

Earthquakes K-2

Earthquake Science



Visit the American Red Cross Web site
at www.redcross.org/disaster/masters

LESSON PLAN 2

Things Are Shaking

Young children can better understand earthquakes and their impact by observing a tabletop demonstration rather than trying to imagine earthquakes on a global scale.

Key Terms and Concepts

community
damage
earthquake

energy
fire
seismic waves

shake
tremble

Purpose

To illustrate what can happen as a result of an earthquake

Objectives

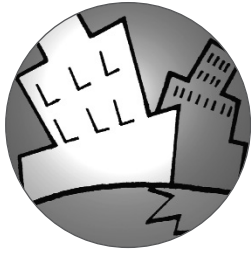
The students will—

- Use a cardboard box and the DVD “Earthquakes” to demonstrate what they might feel during an earthquake.
- Create the sounds of an earthquake.
- Write picture words to describe the sounds and sensations of an earthquake.
- Build small communities in cake pans and simulate, observe and describe the effects of an earthquake that strikes the communities.
- Read *Earthquake* by Milly Lee (Sunburst Edition, 2006) to compare the pictures and descriptions of San Francisco’s 1906 earthquake to their own cake-pan communities.
- Talk with family members about natural disasters that have affected the community and share the stories through pictures. (Home Connection)
- Write stories about a person or animal living in their cake-pan communities when the earthquake strikes. (Linking Across the Curriculum)
- View and discuss a PowerPoint presentation of photographs from the 1906 earthquake. (Linking Across the Curriculum)
- Demonstrate, describe and measure the diminishing effects of seismic waves as they move farther from the epicenter of the earthquake.

Activities

“What’s Quaking?”

“Shake, Rattle and Roll”



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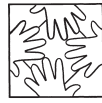
Things Are Shaking

Materials

- Large cardboard box from an appliance (washer, dryer, refrigerator) with one of the six sides removed or cut like a door and windows (optional)
- DVD: "Earthquakes" (optional)
- Chalkboard and chalk or chart paper and markers



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"What's Quaking?"

SET UP 30 minutes CONDUCT 35 minutes

Science: Earth Science and Physical Science; Language Arts: Vocabulary

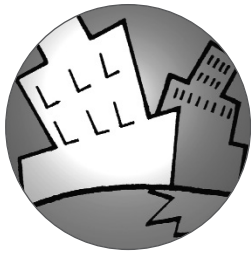
TEACHING NOTE If you plan to use the cardboard box simulation, view the DVD "Earthquakes" for an example of how to cut out the sixth side of the box.

1.  Guide student discussion to build an understanding of the word "quake." First, write the word "tremble" on the chalkboard and have the students stand and illustrate what it means to tremble. Talk with the class about times they have trembled: when they were frightened, when they were cold or when a big truck passed them on the highway and they felt the car shake.
2. Discuss other terms that mean the same as tremble. (Shake, vibrate, shiver, shudder or wobble) Have the students demonstrate the words with their bodies.
3. Ask the students if they have ever experienced an earthquake, and if so, ask them to discuss their experiences. If not, tell them to try and imagine what they would feel if they were not shaking, but the ground and floor under them were shaking.
4. Use the cardboard box OR show the beginning of the DVD "Earthquakes" to convey the experience of the earth shaking.

TEACHING NOTE If using the box, have one child at a time step inside the box, while you and another child rock the box back and forth. Do this for about 10 seconds, while explaining that earthquakes don't last long and the movement always stops.

5. Add sound to the earthquake experience. If some students have experienced a quake, ask them to describe the sound: The earth makes low, rumbling sounds like thunder or a train. Have the students try to make a sound like that, perhaps by pounding their knees or lightly drumming on their desks. Students should be thinking about what sound things on the earth might make during the quake—rattling, shaking and even breaking. Have the students add these sounds by shaking the tables or rattling paper clips in a plastic cup or dropping pencils and books on the floor.

Once again, make the sounds for just a few seconds, then maybe 10 seconds and no more than 30 seconds. Afterward, ask for silence. Start again for just a few seconds, reminding the students that earthquakes stop and sometimes start again, but will stop once more.



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Wrap-Up

Allow time for the students to express their observations and feelings.



Have the students name words that describe earthquakes—"tremble," "shake," "roar," "crash," "rumble" and so forth—and then tell them to write the words to illustrate what they mean.

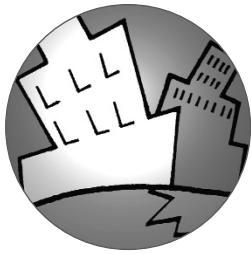
For example, "roar" might be written in big, bold, capital letters with each character written progressively larger. "Rumble" could be represented in crooked, shaky writing, and shattered or broken letters could spell the word "earthquake" itself.



Have students share their illustrated terms as they describe the sounds and feelings of an earthquake.



