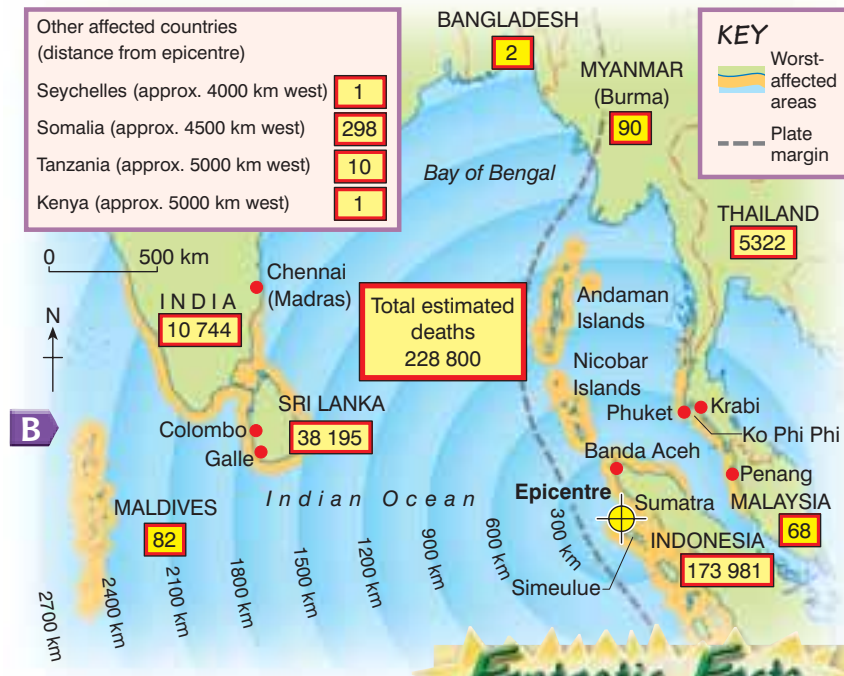


# What happens in an earthquake?

**The Indonesian earthquake of 26 December 2004 was the fourth biggest earthquake since 1900 – it measured 9.0 on the Richter scale. Like many such events it only lasted for a few seconds – but the devastation caused by the tsunami that followed was greater than any recorded tectonic event in recent history. Tsunamis are relatively unusual, especially ones this size. However, earthquakes are more common than we think.**

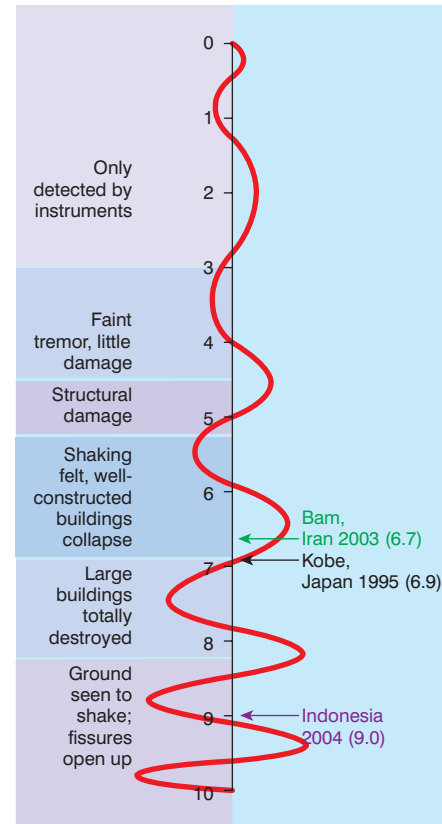
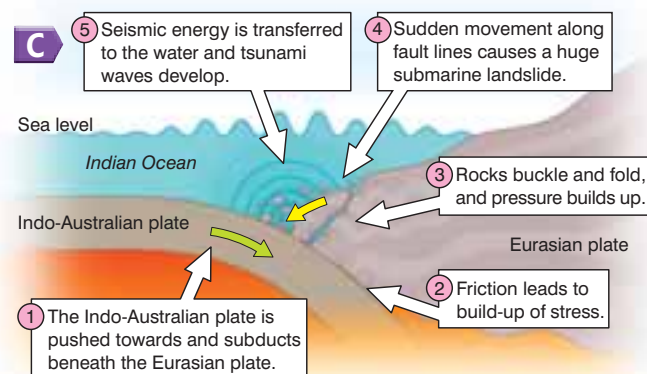
Any large movement in the Earth can lead to an earthquake. Some of our worst earthquakes happen when plates collide or rub past each other at plate margins. Friction prevents the plates from moving past each other easily. Pressure builds up in the crust. This may be relieved by a sudden earth movement and the release of energy is what we experience as an earthquake. But just like releasing one end of a spring, it may take a while for the ground to settle down afterwards, so aftershocks are often experienced for some time after a big 'quake. The Indonesian earthquake was rapidly followed by further earthquakes in the region, in February 2005 (measuring 6.7) and March 2005 (8.7).



