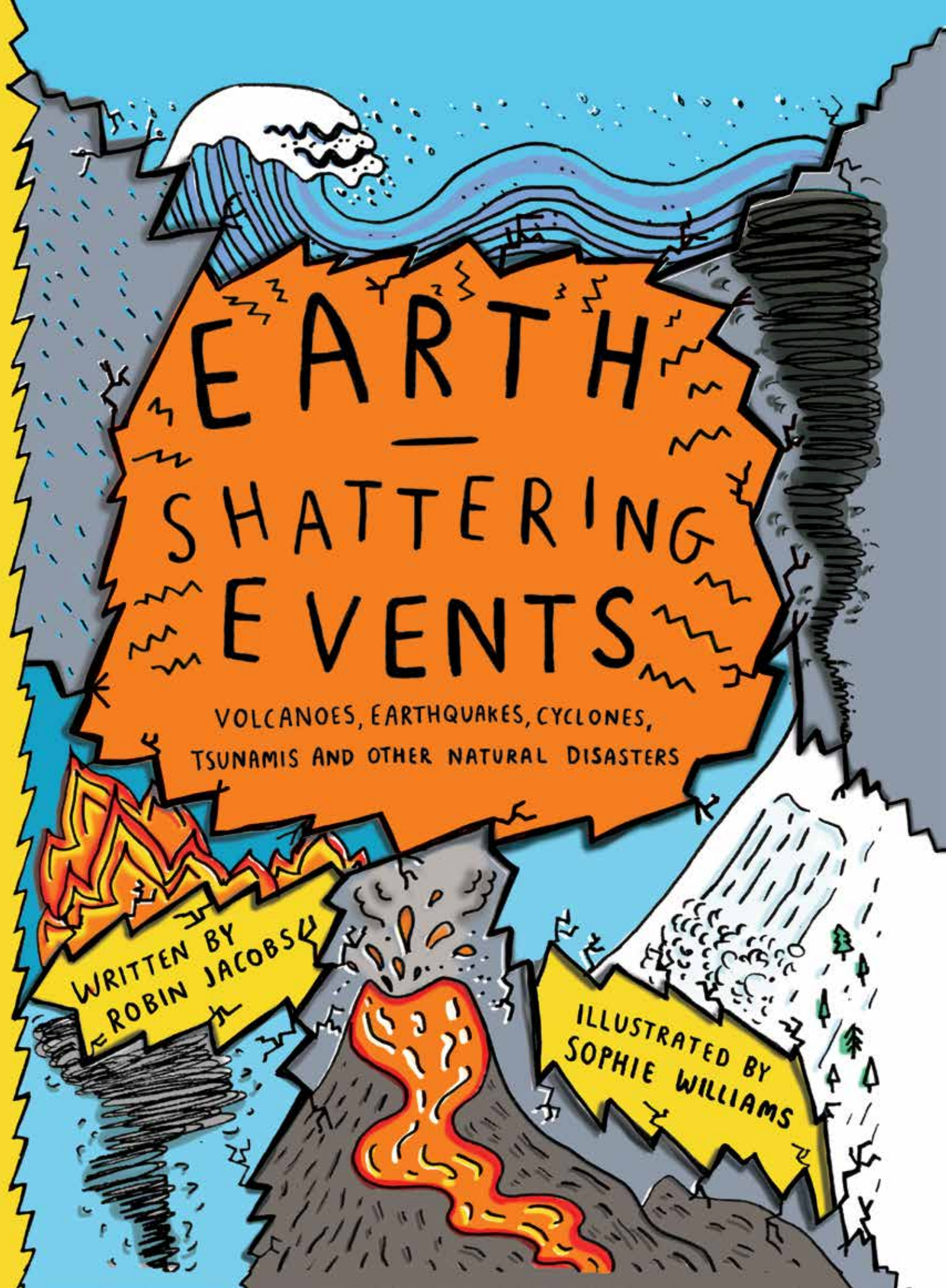
EARTH
—
SHATTERING
EVENTS
VOLCANOES, EARTHQUAKES, CYCLONES,
TSUNAMIS AND OTHER NATURAL DISASTERS
WRITTEN BY
ROBIN JACOBS
ILLUSTRATED BY
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EARTH SHATTERING EVENTS

