



An earthquake is one of the worst natural **disasters** on our Earth. We think that the ground we stand on is very **stable**, but it isn't. It moves quite a lot. In the last few **decades**, **scientists** have been able to find out why earthquakes happen.

Earthquakes happen when there is a **sudden vibration** in the Earth's **crust**. It's like a large **lorry** that travels down your street. When it passes by, you feel your house shake.

Earthquakes can be **caused** by a lot of things :

- volcanoes that suddenly **erupt**
- **meteorites** that hit the earth
- underground explosions
- buildings that **fall apart**

But most earthquakes happen because the Earth's **plates** move.

In the middle of the 20th **century** scientists found out that continents do not always stay in the same place. They have been moving on plates for millions of years. The Earth's **surface** is made up of many such plates. Where two plates meet, **magma** comes out of the inner part of our planet . These areas are called **faults**—breaks in the Earth's crust.

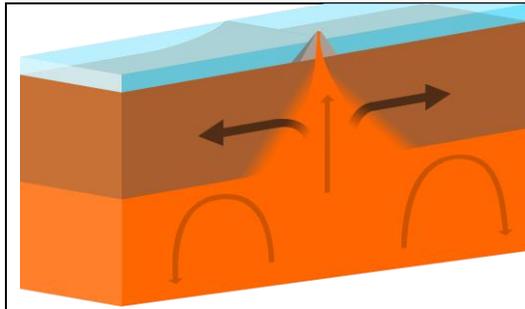
How Plates Move

When two plates move away from each other, lava or magma comes out of the Earth. Most of this happens at the bottom of oceans, where the crust is very thin. Lava cools down when it reaches the water and underwater mountains are formed.

When plates push **towards each other**, one of them **slides** under the other. Rocks are pushed up and new mountains are formed.

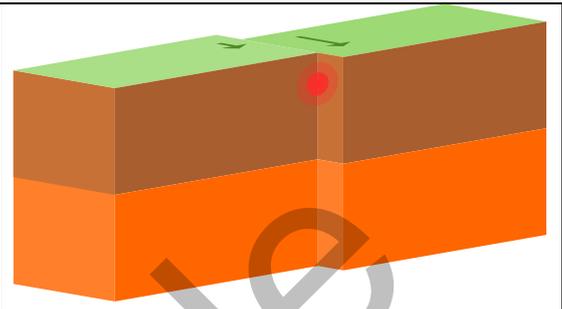
Some plates slide past each other; for example, one moves north and the other moves south . When these plates move along faults a lot of energy is **released**, which causes the biggest earthquakes.

We only hear about earthquakes **once in a while** , but they really happen every day. There are more than 3 million earthquakes every year - about 8,000 every day or one every 11 seconds. Most of them are very weak or they happen in places where nobody lives. Some of them **occur** on the **sea floor**.



Two plates moving away from each other

Image: [domdomegg, CC BY 4.0](#), via Wikimedia Commons



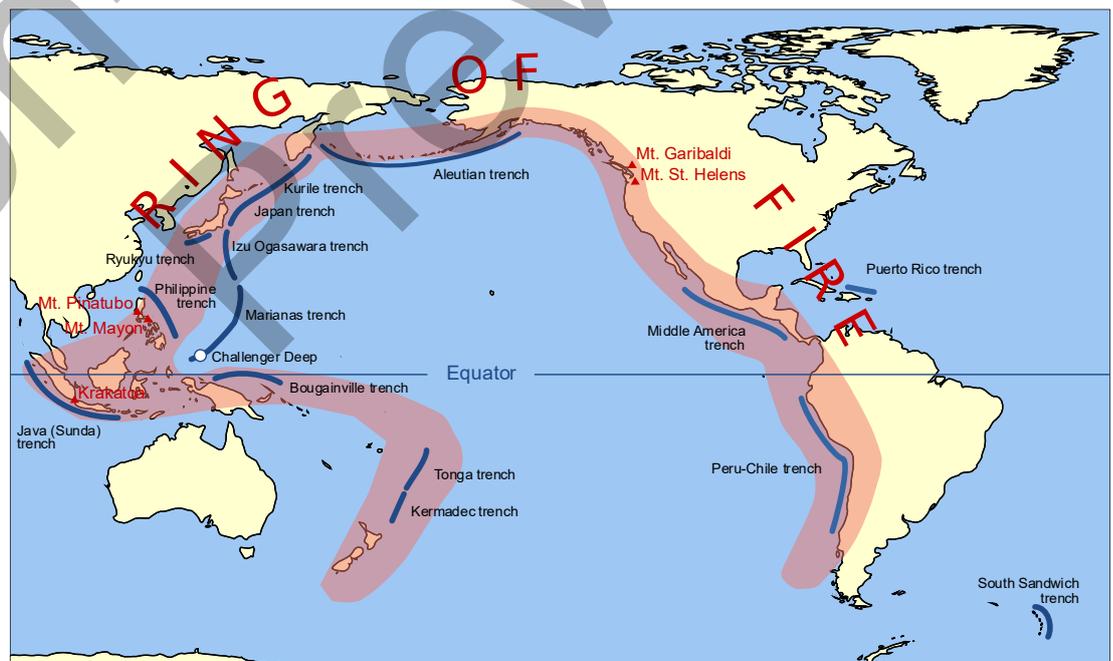
Two plates sliding past each other

Image: [domdomegg, CC BY 4.0](#), via Wikimedia Commons

Where Earthquakes Happen

Earthquakes **occur** all over the world but there are places where they happen more often. Big earthquakes can be found where plates meet.

