



Discover what makes the Earth shake

Earthquakes occur every day all over the world. Most of the time humans can't feel them, but sometimes they are so strong that they destroy entire cities.

Earthquakes are one of the most powerful natural forces on Earth. They can shake huge buildings to pieces, cause giant waves to swell up from the sea and destroy cities in seconds. On Saturday 6 February, an earthquake in the city of Tainan, in Taiwan, caused a 17-storey building to collapse. Almost 400 people were rescued from the building and 114 people have died. On Sunday 14 February, an earthquake hit the city of Christchurch on New Zealand's South Island, making cliffs crumble into the sea.

So what causes these earth-shattering events and how can people prepare for them?



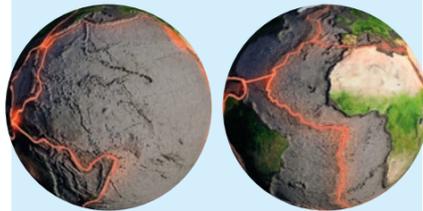
Rescuers at the ruined tower block in Tainan.

Why do earthquakes happen?

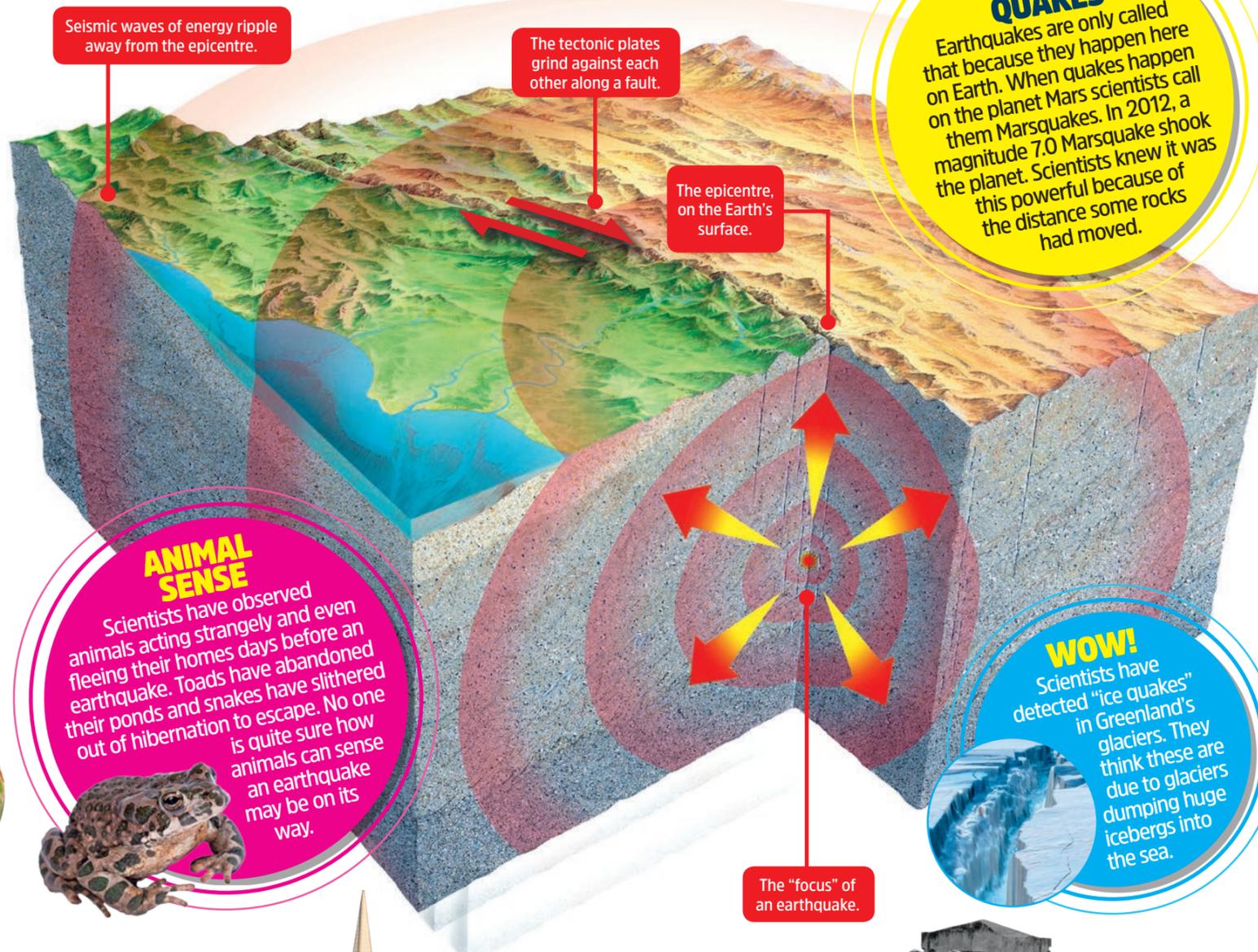


A boat swept up by a tsunami.