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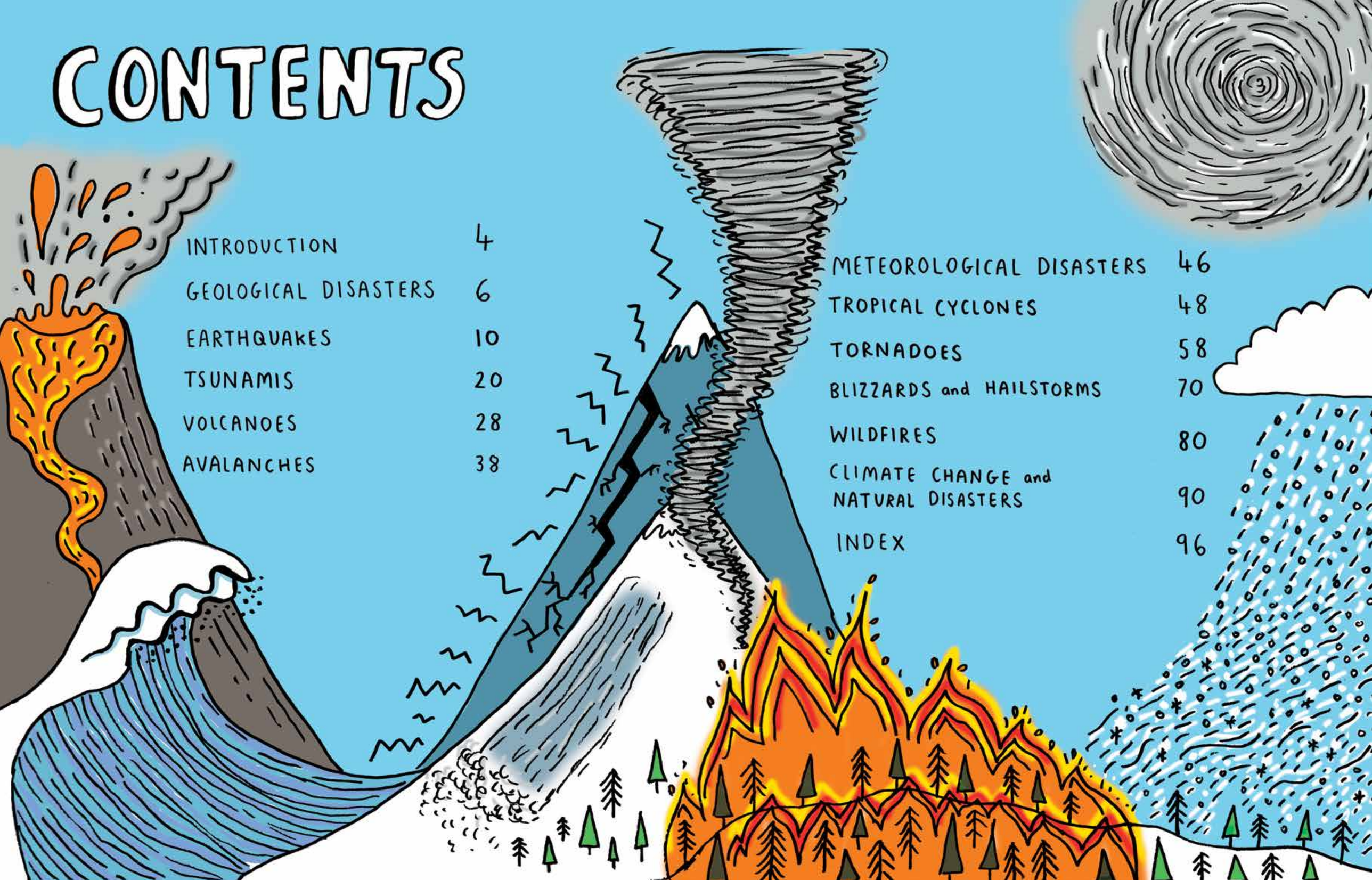


INTRODUCTION

Our species, Homo sapiens, or humans, takes its domination of the planet for granted. We strip the planet of its resources to grow our crops, feed our livestock, fuel our cars and make the millions of products that have become part of our lifestyles.

But every so often, the planet reminds us who's boss. The ground beneath our feet trembles and shakes and even ruptures. Great waves or storms sweep into our pleasant beach resorts, leaving behind nothing but rubble. Eruptions of liquid stone spew forth from volcanoes that for thousands of years seemed like nothing more than harmless mountains.

A natural disaster refers to a catastrophic event that impacts upon humans. When a volcano erupts deep under the sea, we do not think of this as a disaster, but rather a natural phenomenon. To be a disaster, property must be damaged, communities destroyed and lives lost. Often, the people who are most affected by natural disasters are the most vulnerable; the ones who have no choice but to live in the danger zone, in ramshackle housing. The ones who cannot afford to buy in exported food or clean water when their water source gets contaminated or dries out. In developing countries, when infrastructure like roads or bridges are destroyed, it takes many years to repair them, and so the damage left behind often takes many decades to overcome.

And it is not just humans that are harmed by natural disasters. Changes in soil and water quality, scorched forests and changing coastlines can have a huge impact on ecosystems and the wildlife that inhabits them.

