

## Earthquakes 3–5

### Earthquake Safety

#### LESSON PLAN 4

# Stay Safe in an Earthquake

To stay safe before, during and after an earthquake, children and their families need to identify and remove hazards. They also must know what to do when an earthquake strikes.

### Key Terms and Concepts

aftershock  
avalanche  
damage  
debris

Drop, Cover and  
Hold On  
evacuate  
hazard

landslide  
liquefaction

### Purposes

To help the students and their families recognize how ordinary objects and regular room arrangements can become serious hazards during an earthquake

To help the students and their families know what to do if an earthquake occurs

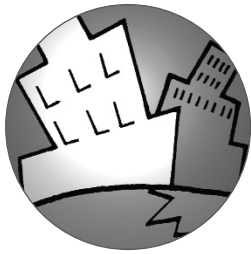
### Objectives

The students will—

- Discuss and define hazards in relation to earthquake injuries and damage.
- Identify types of earthquake hazards and participate in a school-wide hazard hunt to find and, when possible, correct them.
- Follow *Home Hazard Hunt* with their families to find and correct earthquake hazards at home. (Home Connection)
- Use *Neighborhood Hazard Hunt* to identify types of earthquake hazards in the community. (Linking Across the Curriculum)
- Create a list of earthquake hazards in the community and write letters or e-mail messages to appropriate people about correcting these hazards. (Linking Across the Curriculum)
- Rate earthquake hazards from least to most dangerous. (Linking Across the Curriculum)
- Use *Earthquake Simulation* to practice Drop, Cover and Hold On.
- Participate in an earthquake drill and evacuation and read *Drill and Evacuation Checklist* to see what steps need improvement.
- Talk about feelings and concerns during an earthquake drill and evacuation.



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- Write and illustrate letters to friends to describe an earthquake drill and discuss feelings and concerns.
- Teach Drop, Cover and Hold On to family members and practice it with them. (Home Connection)
- Create posters or brochures to educate and alert others about earthquake safety. (Linking Across the Curriculum)
- Use “Did You Feel It?” from the U.S. Geological Survey to identify earthquake intensity. (Linking Across the Curriculum)

### Activities

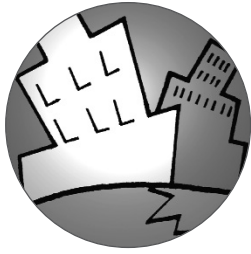
“Hazard Hunt”

“What Should I Do?”

“What Should I Do Next?”



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#### Materials

- Chalkboard and chalk or chart paper and markers
- "California Schools After a Quake" (photos included on CD-ROM)
- LCD projector or printouts of above photos
- 3 large poster boards or pieces of chart paper, 1 per group
- Crayons or markers
- *Home Hazard Hunt*, 1 copy per student (Home Connection)
- *Neighborhood Hazard Hunt*, 1 copy per student (Linking Across the Curriculum)




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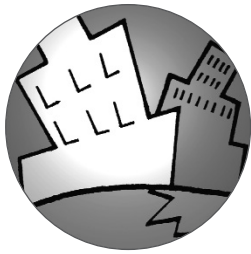
## "Hazard Hunt"

**SET UP** 15 minutes **CONDUCT** 2 to 3 class sessions, including group time to search for and, when possible, correct hazards

**Science: Health; Social Studies: Community**

1. Ask the students what they think causes deaths and injuries when an earthquake has happened. Ask them to imagine what would happen if an earthquake shook the ground where they live. Allow them to express their ideas and, after some discussion, make sure that the students realize that the movement of the ground during an earthquake seldom directly causes people to get hurt. Most people are hurt from things falling on them inside or outside buildings.
2.  As a class, define the term "hazard." (A source of danger.) Discuss with the students how it relates to earthquakes.
3. Ask the students to help make a class list of the types of hazard that can result from an earthquake. As the students give their ideas, write them on the board. Guide the students' responses to make sure they include the hazards listed in the chart below.