The Earth's crust – the layer we stand on – might feel solid but it is actually broken up into around 12 huge slabs of rock, known as tectonic plates. These plates fit together like a jigsaw. The plates are moving extremely slowly on top of super-hot melted rock called "magma" and sometimes they grind against each other. When this happens friction builds up between the plates and pressure is released deep underground at a point called the "focus". The point on the Earth's crust directly above the focus is called the "epicentre". Waves of energy, known as seismic waves, ripple through the ground away from the epicentre, causing the ground to shake. When an earthquake happens in the middle of the ocean, the tremors push up giant waves of water called tsunamis.



The red lines mark the tectonic plates.



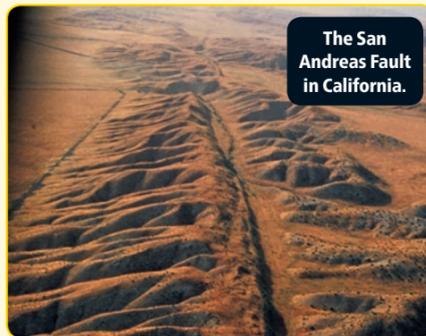
PLANET QUAKES
Earthquakes are only called that because they happen here on Earth. When quakes happen on the planet Mars scientists call them Marsquakes. In 2012, a magnitude 7.0 Marsquake shook the planet. Scientists knew it was this powerful because of the distance some rocks had moved.

ANIMAL SENSE
Scientists have observed animals acting strangely and even fleeing their homes days before an earthquake. Toads have abandoned their ponds and snakes have slithered out of hibernation to escape. No one is quite sure how animals can sense an earthquake may be on its way.

WOW!
Scientists have detected "ice quakes" in Greenland's glaciers. They think these are due to glaciers dumping huge icebergs into the sea.

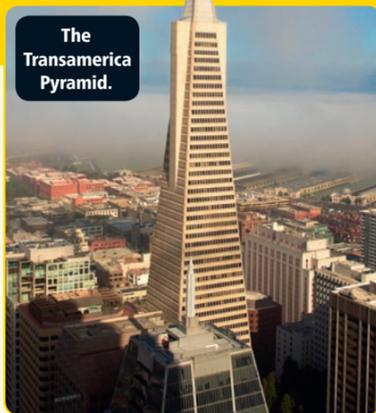
How do countries prepare for earthquakes?

Many cities are built in a special way that allows them to withstand earthquakes, because often there is not enough time to move everyone out to safety. San Francisco, in the US, is built very close to the San Andreas Fault, where two tectonic plates touch. The city has specially wide streets so that if any buildings collapse during an earthquake there is still room for people to get past and escape.



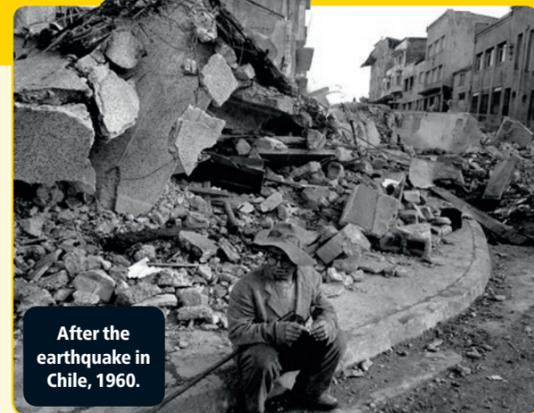
The San Andreas Fault in California.

The tallest building in San Francisco is called the Transamerica Pyramid. It was built to absorb the energy of an earthquake. When an earthquake measuring 6.9 on the Richter scale struck the area in 1989, the Pyramid shook from side to side for around a minute but the structure was completely undamaged. The building has a steel-and-concrete foundation 15 metres deep that sways gently during an earthquake.



The Transamerica Pyramid.

Chile, in South America, is another country that suffers from lots of earthquakes. The authorities there have learnt how to respond to them very effectively. Every year, the army practises evacuating people from huge areas, so that everyone knows what to do in an emergency. During the evacuation, warnings are sent to people's mobile phones alerting them to the danger. This preparation saves thousands of lives.



After the earthquake in Chile, 1960.

The Richter scale



In 1935, Charles Richter developed a scale to measure the energy released by an earthquake. This energy is called the magnitude. The Richter scale is still used and scores an earthquake from one to 10.

- 10 If an earthquake were to have a magnitude of 10.0, the energy released would be so powerful that the surrounding area would be completely destroyed.
- 9 An earthquake in Chile in 1960 was the most powerful ever recorded. It measured 9.5.
- 8 In 1883 a volcano triggered an 8.0 earthquake in Indonesia that killed 36,000 people.
- 7 An earthquake on this scale would release more energy than an atomic bomb.
- 6 A quake of this magnitude can cause serious damage. The most powerful earthquake in Britain measured 6.1 on the Richter scale and happened in the North Sea in 1931.
- 5 A level five event would cause furniture to move and plaster to fall from the walls.
- 4 An earthquake of this strength would be felt by humans but damage would be minimal. The tremors would only make your windows rattle and break small objects.
- 3 Earthquakes of this magnitude release the same amount of energy as a lightning bolt.
- 2 At this level you couldn't feel any tremors but you might see hanging objects like lampshades swinging a bit. Quakes this small can only be detected by specialist equipment.
- 1 Known as micro earthquakes, these common events are not felt by humans.