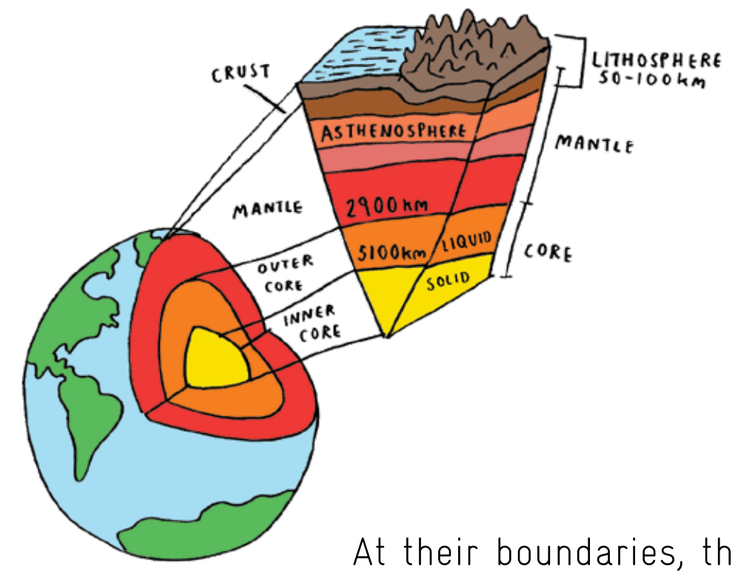
Natural disasters are becoming more frequent and more extreme as a result of climate change (see p. 90). It is ironic that those least responsible for climate change are the ones most affected.

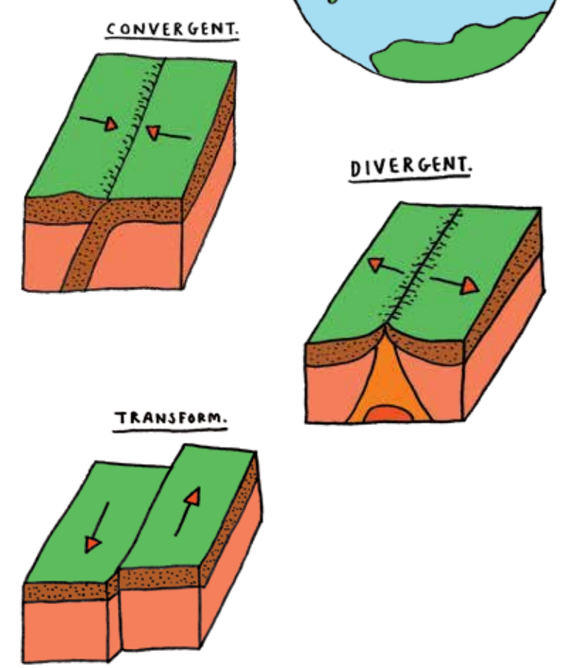
In any given year, there may be two or three hundred large-scale disasters. Using modern technology, Scientists can predict events like blizzards, cyclones and other weather-related disasters, allowing the affected populations to evacuate or prepare, but some disasters like earthquakes, tsunamis, volcanic eruptions or wildfires have very short warning times, and the results can be catastrophic.

These disasters demonstrate the immense power of nature. In their terrifying, destructive force, they make us realise how tiny and insignificant we are in the context of Earth's long, rich history. They remind us that we must always respect and look after this most special of planets.

GEO-LOGICAL DISASTERS

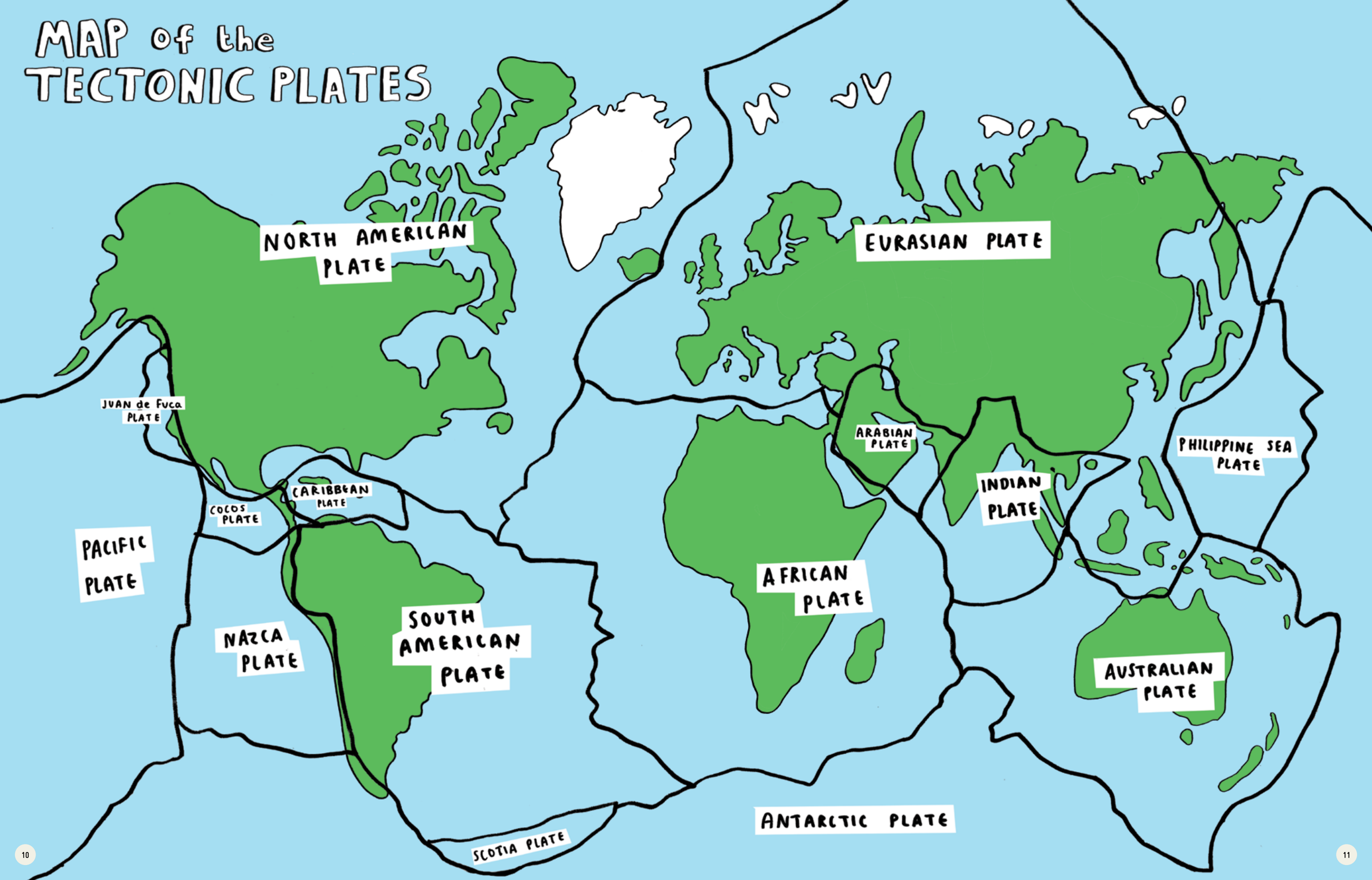
Earth's outer layer (the lithosphere) is made up of large plates of rock called tectonic plates that float on top of a layer of thick molten rock called magma. We think of the ground beneath us as sturdy and secure. We use terms like 'down to earth' and 'grounded' to refer to something dependable and permanent. But in fact the tectonic plates are in constant motion, adjusting themselves to the flow of magma beneath them.





