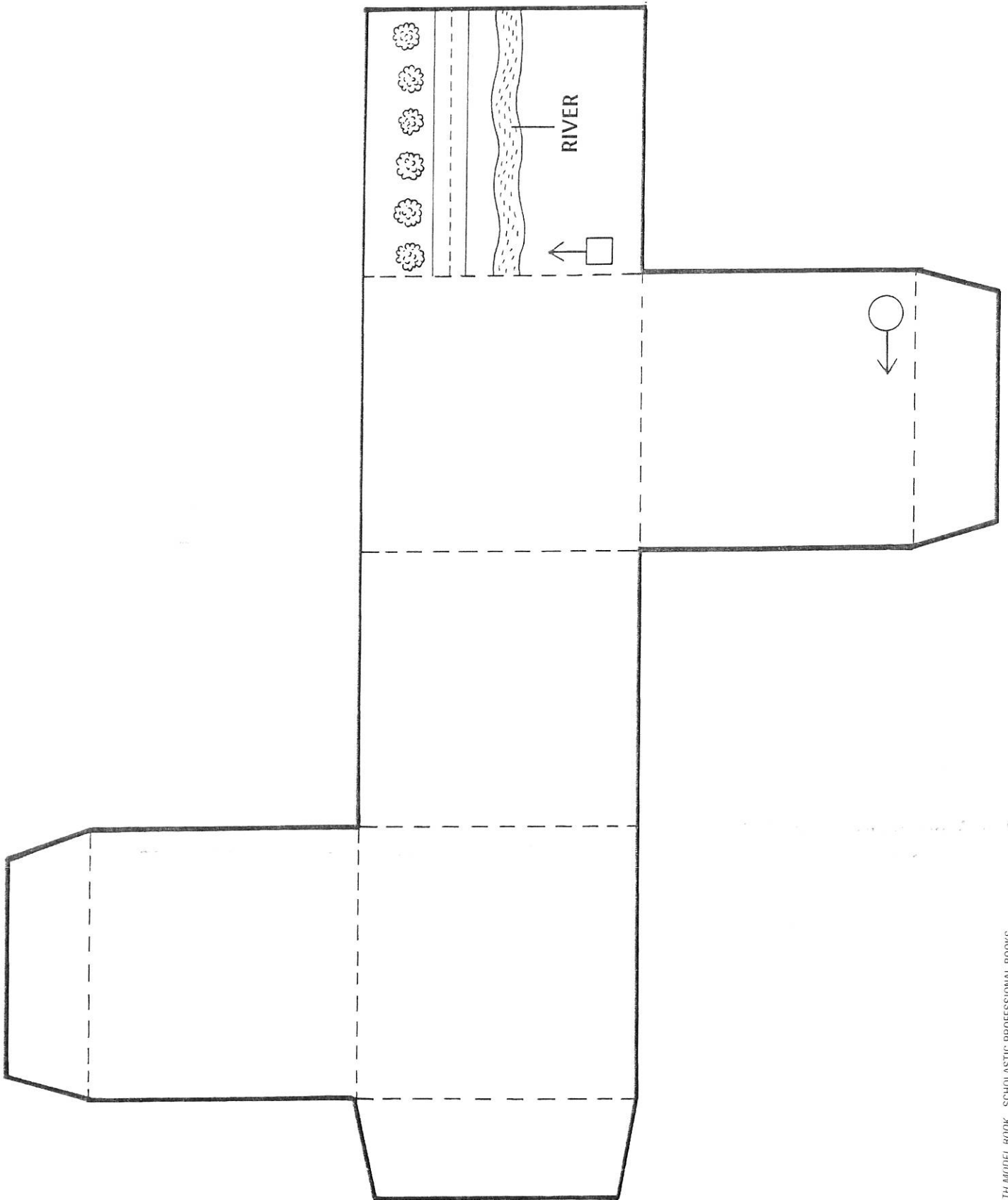
The San Andreas fault runs for about a thousand miles through Southern California. Encourage students to find out more about this famous fault by challenging groups to draw a map of it, create a timeline of known quakes along it, or write futuristic stories of the "Big One" yet to come.

RESEARCH IT

Related topics for research reports and projects:

- How were fault block mountains like the Sierra Nevadas in California and the Tetons in Wyoming formed?
- Where do most major earthquakes (those that cause damage) occur? What is the Richter scale?

ROCK BLOCKS



ROCK BLOCKS