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Materials

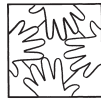
- *Earthquake* by Milly Lee (Sunburst edition, 2006)

For each group of students:

- Cake pan (9" x 13" [23 cm x 33 cm])
- 2 long strips of cloth or heavy paper (approx. 16" x 4" [40 cm x 10 cm])
- Container of dirt to fill cake pan about 1 to 2 inches (3 to 5 centimeters) deep
- Container to hold the dirt
- Small toy cars, houses and people; plastic blocks; and ice cream sticks



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"Shake, Rattle and Roll"

SET UP 30 minutes CONDUCT 35 minutes

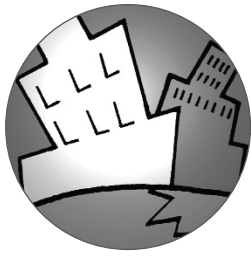
Science: Physical Science and Earth Science; Social Studies: Community; Language Arts: Reading

TEACHING NOTE If you do not have small toy houses, use paper cups to represent buildings and/or math manipulatives to construct buildings or represent cars. The ice cream sticks represent roads and bridges.

This activity is written for a small, independent group of four students. However, depending upon the abilities and ages of your students, you may wish to adapt it to a demonstration for the entire class.

1. Explain to the students that they are going to build a model of a small community on the crust of the earth, and they will simulate an earthquake that will affect the community they built.
2. Divide the class into groups of four students. Distribute the materials needed to construct the community, including the dirt, cake pan, and cloth or paper strips. Have students follow the steps to construct their communities as you illustrate or explain them:
 - a. Place the strips of paper or cloth in the bottom of the pan side by side. The strips should touch but not overlap each other. The strips will alternate, with successive strips hanging over opposite edges of the pan by at least 1 inch (2.5 centimeters). Explain to the students that the strips represent the ground on which their community is built.
 - b. Fill the pan with 1 to 2 inches (3 to 5 centimeters) of dirt. Pat down the dirt.
 - c. Place the toys or other building materials on top of the dirt to simulate a small community. Be creative, putting in bridges, streets, tall buildings and so forth.
3. Now, have the students simulate an earthquake in their cake-pan communities. Have two students in each group grasp one of the ends of the strips of cloth or paper and pull in opposite directions in a quick little jerk.

TEACHING NOTE You may have different groups pull at different rates of speed to lead to a discussion of the different strengths of earthquakes. Students usually simulate very violent earthquakes, but most earthquakes are mild.



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Wrap-Up

Gather the class together and ask the students to describe the changes they observed both to the earth's surface and to their community.

Read *Earthquake* by Milly Lee, a picture book about the 1906 San Francisco Earthquake and its impact on the Chinatown community.

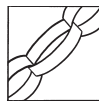


Based on the people and the pictures in the books, have the students talk about how the changes they observed in their cake-pan communities actually would affect a real community.



Home Connection

Have the students talk to family members to find out about earthquakes or other natural disasters that have had an impact on them and/or their communities—hurricanes, snow storms, tornadoes, etc. Have them share these stories in pictures with brief descriptions, similar to the format of Milly Lee's *Earthquake*.



Linking Across the Curriculum

Language Arts: Writing; Social Studies: Community

Have the students write stories about a person or an animal living in their cake-pan communities when their earthquake struck.

For younger students: Have the class or small groups of students make up the story together while you or a volunteer writes the story on sentence strips. You can use this story again to practice reading by switching the sentence strips or focusing on specific words.

Social Studies: History and Community; Language Arts: Reading

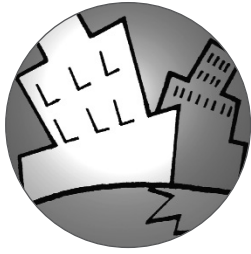


The *San Francisco Chronicle* has a virtual museum online that provides excellent images from the 1906 earthquake and fire. Use the PowerPoint presentation at <http://www.sfmuseum.org/views/1906.ppt> to have the students talk about how the earthquake affected the community and compare the photographs with the story in Milly Lee's *Earthquake*.

Science: Physical Science and Earth Science; Mathematics: Measurement

For this exercise you will need sand, a small, light table and a rubber mallet (or rubber-heeled shoe).

The energy released by an earthquake as seismic waves is most powerful deep underground where the earthquake actually begins—the focus. Invite the students to prove this with the following experiment. Spread at least one cup of sand near one end of the table. Tap that end of the table with the mallet or your shoe. Briefly describe what happens to the sand. Move the sand farther away from the end of the table. Tap the table's end again. Try very hard to tap the table in exactly the same place you tapped before and with the same force. Describe what happens to the sand this time.



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Continue to move the sand and tap the end of the table. Try to keep the place and force of the tap the same each time. What happened to the movements of the sand as the distance between it and the earthquake—the tap of the mallet or shoe—increased? Have the students describe their observations and explain what they think happened.

Extension: Have the students determine a way to use measurement to describe the actual reaction of the sand to the force of the tap.



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