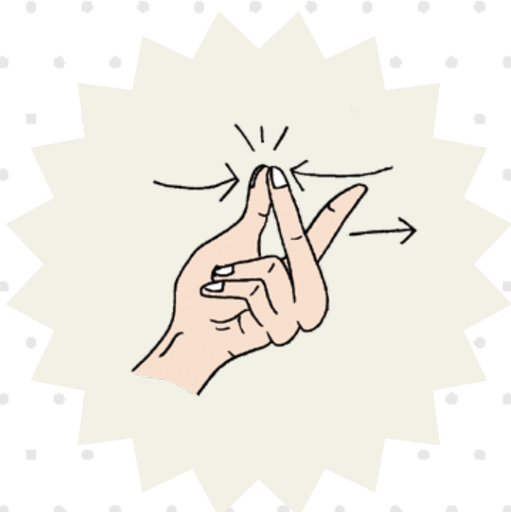
At their boundaries, the plates interact; pushing together, pulling away or sliding past each other. These interactions cause land to be created, earthquakes to happen, land to buckle into mountains and volcanoes to form and erupt.

MAP of the TECTONIC PLATES



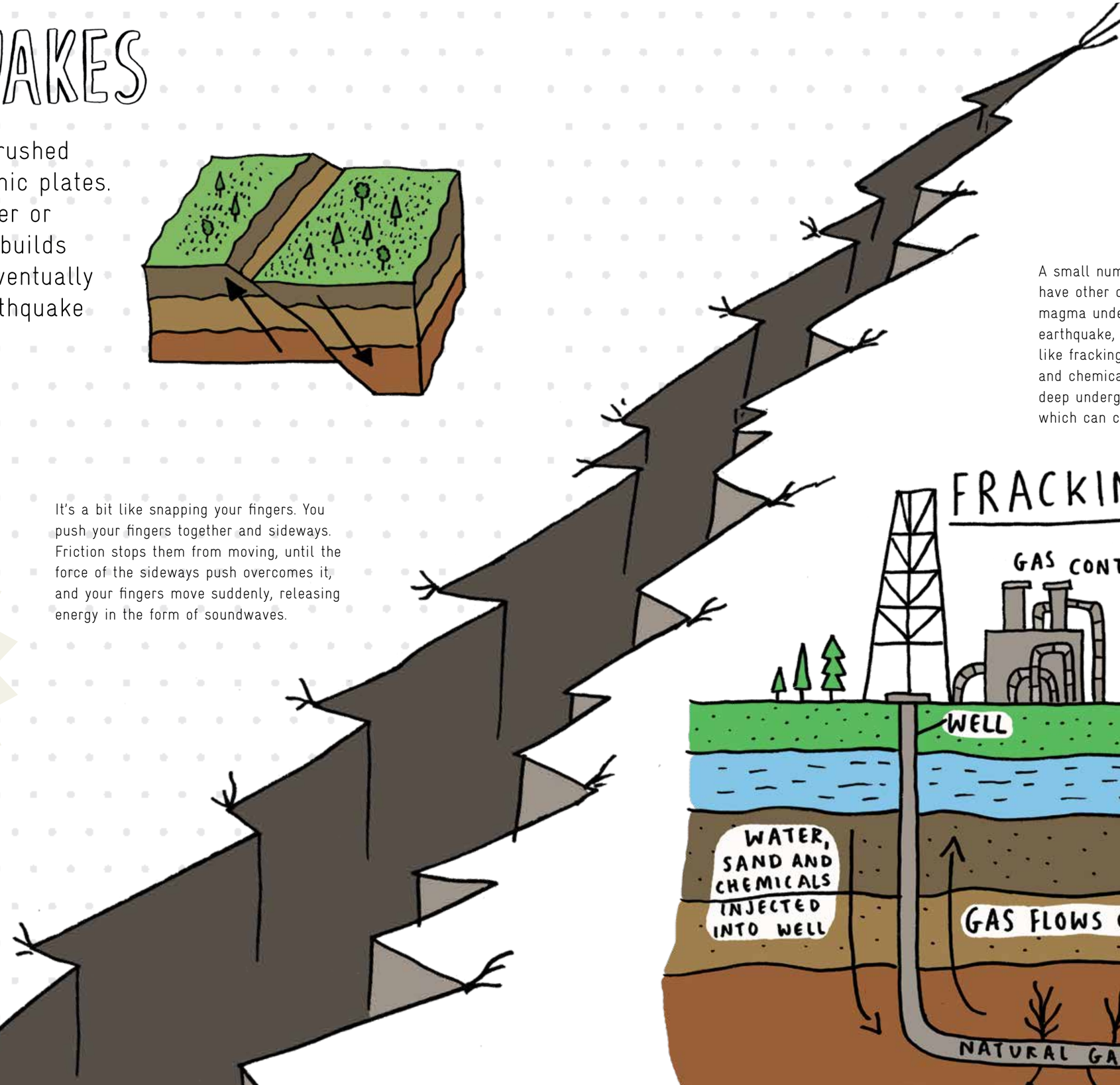
EARTHQUAKES

A fault is a thin zone of crushed rock, separating two tectonic plates. When