<b>Damage inside the classroom and hallways</b> Overturned bookcases, furniture and appliances Falling objects from shelves and walls Falling glass from broken windows Collapsing walls Falling pieces of ceiling and light fixtures	<b>Damage outside the school building</b> Falling brick from walls and chimneys Falling roof shingles Falling glass from broken windows
<b>Other damage within the school building</b> Power outages Fires from broken gas lines and damaged electrical wires Flooding from broken water pipes Toxic fumes from spilled chemicals	<b>Damage around the community</b> Fallen power lines and power outages Damage to bridges, highways and railroad tracks Flooding from dam failures; damage to reservoirs and water towers Fires from broken gas lines and chemical releases Landslides or avalanches Tsunamis Liquefaction, causing loss of support for buildings and bridges



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4. Explain that there may be some hazards that we cannot correct; however, there are many others that we can. Show printouts or project the photos included on the *Masters of Disaster* CD-ROM, “California Schools After a Quake.” Explain that all these photographs depict earthquakes that occurred when schools were not in session. No one was hurt. Practicing Drop, Cover and Hold On would have prevented injuries had children been in the school buildings. Safe evacuation would have been possible, although the darkened hallways would have been challenging for students to navigate.

**TEACHING NOTE** These photographs could frighten young students. Look at the photos before deciding whether or not to show them to your class. You may choose to show only a few photos that you feel address issues and hazards your students can understand—fallen books and bookcases, boxes toppled from shelves and so forth.

As students view the photographs, have them point out the hazards they see. (Suspended ceiling tiles and metal brackets were not stable; bookshelves were not bolted down; heavy objects and boxes fell from shelves; etc.) Which of these hazards could have been eliminated? Explain. (Bolt bookcases to wall studs; move heavy or breakable objects from high shelves to low shelves; move filing cabinets away from exits; do not use suspended ceiling tiles; and install emergency lighting in hallways.)

5. After viewing and discussing the photos, divide the class into three groups for a school hazard hunt. Assign one of the three areas to each group:

Group 1: Classrooms (yours and others)

Group 2: General school building (halls, cafeteria, gym, offices, custodian’s closets or storerooms)

Group 3: School grounds (fields, parking lots, playground, etc.)

Provide time for the students to visit and examine each of the areas they must search for earthquake hazards. Tell them to look carefully for things that might cause injuries during an earthquake and things that might block exits and escape routes after the quake.

**TEACHING NOTE** A complete school hazard hunt could take many hours. Your students could search for only the most obvious hazards or you could extend the activity over several days.

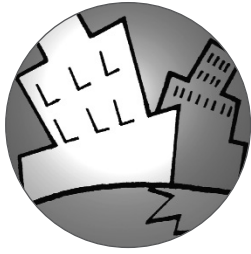


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### Wrap-Up

When all three groups have had a chance to visit their assigned areas and look for earthquake hazards, have them use the poster board to record and report their findings, including examples, descriptions and illustrations.



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As a class, discuss the search to decide whether the major hazards were reported in each area of the school. Determine which hazards can be corrected and which cannot. Which hazards can students correct—removing stacks of books and boxes from the tops of bookshelves; which hazards can adults correct—bolting bookshelves to walls and reinforcing lighting fixtures.

Have the students present their hazard hunt findings and possible corrective measures to the school administration through letters or an invitation to a guided tour of possible hazardous areas. If appropriate, work with the students to eliminate the hazardous conditions they are able to correct.



## Home Connection

Explain to the students that they're going to conduct a home hazard hunt. Distribute *Home Hazard Hunt* and discuss the steps to take with their families in order to stay safe during and after an earthquake.

Have them work with their families to discuss potential hazards and how to fix them. It's best to go to each room of their homes and look around to see what might happen in case of an earthquake. Have them look carefully at the areas where family members are most likely to be—at the dinner table, watching TV or in bed. What could happen? How can they fix it?

Challenge the students to help prepare relatives and elderly neighbors as well.

**TEACHING NOTE** Consider awarding a *Masters of Disaster* earthquake sticker to the students when they discuss the hazards they found and the safety measures they have taken at home.



## Linking Across the Curriculum

### Social Studies: Community; Science: Health

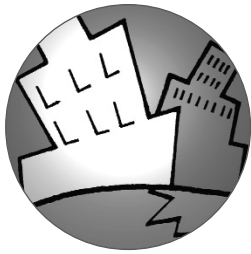
Distribute *Neighborhood Hazard Hunt* and, after providing time for the students to complete the activity sheet, divide the class into small groups. Have the students work together to make sure they found all the possible hazards. Discuss why outdoor earthquake safety means finding a clear area.

