

When the Earth Quakes

Chances are, you already know what an earthquake is. An earthquake—also called a quake or a tremor—is the name given to any widespread shaking of the ground.

Quakes have occurred all throughout human history, and even back into prehistoric times. The human and economic damage produced by a large quake is often too terrible to grasp. The worst quakes cause hundreds of thousands of deaths, along with the destruction of entire cities. For these reasons, earthquakes are among the most feared of all the natural disasters.

For centuries, people had no idea why earthquakes happened. Since they knew little about science, they relied on myths and legends to explain them. Most of their explanations for quakes are unbelievable to us today. For instance, the ancient Greeks believed, with no real evidence, that there were huge, windy caverns deep beneath the ground. They thought that when these winds got particularly strong, they made the Earth's surface shake.

Other early peoples had explanations for quakes that were even more implausible. Some believed that the Earth sat on the back of a giant turtle, which in turn was supported by other giant animals. When any of these animals moved, they said, quakes resulted. Today, of course, we know better.

The study of earthquakes is called seismology (size-moll-o-gee) and the scientists who study quakes are called seismologists (size-moll-o-gists). Seismologists have been researching the causes and effects of earthquakes for more than 150 years. They have learned that the Earth's outer shell is made up of enormous flat surfaces called plates. There are about seven or eight major plates on our planet, along with hundreds of lesser ones. These plates are in slow, constant motion. They meet at fault lines, forming long cracks in the Earth's surface.



These fault lines do not cause quakes on their own, however. There is a remarkable amount of heat and pressure in the depths of our world. Those physical forces, along with changing surface temperatures, cause plates to collide and rub against one another. This rubbing can create severe vibrations that are capable of being felt hundreds or even thousands of miles away. It is these vibrations that we experience as earthquakes.

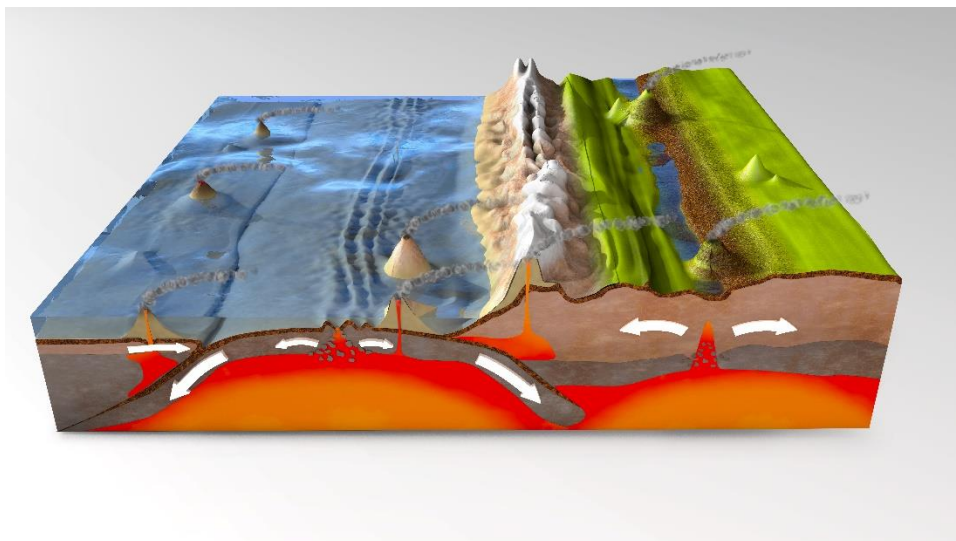
Human activity has also been known to cause them. The construction of large buildings or dams, or the digging of mines, can create pressure on the Earth's surface. And if that pressure is applied near a fault line, a quake can result. For instance, it is estimated that about 25 percent of all earthquakes recorded in Britain can be traced to human causes. Human-made quakes, fortunately, are almost always very minor.

There are, in fact, thousands of quakes on our planet every year. Luckily, most of them—even the natural ones—are not strong enough to do much damage. Many are too weak to even be felt; they are detected by scientific instruments called seismometers (size-mom-i-terz).

Seismometers measure quakes using the Richter (rick-ter) scale. These measurements are expressed in terms of *magnitude*, a word that means size or intensity. An earthquake with a magnitude of 3 or lower on the Richter scale usually does little or no appreciable damage. But quakes that measure 7 or higher can do considerable harm to large areas.

The worst earthquakes in recorded history have measured 9 or slightly higher. In March of 2011, such a quake struck Japan. Many towns were completely destroyed, and tens of thousands of people lost their lives. Thousands more were injured; others simply vanished.

Earthquake devastation often does not end with the quake itself. Most quakes create aftershocks, smaller quakes that can also do massive damage. The very worst aftershocks create a chain of disasters; they shake hills and mountains, producing landslides and avalanches. A large enough earthquake in the right place might even trigger volcano eruptions.



Some quakes occur at fault lines located on ocean floors. These quakes often produce waves called tsunamis (soo-nahm-eez). A tsunami can be quite huge and have an incredible destructive potential. The largest tsunamis travel hundreds of miles across an ocean, wreaking havoc on every ship and island in their paths, before slamming into the coast of a continent.

During the 2011 Japanese earthquake, the tallest tsunami had a height of more than 125 feet (about 38 meters) tall. That is far from the most sizable one on record, however. That questionable honor goes to the one that hit the coast of Alaska in 1958. It was a towering 1,700 feet (about 500 meters) tall.

As seismologists learn more about present earthquakes, they are able to uncover facts about quakes of the past. They have discovered, for instance, that an undersea quake in 1700 along the northwestern coast of North America also had a magnitude of about 9. This quake caused a landslide that blocked the mighty Columbia River for several years. Over time, much of that blockage has been washed away as the river has reclaimed its natural course. There is little historical record of the event, but it is remembered as a legend among the native peoples who still live in the area. They refer to the result of the landslide as "The Bridge of the Gods."

One goal of seismology is to discover ways of predicting earthquakes. Seismologists are still a long way from reaching that goal. They can only make general guesses about the likelihood of earthquake activity for a given area within a long period of time. But it is hoped that someday soon, we will be able to know when an earthquake is coming, even if we cannot prevent it.

