

Earthquakes

ABOUT EARTHQUAKES

Earthquakes are unpredictable and can occur at any time. At least one earthquake occurs somewhere in the world each day. Some are slight tremors that can hardly be felt, while others are much stronger.

Beneath the earth's surface stress is built up. When this stress is suddenly released, it creates seismic waves, which result in an earthquake.

When earthquakes occur they make a loud noise like a train and the ground and buildings shake and sway. This can last from a few seconds to a few minutes. Hours or days later, you may still feel the earth move. These are called **after-shocks** and are less severe than the initial earthquake.

Measuring earthquakes

The **magnitude** of an earthquake is measured and recorded by a device called a **seismograph**, which uses the Richter Scale.

Earthquakes happen because the earth's **tectonic plates** are always moving and floating on **molten rock**. An earthquake can last from a few seconds to a few minutes, which can be followed by after-shocks.

The **Richter Scale** has no upper limit to being able to record the magnitude of an earthquake. The most severe earthquakes so far, have not exceeded 9.5 on the Richter Scale. The Richter Scale uses complex mathematics to calculate the magnitude of an earthquake. For instance, a magnitude 7.0 earthquake creates 10 times the ground motion of a magnitude 6.0 earthquake and the total energy release is about 30 times greater. This in turn is 30 times greater than a 5.0 and so on.

Another scale used to describe earthquakes is the **Modified Mercalli (MM)**. It rates the level of intensity, shaking felt and damage caused, and uses Roman numerals. On this scale, I is a barely detectable tremor, and XII is catastrophic damage.

Did you know?

- ▶ The Australian Geological Survey Organisation in Canberra estimates that, on average, the Australian region experiences an earthquake of at least Richter Scale magnitude 5.5, or larger, every 13-15 months.
- ▶ 90 per cent of all earthquakes in the world take place at tectonic plate boundaries and are the result of the constant movement of the plates against each other.
- ▶ The oldest parts of Australia, the western and central areas, are most seismically active.
- ▶ The 1989 Newcastle Earthquake has been Australia's most damaging earthquake with 13 fatalities and insured damage of \$1124 million.
- ▶ The most deadly earthquake was recorded in China in 1557. During this time many people lived in the mountains in caverns and the quake resulted in over 800,000 deaths.
- ▶ Earthquakes have affected the Cairns region for many years. Talk to the Cairns Regional Council or local SES units about what people experienced and what happened.

Background

Classroom resources provided by Cairns Regional Council



Curriculum links

7	Science	ACSHE121: Science as a Human endeavour; Use and influence of science	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity
	Geography	ACHGK042: Knowledge and understanding	Causes, impacts and responses to an atmospheric or hydrological hazard
8	Science	ACSHE136: Science as a Human endeavour; Use and influence of science	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity
	Geography	ACHGK050: Knowledge and understanding; Landforms and landscapes	Causes, impacts and responses to a geomorphological hazard
9	Science	ACSSU180: Science Understanding; Earth and space sciences	The theory of plate tectonics explains global patterns of geological activity and continental movement
10	Geography	ACHGK074: Knowledge and understanding; Environmental change and management	The application of geographical concepts and methods to the management of the environmental change being investigated
	Geography	ACHGK075: Knowledge and understanding; Environmental change and management	The application of environmental economic and social criteria in evaluating management responses to the change.