### Answers to *Neighborhood Hazard Hunt*

Possible hazards include—plate glass windows, power poles and wires, flagpoles, statues, billboards, billboard lights, a bridge, a parapet on a building, flowerpots on window ledges, signs over doors, awnings, candles and bare feet.



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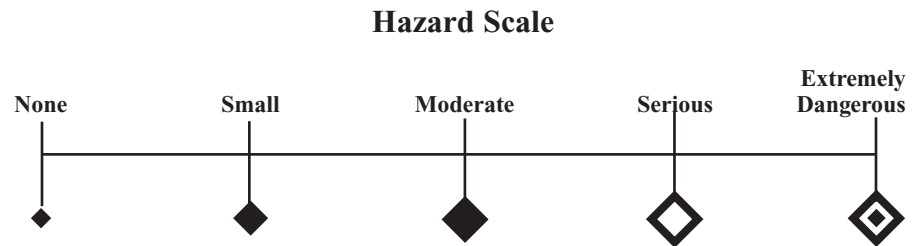
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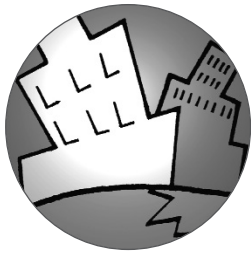
#### Social Studies: Community

The students will identify earthquake hazards throughout the community, and with the help of their families they can make a list of hazards they find when shopping or playing in the park. Consider having the students send simple letters or e-mail messages to the appropriate shop owners or city officials suggesting ways to correct the hazards they identified in their community.

#### Mathematics: Rating System

Invite the students to work in small groups, or within the class as a whole, to rate each hazard found on their lists (classroom, general school building, school grounds) according to the following scale.





## Earthquakes 3-5

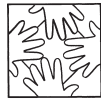
### LESSON PLAN 4 Stay Safe in an Earthquake

#### Materials

- Noisemakers (e.g., pans, pencils, musical instruments)
- *Earthquake Simulation*, 1 copy per student
- *Drill and Evacuation Checklist*, 1 copy per student



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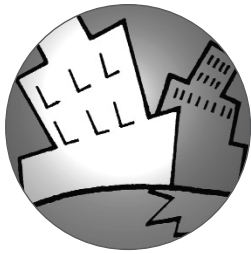
## "What Should I Do?"

**SET UP** 5 minutes **CONDUCT** 30 minutes, plus time to practice  
safety position

Language Arts: Reading; Fine Arts: Dramatic Arts; Science: Health

**TEACHING NOTE** The point of Drop, Cover and Hold On is to take cover immediately in the closest safe place. (For example, under a desk at school; under a sturdy table at home; or against an interior wall in an office building. If outside, move to an open space. If you are in bed, stay there and protect your head with a pillow.) The phrase "Duck, Cover and Hold" means the same as Drop, Cover and Hold On. Use the terminology approved by your school or district.

1. Ask the students if they would know what to do if an earthquake started right now. Have them share their answers.
2. Explain and demonstrate to the students the correct behavior. In the event of an earthquake students should—
  - **Drop:** Get under the desks or tables, positioning as much of their bodies as possible under cover.
  - **Cover** their eyes by leaning their faces against an arm as they hold on.
  - **Hold On** to a leg of the desk or table. (Their hands and heads should be about halfway between the floor and the top of the desks or tables.)
4. Explain to the students that you want them to practice when you say, "Drop, Cover and Hold On." Have the students drop. Keep them quiet. Once they have mastered the position, you should drop as well. After 10 to 15 seconds in place, ask them to get up carefully and check themselves and their neighbors. Ask, "Is everyone all right?" Wait for their answers and look around to visually check the students and the room.
5. Repeat the drill regularly until the students have mastered it. When you think that students are comfortable with the drop drill, conduct an imaginary earthquake exercise. Explain that you are going to create an imaginary earthquake by reading a story to help the students understand what to do if a real earthquake were to happen. Remind the students that "imaginary" means "pretend."
6. Appoint student helpers for the simulation.
  - One student to flick the lights on and off a few times and then eventually turn them off
  - One student to be the "timer" who will count the seconds to see how long the earthquake lasted



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- Several students to create earthquake sound effects such as windows rattling, desks or tables scraping, drawers opening, dogs barking, books falling, trees scraping the building, people shouting, babies crying, car alarms sounding and doors banging shut

**TEACHING NOTE** The simulation can get out of hand if you do not set it up carefully. Warn neighboring teachers before the drill. The sound effects might be too intense for younger students, those who have recently experienced a damaging quake, and students who are not familiar with earthquake drills. The scenario can be read without special effects and will still be effective.

