What is an earthquake?

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

The Northridge, California, earthquake of January 17, 1994, struck a modern urban environment generally designed to withstand the forces of earthquakes. Its economic cost, nevertheless, has been estimated at $20 billion. Fortunately, relatively few lives were lost. Exactly one year later, Kobe, Japan, a densely populated community less prepared for earthquakes than Northridge, was devastated by the most costly earthquake ever to occur. Property losses were projected at $96 billion, and at least 5,378 people were killed. These two earthquakes tested building codes and construction practices, as well as emergency preparedness and response procedures.

Where earthquakes have occurred in the past, they will happen again. Learn whether earthquakes are a risk in your area by contacting your local emergency management office, American Red Cross chapter, state geological survey, or department of natural resources.

Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the United States approach $200 billion.

There are 45 states and territories in the United States at moderate to very high risk from earthquakes, and they are located in every region of the country. California experiences the most frequent damaging earthquakes; however, Alaska experiences the greatest number of large earthquakes—most located in uninhabited areas. The largest earthquakes felt in the United States were along the New Madrid Fault in Missouri, where a three-month long series of quakes from 1811 to 1812 included three quakes larger than a magnitude of 8 on the Richter Scale. These earthquakes were felt over the entire Eastern United States, with Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking.

AWARENESS INFORMATION

Expect aftershocks. Aftershocks are smaller earthquakes that follow the main shock and can cause further damage to weakened buildings. After-shocks can occur in the first hours, days, weeks, or even months after the quake. Be aware that some earthquakes are actually foreshocks, and a larger earthquake might occur.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking. Much of the damage in earthquakes is predictable and preventable. We must all work together in our communities to apply our knowledge to building codes, retrofitting programs, hazard hunts, and neighborhood and family emergency plans.

EMERGENCY INFORMATION

1. The best protection during an earthquake is to get under heavy furniture such as a desk, table, or bench
2. The greatest danger exists directly outside buildings, at exits, and alongside exterior walls. Many of the 120 fatalities from the 1933 Long Beach earthquake occurred when people ran outside of buildings only to be killed by falling debris from collapsing walls.
3. Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

DANGER ZONES

Earthquakes occur most frequently west of the Rocky Mountains, although historically the most violent earthquakes have occurred in the central United States. All 50 states and all U.S. territories are vulnerable to earthquakes. Forty-one states or territories are at moderate to high risk.

HELP YOUR COMMUNITY GET READY

The media can raise awareness about earthquakes by providing important information to the community. Here are some suggestions:

1. Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals.
2. Conduct a week-long series on locating hazards in the home.
3. Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments on what to do during an earthquake.
4. Provide tips on conducting earthquake drills in the home.
5. Interview representatives of the gas, electric, and water companies about shutting off utilities.

DID YOU KNOW...

- Many people think of California as "Earthquake Country," but the state with the most major earthquakes is Alaska. The grandaddy of earthquakes was along the New Madrid Fault in Missouri where a 3-month long series of quakes in 1811--1812 included th ree quakes larger than a magnitude of 8. These quakes were felt over 2 million square miles.
- The Richter Scale was developed by Charles F. Richter in 1935. It is a logarithmic measurement of the amount of energy released by an earthquake. Earthquakes with a magnitude of at least 4.5 are strong enough to be recorded by sensitive seismographs all over the world. In the United States several thousand shocks of varying sizes occur annually.
- The effects of earthquakes are also measured by the Modified Mercalli Intensity scale. The intensity of a quake is evaluated according to the observed severity of the quake at specific locations. The Mercalli scale rates the intensity on a Roman nu meral scale that ranges from I to XII.
- The Loma Prieta (northern California) earthquake of October 1989 registered 7.1 on the Richter scale and as high as XI on the Mercalli scale.