the plates push under or past each other, pressure builds up along the fault, until eventually the plates slip and an earthquake occurs.

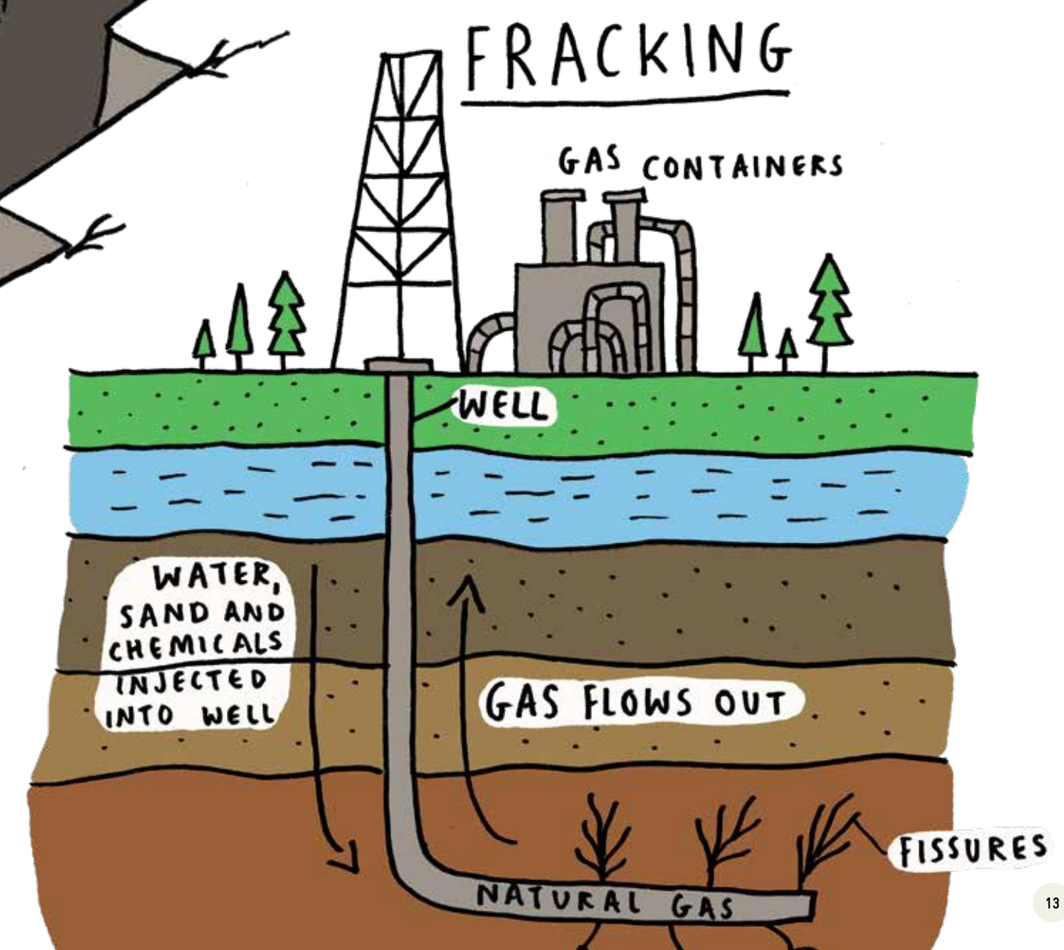


It's a bit like snapping your fingers. You push your fingers together and sideways. Friction stops them from moving, until the force of the sideways push overcomes it, and your fingers move suddenly, releasing energy in the form of soundwaves.