7. Before you read the simulation, remind the students at their desks to follow the Drop, Cover and Hold On procedure. Remind your helpers to complete their assigned tasks when you cue them in the story.

Read the simulation, noting the students' ability to Drop, Cover and Hold On at the appropriate times. After the simulation allow the students to share their feelings during the imaginary earthquake. Were they scared? Why? Did they feel safer in the Drop, Cover and Hold On position? Challenge them to give reasons why each step in the procedure is important to their safety.

8. Have the timer report the length of the simulated earthquake. Explain that most earthquakes that we feel last from a few seconds to a minute. Very powerful earthquakes can last up to several minutes. Longer quakes cause greater damage.
9. Repeat the simulation, selecting different students to provide the effects so that each student has an opportunity to practice the Drop, Cover and Hold On procedure.



### Wrap-Up

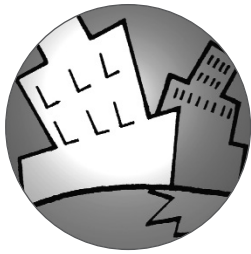
After successfully practicing Drop, Cover and Hold On, practice a fire drill or evacuation. Remember, fires often break out after a large earthquake. Briefly review evacuation procedures.

- a. If it's cold, allow students to quickly and quietly pick up their coats before leaving the room, but not put them on until they're outside. That way, if there's an aftershock while evacuating, student can use the coats to cover their heads.
- b. Give the students the instruction to evacuate. Have the students follow the normal evacuation route.
- c. When the class is assembled outside, take roll.
- d. Have students walk back into class.



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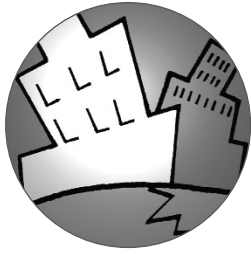
Distribute *Drill and Evacuation Checklist*. Have the students consider each point on the checklist. Then, evaluate their performance as a class. Would your class merit an A (9 out of 10); a B (8 out of 10); a C (7 out of 10); or would you have to repeat the exercise?

In the days following the activity, explain to the students that you may, without warning, say “Earthquake.” You and the students will react by following the Drop, Cover and Hold On procedure. Practice in a variety of places: the cafeteria, auditorium, library, hallway, etc. Have the students discuss the challenges that different places present.

**TEACHING NOTE** If your school evacuates after every Drop, Cover and Hold On drill, follow the evacuation steps in the Background to Earthquakes and practice with your buddy teacher and his or her class.



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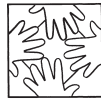


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### "What Should I Do Next?"

SET UP 5 minutes CONDUCT 50 minutes

Language Arts: Writing; Science: Health

**TEACHING NOTE** Complete this activity after a Drop, Cover and Hold On drill and/or evacuation drill.

1. After you have taken roll and know that everyone is safe in the classroom or at the meeting place designated for your evacuation drill, have the students talk about how an earthquake drill or an evacuation drill makes them feel.
2. Describe the scene—  
"There has been a major earthquake, but each of you knew what to do to protect yourself. You dropped, covered and held on. You checked to make sure everyone was safe and then followed the evacuation route carefully. Although there are a few bruises, we're okay. Getting out of the school building was difficult, walking through all the debris, but we're safe outside now. Let's talk."
  - How do you feel? (Answers will vary but may include scared, worried, sick to my stomach, like crying, proud that we got out safely.) Remind students that it's normal to feel these different things and always good to talk about their feelings.
  - How might we make ourselves feel better? (Take some deep breaths. Do some visualization activities. Hold hands or hug each other. Tell or listen to stories. Talk softly together, always listening for instructions so we'll know what comes next.)