## Fantastic Facts

- The death toll from the Indonesian earthquake and tsunami was put at more than 228 800 (it included 124 UK citizens, with 21 missing, feared dead).
- The largest recorded earthquake in the world – in Chile on 22 May 1960 – had a magnitude of 9.5.

As the Indian Plate subducted beneath the Burma micro-plate, tensions built up, over centuries. These were released suddenly in 2004 as a fault line shifted a distance of 20 metres.



## Tsunami

A giant wave or series of large waves in the ocean created by major shallow-water earthquakes and/or submarine landslides.

## Liquefaction

The process in an earthquake when the movement of energy waves causes the ground to act like a liquid.

## Magnitude

A measure of how much energy is released by an earthquake.

## Intensity

A measure of the effect of an earthquake.

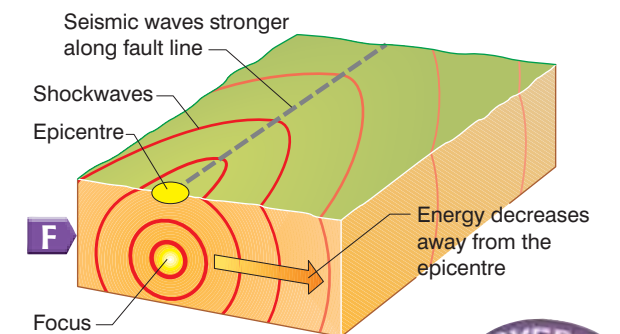
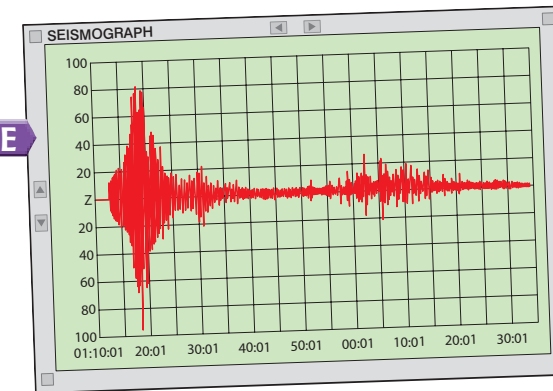
Seismic shockwaves (diagram E) shake the ground, causing rigid buildings to collapse. A large 'quake may shake the earth so much that it fails to act like a solid any more and **liquefaction** occurs as the ground moves like water. Such movements can be devastating for any buildings or gas or water pipes in the area.

The amount of energy released by an earthquake is called its **magnitude**. This is the measure on the Richter scale (diagram D) from 1 to 10. Every step on the scale is 30 times greater than the one before. So a scale of 5, for example, is a lot less worrying than a scale of 9 (as experienced in Indonesia).

The **intensity** of an earthquake is a measure of how it affects the land, so it is measured in terms of the damage caused. The effects will be far worse in areas where the ground is soft or where buildings are less well-constructed.

D The Richter scale

A seismometer drew this record of an earthquake, which is called a seismograph



- 1 State whether each of these is **true** or **false**, and try to explain why.
  - a **Magnitude** is a measure of the energy released by an earthquake.
  - b Earthquake magnitude and **intensity** are measures of the same thing.
  - c Places close to the **epicentre** experience a stronger effect than places further away.
  - d A **seismometer** measures the shaking of the ground.

- 2 Draw a simple concept map to explain the links between the terms shown in **bold text** in question 1. Add extra links using ideas from these two pages, e.g. *seismic*, *tsunami*, *focus*.
- e The **Richter scale** is an earthquake measuring machine.
- f Old or weaker **buildings** are very safe in an earthquake.
- g Most earthquakes last for less than **10 seconds**.
- h **Aftershocks** rarely follow after an earthquake.

- 3 Earthquake warning systems are very expensive. Write a paragraph to explain why it might be a good idea for wealthier countries to help all countries to have a seismic warning system.

Hint: Think about:

- the issue in terms of humanitarian, scientific and economic factors
- how many countries were affected by a single earthquake in the Indonesian tsunami.

OVER TO YOU