The same thing happens in an earthquake. The tectonic plates push against each other as they try to move past. Eventually, they slip suddenly, releasing energy in the form of seismic waves that travel through the rock, causing the earth to shake.



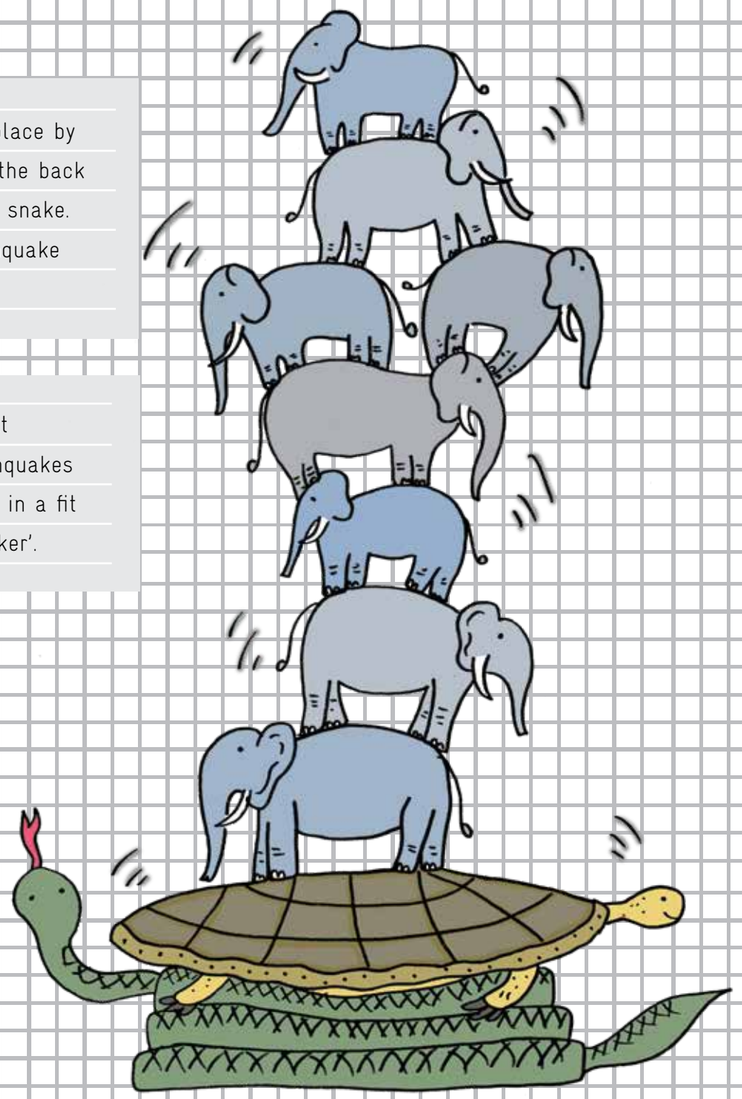
A small number of earthquakes have other causes. The movement of magma under a volcano can trigger an earthquake, as can some human causes like fracking. Fracking is when water and chemicals are injected into rocks deep underground to extract oil or gas, which can cause the bedrock to crack.

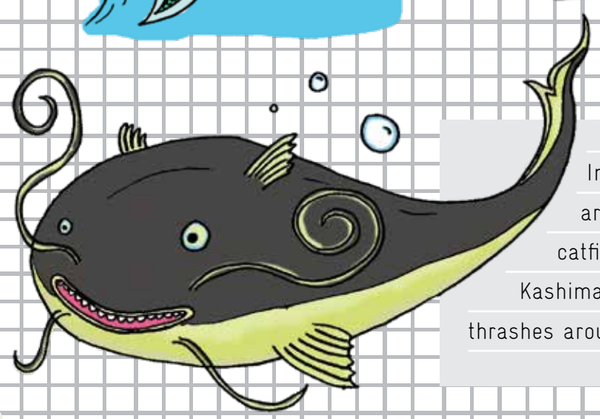


EARTHQUAKE MYTHS

In Hindu mythology, Earth is held in place by eight gigantic elephants balanced on the back of turtle, which stands on a coiled up snake. If any of these animals shift, an earthquake occurs.

In Ancient Greece, people believed that Poseidon, god of the sea, caused earthquakes by striking the ground with his trident in a fit of rage. He was nicknamed 'Earth Shaker'.