### Wrap-Up

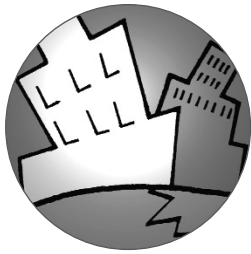
After the discussion, have the students write a letter to a friend describing—

- what happened in the class earthquake simulation.
- what they did to make sure they stayed safe.



Each letter must—

- Describe the earthquake—how it felt and what it did to the classroom, school and the community.
- Describe the feelings the students experienced during, immediately following and long after the quake.
- Include snapshots (student illustrations) of the actions they took and the effects of the earthquake on the classroom.



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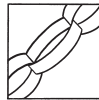


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### Home Connection

Have the students teach the Drop, Cover and Hold On procedure to family members. They will develop plans, as families, to practice the procedure throughout the week from different areas of their homes, inside and outside. Tell them to talk with their families about what might happen if an earthquake occurs at different times of day or night and different days of the week.



### Linking Across the Curriculum

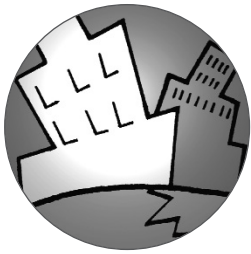
**Social Studies: Community; Science: Health; Language Arts: Writing; Visual Arts: Design**

Have the students share their information on earthquake safety with others through colorful posters or brochures that alert the public to Drop, Cover and Hold On and to evacuation procedures. The purpose is to inform the public that the drill is important to safety during an earthquake, so make sure brochures and posters are clear, concise and appealing.

### Social Studies: Geography and Community; Science: Technology



Did You Feel It? (<http://earthquake.usgs.gov/eqcenter/dyfi.php>) from the U.S. Geological Survey is an excellent way to report an earthquake experience, to take a test run, or to discover recent quakes across the country. When an actual quake occurs, the students can go to the site to report whether or not they felt the quake. After clicking a specific earthquake, click “Did You Feel It? Tell Us!” to answer a questionnaire describing your experiences. For a test run, select an earthquake, look at the form, but do not submit false data. Accurate information helps scientists develop Community Internet Intensity Maps for specific earthquakes.



# Home Hazard Hunt

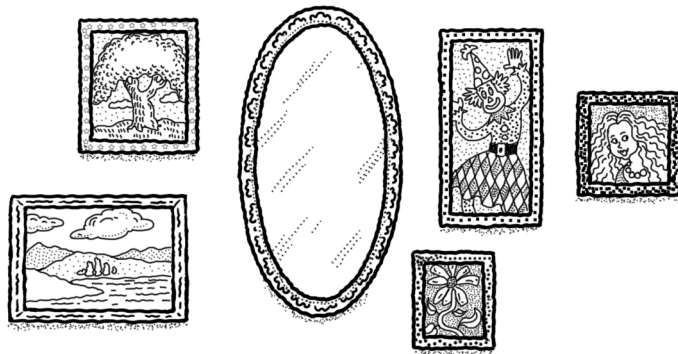
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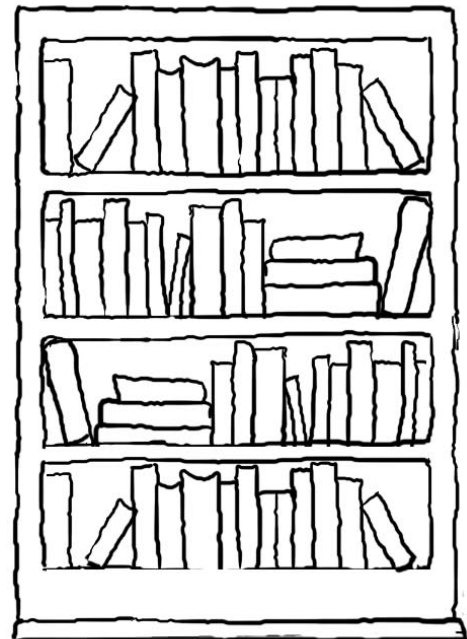
Anything that can move, fall, break or cause a fire could be a hazard during an earthquake. Imagine what would happen if you picked up each room in your home and shook it.

