

## Earthquakes • Section Summary

## Earthquake Safety

### Key Concepts

- How do geologists determine earthquake risk?
- What kinds of damage does an earthquake cause?
- What can be done to increase earthquake safety and reduce earthquake damage?

Geologists can determine earthquake risk by locating where faults are active and where past earthquakes have occurred. In the United States, the risk is highest along the Pacific Coast in the states of California, Washington, and Alaska. The eastern United States generally has a low risk of earthquakes because this region lies far from plate boundaries.

Causes of earthquake damage include shaking, liquefaction, aftershocks, and tsunamis. The shaking produced by seismic waves can trigger landslides or avalanches. The types of rock and soil determine where and how much the ground shakes. **Liquefaction** occurs when an earthquake's violent shaking suddenly turns loose, soft soil into liquid mud. As the ground gives way, buildings sink and pull apart. Sometimes, buildings weakened by an earthquake collapse during an aftershock. An **aftershock** is an earthquake that occurs after a large earthquake in the same area.

When an earthquake jolts the ocean floor, plate movement causes the ocean floor to rise slightly and push water out of its way. The water displaced by the earthquake may form a large wave called a **tsunami**. A tsunami spreads out from an earthquake's epicenter and speeds across the ocean. The height of the wave is low in the open ocean, but the wave grows into a mountain of water as the tsunami approaches shallow water.

The main danger from earthquake strikes is from falling objects and flying glass. **The best way to protect yourself is to drop, cover, and hold.** To prepare for an earthquake, store in a convenient location an earthquake kit containing canned food, water, and first aid supplies.

Most earthquake-related deaths and injuries result from damage to buildings or other structures. **To reduce earthquake damage, new buildings must be made stronger and more flexible. Older buildings may be modified to withstand stronger quakes.** The way in which a building is constructed determines whether it can withstand an earthquake. A **base-isolated building** is designed to reduce the amount of energy that reaches the building during an earthquake. During a quake, the building moves gently back and forth without any violent shaking.

Earthquakes can cause fire and flooding when gas pipes and water mains break. Flexible joints and automatic shut-off valves can be installed to prevent breaking and to cut off gas and water flow.

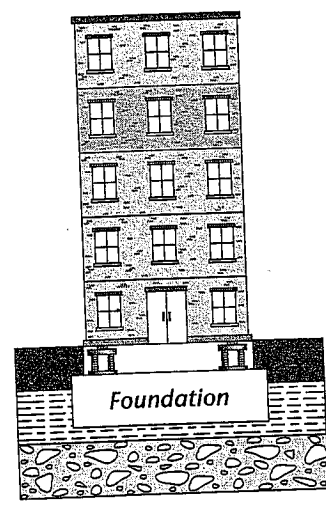
**Earthquakes** ▪ *Review and Reinforce*

# Earthquake Safety

## Understanding Main Ideas

*Answer the following questions on a separate sheet of paper.*

1. What types of damage do earthquakes cause?
2. How do ground conditions affect earthquake damage to buildings?
3. Why are aftershocks dangerous to buildings after a large earthquake?
4. Why do tsunamis grow into larger waves as they approach land?
5. If an earthquake strikes while you are indoors, what should you do?
6. Why should people living in earthquake regions prepare emergency kits?
7. What kind of building design is shown in this figure? Explain how the design helps reduce earthquake damage.



Earthquakes

## Building Vocabulary

*Write a word to complete each sentence correctly.*

8. The water displaced by a strong earthquake on the ocean floor forms large waves called \_\_\_\_\_.
9. \_\_\_\_\_ occurs when an earthquake's violent shaking suddenly turns loose, soft soil into liquid mud.
10. A(n) \_\_\_\_\_ is an earthquake that occurs after a large earthquake centered in the same area.

**Earthquakes** • *Enrich*

## Emergency Planning

Imagine that you are a member of your community's Disaster Planning Board. The board is writing earthquake safety plans for all the public buildings in the community. You are responsible for developing the safety plan for your school. You must survey the school building and identify ways to reduce the risk of damage in an earthquake. You must also prepare a list of safety guidelines to help students, teachers, and other people in the school protect themselves if an earthquake strikes.

*Answer the following questions on a separate sheet of paper.*

1. What types of dangerous conditions will you look for as you survey the school building?
2. Suppose you find the potential hazards listed in the table below. What should be done to eliminate or reduce each hazard? Write your answers in the table.

Hazard	Recommendation
<p>a. Laboratory glassware and microscopes are stored on a high, open shelf.</p>	<hr/> <hr/> <hr/> <hr/>
<p>b. Tall bookcases might topple over.</p>	<hr/> <hr/> <hr/> <hr/>
<p>c. The maintenance supervisor is the only person who knows how to shut off the gas, water, and electric lines.</p>	<hr/> <hr/> <hr/> <hr/>

3. In your list of safety guidelines for the people in the school, what is the most important guideline?
4. Will you recommend that people leave the school building as soon as an earthquake strikes? Explain.
5. What should students outside on the school grounds do to protect themselves?
6. What will you do to make sure that all students know the safety guidelines?

**Earthquakes • Key Terms**

**Key Terms**

Read the clues below, and then find the key terms from the chapter that are hidden in the puzzle. The hidden terms may occur vertically, horizontally, or diagonally.

**Clues**

- |   |   |
|---|---|
| 1. The shaking and trembling of Earth's crust                           | 7. Large wave caused by earthquakes on the ocean floor                  |
| 2. A fold in rock that bends downward                                   | 8. Stress that pushes rock in opposite directions                       |
| 3. A stress force that squeezes rock                                    | 9. A fold in rock that bends upward                                     |
| 4. A large area of elevated flat land                                   | 10. Occurs when an earthquake turns soil into liquid mud                |
| 5. A force that changes a rock's shape or volume                        | 11. The half of a fault that lies below                                 |
| 6. An earthquake that occurs after a larger earthquake in the same area | 12. An instrument that records ground movements caused by seismic waves |

s t i o n s c o d d l n p m  
 f a e a r t h q u a k e v l  
 w a f t e r s h o c k n d i  
 y t o n e e q u r c a f t q  
 d u p c o s h e a r i n g u  
 s w n o f s a z s e p t w e  
 e g o m i p h o r v a d t f  
 i n m p f g t p u l a c m a  
 s o d r s y n c l i n e p c  
 m w c e o m u a q a v b c t  
 o v e s j m w u c k t i b i  
 g l n s o t h u m b b e y o  
 r a t i o k v o o x l e a n  
 a w o o p l y i m s s a h u  
 p u f n t t s u n a m i s s  
 h a l e t a n t i c l i n e

