## ACTIVITY: Tectonic jigsaw puzzles

**Activity idea**

In this activity, students turn a map of the Earth into puzzle pieces to investigate tectonic plates.

By the end of this activity, students should be able to:

* demonstrate how the tectonic plates covering the Earth fit together like puzzle pieces
* locate New Zealand on their puzzle
* offer a simple explanation about the relationship between tectonic plates and why New Zealand has so many earthquakes and volcanoes.

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**Introduction/background**

The surface of the Earth is made up of large separate plates or areas that fit together rather like a huge jigsaw. The plates – which are the outermost layer of the Earth – are more rigid than the layer below. These plates ride on the hotter and more fluid layer underneath (the upper part of the mantle), sometimes moving apart, sometimes moving past each other and other times pushing together at plate boundaries. It is at tectonic plate boundaries where energy builds up as plates push and move against each other. When the pressure gets too much, something has to give, and an earthquake can happen.

Magma is semi-solid rock under the Earth’s crust. It cannot get through the many kilometres of crust that forms the ground we walk on. Only in certain areas where the crust is fractured or broken – like at the edge of a tectonic plate boundary – can the molten mantle start to creep through and form a volcano.

In this activity, students are introduced to tectonic plates and how they fit together. They can visualise the breaks under the ground and begin to see why New Zealand and other areas around the Pacific Ring of Fire are home to so many volcanoes and earthquakes.

**What you need**

* World globe
* Hardboiled egg
* Access to the video [Tectonic plates, volcanoes and earthquakes](http://link.sciencelearn.org.nz/videos/497-tectonic-plates-volcanoes-and-earthquakes)
* Access to the image [Pieces in a puzzle](http://link.sciencelearn.org.nz/images/1037-pieces-in-a-puzzle)
* Access to the Te Ara interactive [Pacific Ring of Fire](http://www.teara.govt.nz/en/interactive/5581/pacific-ring-of-fire)
* Copies of the student handout: [Tectonic puzzle](#handout)

**What to do**

1. Before the lesson, colour copy the student handout: [Tectonic puzzle](#handout). You may wish to use one between 2 or 3 students. Laminate the copies. Cut the plates out along the boundaries for each puzzle. There are 16 pieces (2 of each of the Eurasian plate and Australian plate). You could cut out several plates together to make fewer pieces for younger students. Older students can make their own jigsaw puzzles.
2. Begin the lesson with the image [Pieces in a puzzle](http://link.sciencelearn.org.nz/images/1037-pieces-in-a-puzzle). Find New Zealand’s location, along with other countries the students are familiar with. Note how the black lines sometimes follow the edges of the continents and countries, and other times, they are in the middle of the oceans. Explain that these are called tectonic plates and the lines are tectonic plate boundaries.
3. Hold up the world globe and discuss the shape of the Earth and New Zealand’s location.
4. Hold up the hardboiled egg and compare it to the globe. Discuss how it is a model of the Earth and compare the egg’s shell to the Earth’s crust.
5. Gently tap the egg until the shell breaks. Compare this to the Earth’s surface. The pieces of the shell represent the tectonic plates of the Earth. The cracks represent the boundaries between the tectonic plates.
6. Watch the video [Tectonic plates, volcanoes and earthquakes](http://link.sciencelearn.org.nz/videos/497-tectonic-plates-volcanoes-and-earthquakes). Watch it a second time, pausing the video to discuss what is happening. Questions to consider:

* What might happen as plates move? (Bump into each other, scrape alongside each other.)
* What might happen to buildings and houses built on top of the tectonic plates? (Shake, move, break, fall down.)

1. If time permits, view the Te Ara interactive [Pacific Ring of Fire](http://www.teara.govt.nz/en/interactive/5581/pacific-ring-of-fire) to view earthquake and volcanic activity associated with plate boundaries.
2. Pass out the student handout: [Tectonic puzzle](#handout). Younger students can put together the pieces as prepared by the teacher. Older students can cut along the tectonic boundaries and glue the pieces into an exercise book.

**Extension idea**

Show students the interactive [Volcano map of New Zealand](http://link.sciencelearn.org.nz/embeds/47-volcano-map-of-new-zealand). See if students can match the locations of our volcanoes to the plate boundaries between the Pacific and Australian Plates.

**Student handout: Tectonic puzzle**