Think about where family members spend the most time and make sure these areas are safe from falling objects. Make sure exits are clear, too. Use the following pictures to help you consider the hazards you might find.

For more information, use the Earthquake Safety Checklist (from the *Masters of Disaster* CD-ROM), visit [www.redcross.org](http://www.redcross.org) or contact your local American Red Cross chapter.

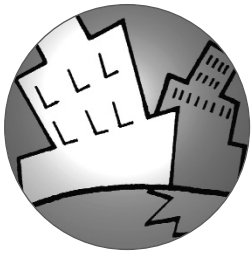


Are mirrors or pictures hung away from beds and chairs?

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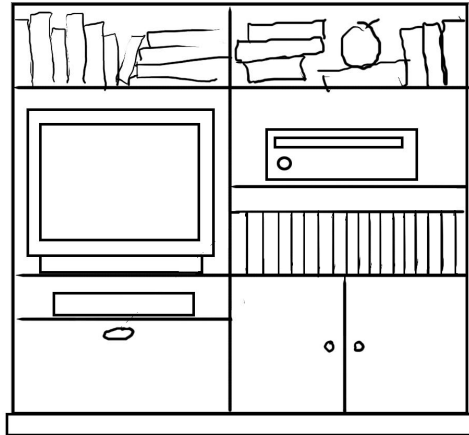
Are bookshelves fastened securely to the wall?

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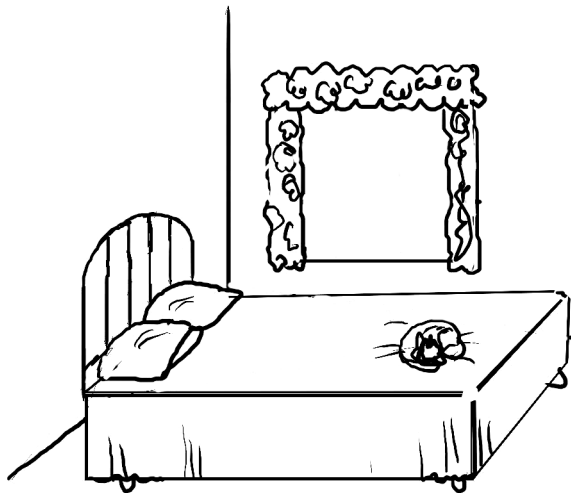


# Home Hazard Hunt

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Are entertainment cabinets bolted to the wall and electronic equipment secure on the shelves and behind cabinet doors?

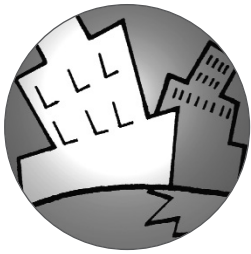


Are beds or chairs a safe distance from big windows?

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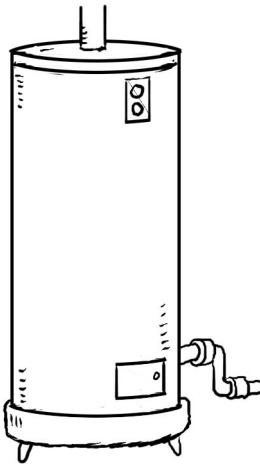
Are there no heavy objects on shelves above beds or chairs?

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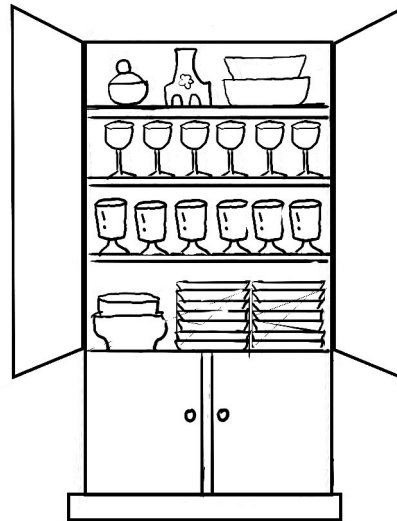


# Home Hazard Hunt

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Is the water heater  
secured to studs?

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Are cabinets or cupboards  
fastened to the wall? Are the  
doors locked shut?