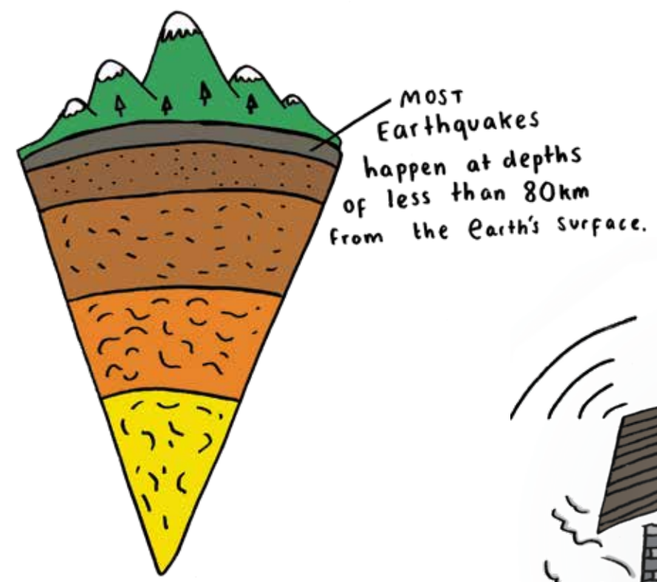
In Japanese mythology it is said that earthquakes are caused by a giant, underground-dwelling catfish called Namazu. Namazu is guarded by the god Kashima, but when Kashima lets his guard down, Namazu thrashes around, causing the earth to shake.

EARTHQUAKE FACTS

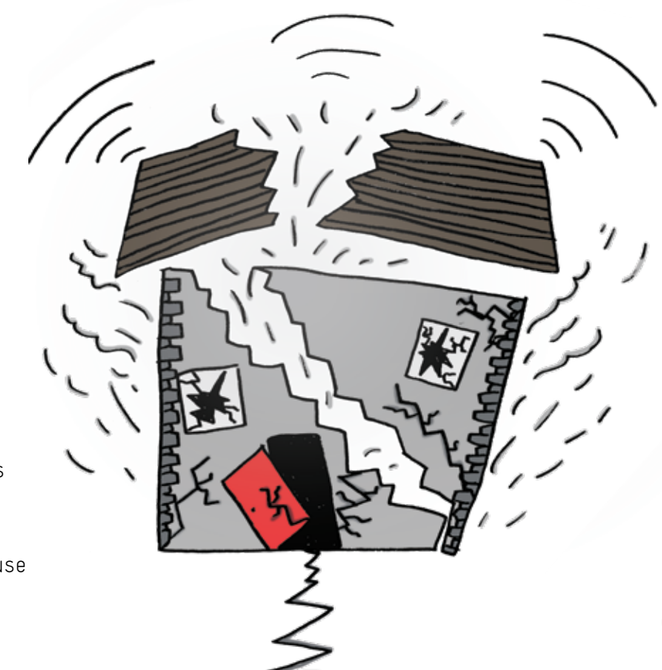
Around 500,000 detectable earthquakes happen annually. In Japan alone, there are at least 1,500 earthquakes every year – around two or three per day! Most of those are so tiny that nobody can feel them.

Approximately 100 earthquakes per year are big enough to cause damage to properties, and earthquakes with a magnitude of 8 and up (see p. 15) occur about once a year. 80 percent of the world's most powerful earthquakes happen in the horseshoe-shaped belt around the edges of the Pacific Plate, known as the 'Ring of Fire' (see p. 29).

Most earthquakes last about one minute. The longest recorded earthquake lasted for ten minutes.

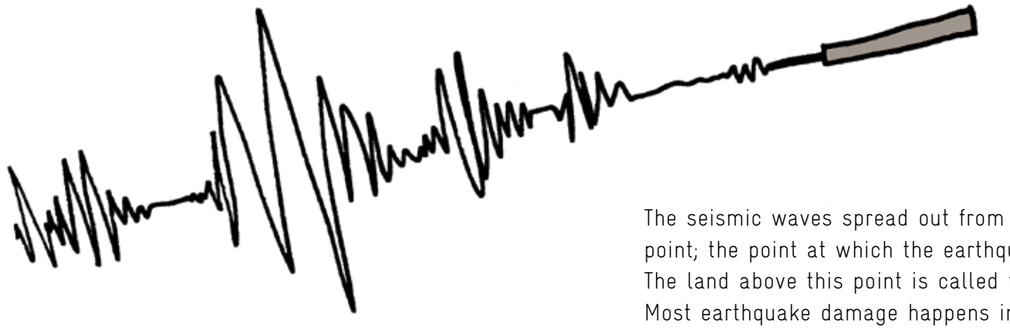


Often, before and after a large earthquake, there will be smaller earthquakes. These are called foreshocks and aftershocks. Aftershocks are unpredictable and very dangerous, as they can cause the collapse of buildings that were damaged in the main shock. They can also cause mudslides and land collapse.

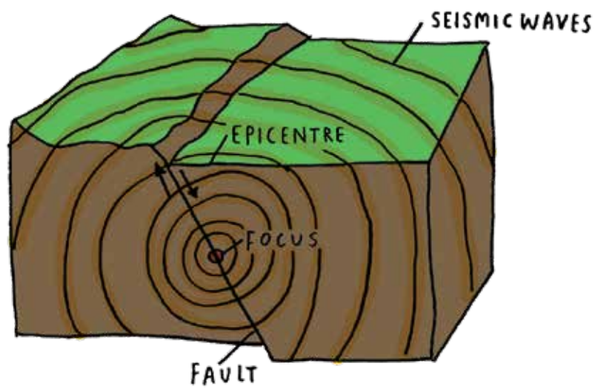


MEASURING EARTHQUAKES

Shock waves from an earthquake travel through the ground and are called seismic waves. Seismologists are people who study earthquakes.