80% of the world's earthquakes happen around the Pacific Ocean—near the east **coast** of Asia and the west coast of America. Japan **registers** over 2,000 earthquakes every year. California and South America are also very active earthquake zones. The **edge** of the Pacific Ocean is called the "Ring of Fire" because there are many active **volcanoes** in this region.



The Pacific Ring of Fire

Image: [Gringer \(talk\) 23:52, 10 February 2009 \(UTC\)](#), Public domain, via Wikimedia Commons



Earthquake Waves

When there is a sudden movement in the Earth's crust, energy moves in the form of waves . It's like **dropping** something into water.

Body waves move through the inner part of the Earth and surface waves travel over the Earth's surface. Body waves can travel very fast—up to 8 km a second. They travel through rock , water and gas . When they reach other places on the Earth's surface they can be **registered** there. They are usually the first waves to get to the surface. Surface waves cause the most **damage**, but they move very slowly. These waves come at the end of an earthquake.

Man-made Earthquakes

Sometimes people can cause earthquakes, for example when **man-made** lakes are filled with water after the **construction** of a dam. Atomic bomb tests are often **conducted** underground and can also cause earthquakes. Some of these tests can help **scientists** find out how quakes happen.

How Earthquakes Are Measured

With a machine called a seismograph scientists can tell where an earthquake happened and how strong it was.

The place in the Earth where the **movement** takes place is called the focus or hypocentre. From here, waves start to **spread out** in all directions. This focus can be very near to the surface, or it can be hundreds of km below it. The area on the surface exactly above the focus is called the epicentre. This is the place where the waves hit first and where the most damage is done.

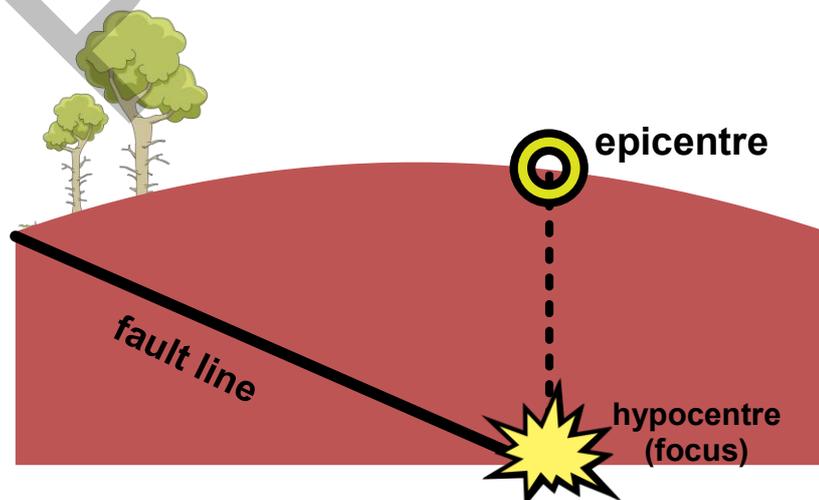


Image: Klaus Rosmanitz



Whenever an earthquake hits us, you hear how **powerful** it is. The Richter Scale is used to **rate** the **magnitude** of earthquakes. Small quakes have a rating of under 4. You won't see a lot of damage here. **Medium-sized** earthquakes reach between 5 and 7 on the scale, and the really big ones are above 7. The largest earthquake that has ever been **registered** was at 9.5 on the Richter scale.

There are more than 100 seismograph stations all over the world. When the Earth shakes, seismologists **compare** the information they get and then they can tell where the earthquake really happened.

Effects of Earthquakes

Earthquakes make the ground move. Buildings shake and many of them **collapse**. **Landslides** also happen when rocks get **loose**.

Another danger is fire. In 1906 San Francisco was hit by a big earthquake and many houses burned down because they were made of wood.

When an earthquake **occurs** on the sea floor, big waves - called tsunamis—hit the coast. They often come without any warning and cause death and destruction near the **coast**.

Earthquakes also can lead to **diseases, especially in developing countries**. When water **supplies** are destroyed people don't have **safe water** to drink. Sometimes earthquakes also hit hospitals where **injured** people are **treated**.



San Francisco earthquake in 1906

Image: Chadwick, H. D , Public Domain via [Wikimedia Commons](#)



The Greatest Earthquakes in History

856

200,000 people are killed in one of the deadliest earthquakes in history in Damghan, Iran.

1138

An earthquake in Aleppo, Syria kills 230,000

1556

The deadliest earthquake in history hits Shensi province in China. Almost 1 million people are killed.

1755

The most serious earthquake in Europe hits Lisbon, Portugal. The whole city is destroyed. About 70,000 people get killed.

1906

San Francisco is hit by a large earthquake. A big fire destroys most of the city. About 500 people die.

1908

Messina, Sicily is totally destroyed by a large earthquake . About 70,000 people are killed.

1923

Tokyo, Japan is destroyed by an earthquake with a magnitude of 8.3 . 150,000 people are killed.

1960

The strongest earthquake ever recorded hits Chile. It reaches 9.5 on the Richter scale. 20,000 people die.

1964

The strongest earthquake in North America hits Anchorage Alaska. Ocean waves reach a height of 20 metres. 200 people are killed

1976

The biggest earthquake ever recorded in China leaves 242,000 people dead.

2004

Indian Ocean earthquake followed by a tsunami kills 250 000 people.

2010

160 000 people die in an earthquake in Haiti.

2011

A 9.1 earthquake - the strongest ever recorded in Japan - hits the country's east coast and causes the Fukushima nuclear disaster.