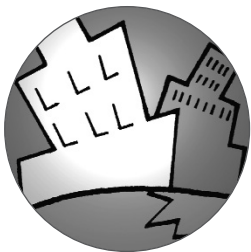
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Your home may not have all the hazards pictured, but it may have other areas that are unsafe. The best way to test your home for hazards is to sit in a space where you spend time and look around you. Imagine the room shaking violently. Could something fall on you? If so, remove or secure it.

Try this exercise all around your home.







# Neighborhood Hazard Hunt

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Name \_\_\_\_\_

**Directions:** Around your community, there are many objects that could move, fall, break or cause a fire and damage during an earthquake. Circle each hazard you find. Then, on the back of the sheet, write a brief description of each hazard and the problem that could occur.

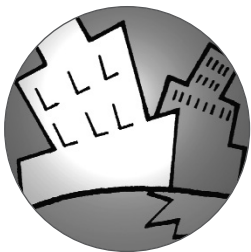


Adapted from *Earthquakes: A Teacher's Package for K-6* developed by the National Science Teachers Association with the support of the Federal Emergency Management Agency, revised April 1999.



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# Earthquake Simulation

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Name \_\_\_\_\_

**Directions:** This is a story about an imaginary earthquake. As you read it, time the event and simulate the sounds. Most important, practice Drop, Cover and Hold On to stay safe.

First, you hear low, rumbling sounds. The noise grows louder and louder, for about one or two seconds. Then, wham! There's a terrific jolt. You feel as if someone suddenly slammed on the brakes in the car or a truck just rammed into the side of the building.

The floor seems to be moving beneath you. You hear someone say, "Earthquake! Drop, Cover and Hold On!" It's hard to get under the desk. You feel as if you are riding a raft down a fast river.

Drop, Cover and Hold On! Get under your desk as quickly and quietly as you can, right now. Cover your eyes and hold on.

The building is creaking and rattling. Books are falling from the bookcase. Hanging lamps are swinging. Suddenly a light falls to the floor and smashes. The windows are rattling.

Be sure to stay in the Drop, Cover and Hold On position under your desk.

You hear noises outside. A car alarm sounds. Dogs are barking. A baby is crying. People are shouting. The shaking is making church bells ring. You hear crashing sounds from bricks falling to the ground. Trees outside are swaying and scraping against the walls.







# Earthquake Simulation

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Inside the room, the floor keeps rocking. Tables and chairs are sliding. Oh! Something just fell and crashed to the floor. The lights begin to flicker on and off... they just went out! Now the door swings back and forth. Bang! It slams shut. There's silence now. Just as suddenly as the noise and shaking began, the room falls quiet and still.

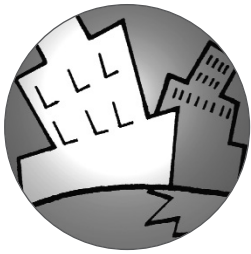
*(Stop timing.)*

Please, everyone stay where you are for a few more seconds. We want to make sure the shaking has stopped and nothing else is going to fall.

Okay, everyone may come out slowly and stand up. It is important to remain very quiet and wait for instructions. Is everyone all right? Check yourself and those around you. Look at me and tell me if anyone is hurt. How long did our earthquake last?

Be ready to take cover again at any moment because the shaking may start again. Sometimes more earthquakes can happen shortly after the first one. Those are called aftershocks. Now, let's sit and talk about how we plan and practice to be safe in an earthquake.





# Drill and Evacuation Checklist

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Name \_\_\_\_\_

**Directions:** It's important to practice what to do in case of an earthquake; it's even more important to improve your skills. Consider each of the questions below after you complete an earthquake drill and evacuation. Place a check in the box if the answer is "yes." Talk about how to improve if the answer is "no."

Did everyone know to Drop, Cover and Hold On?

- ☐ Did everyone follow the procedure correctly?
- ☐ Did everyone take cover no matter where he or she was?
- ☐ Did everyone know to drop away from windows, light fixtures, glass cases and other hazards?
- ☐ Does everyone know what to do if he or she is outside or in a bus or car?
- ☐ Did everyone remain quietly in his or her safe position?
- ☐ Were those with special needs able to participate in the drill and evacuation?
- ☐ Did an adult take emergency information and needs when we evacuated?
- ☐ Did everyone sit quietly and listen for further directions?
- ☐ What must we do to improve?