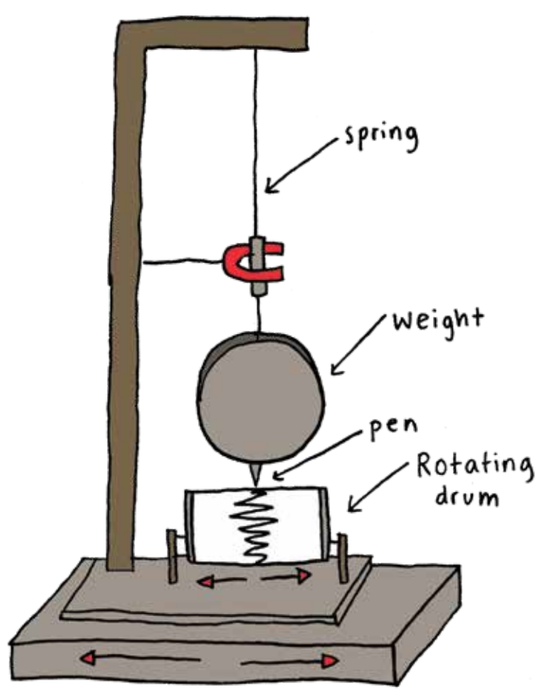
The seismic waves spread out from the focus point; the point at which the earthquake started. The land above this point is called the epicentre. Most earthquake damage happens in and around the epicentre.



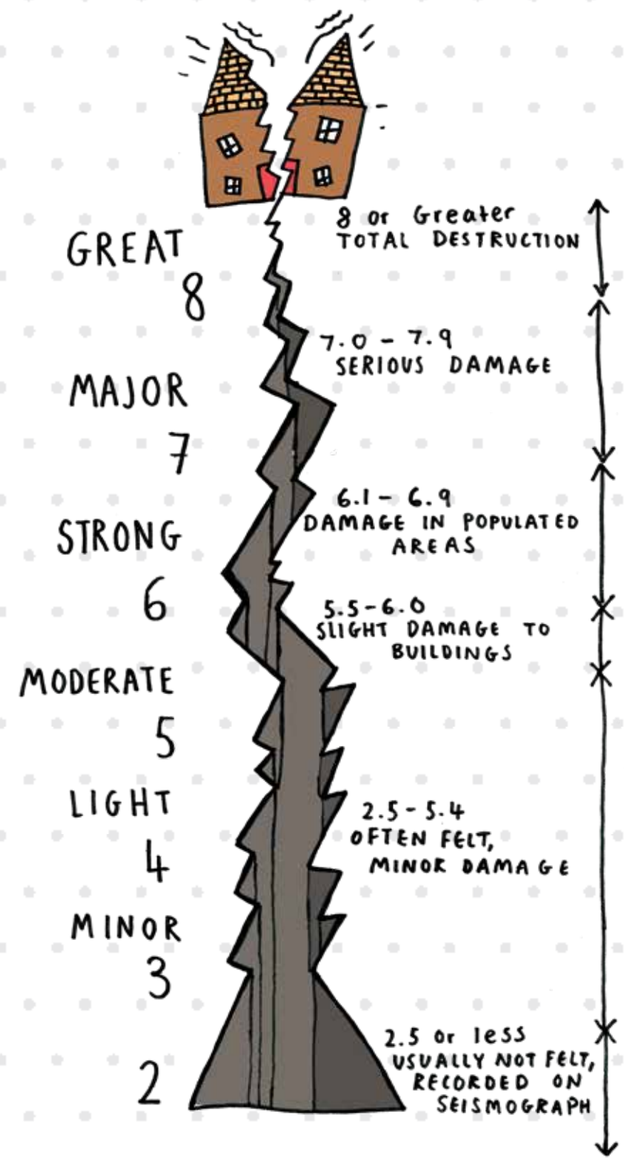
A seismograph records an earthquake's shockwaves, allowing scientists to measure its intensity.

The Richter scale measures earthquakes based on the amount of energy released. The Moment Magnitude scale (MMS) is similar, but takes into account the geometry of the fault as well as the energy released. It is more accurate than the Richter scale, and is most commonly used for measuring large earthquakes.

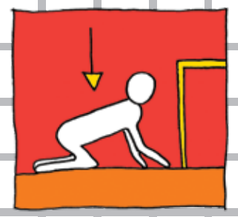
SEISMOGRAPH



MOMENT MAGNITUDE SCALE



WHAT TO DO IN AN EARTHQUAKE



DROP!

If you are indoors, shelter under a table or bench. Hold on to it firmly and if it moves, move with it. Stay away from windows, bookcases, hanging objects or tall, heavy furniture.

COVER!

If you are outdoors, stay away from tall buildings, streetlamps and power lines.

HOLD ON!

When all shaking stops, head for the exit. Never use the lift – always use stairs, and be prepared for possible aftershocks.