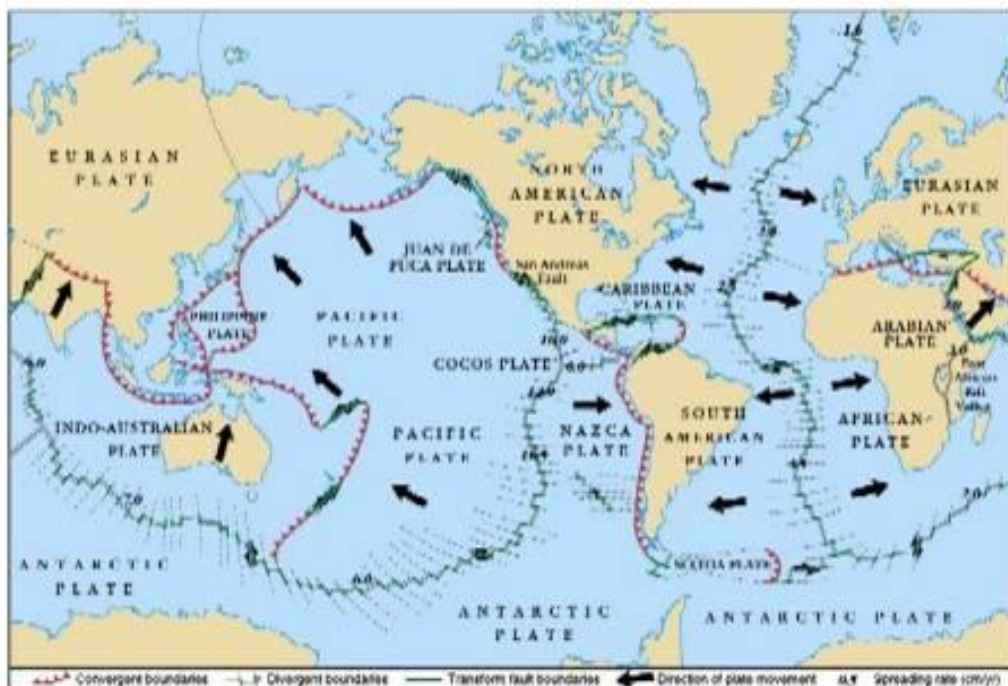


## Earthquake Data – Teacher Notes

### Earthquakes and tectonic plates

Tectonic plates can move against each other at zones of convergence. Sometimes it takes a great deal of pressure to overcome friction from the adjoining plate. Stress builds up until it is suddenly released as an earthquake. Rock on either side deforms in response to pressure until its internal energy is overcome and the rock on either side of the break, or fault, move to their new position and regain their original shape. This can be demonstrated by asking students to rub one hand across the other whilst pressing firmly. Movement will be limited by friction between the hands and flesh will be deformed along their interface. However there will be a moment when the pressure builds up to overcome limiting friction and movement starts.



### **Convergent Boundaries** or zones of convergence (Red in the diagram above)

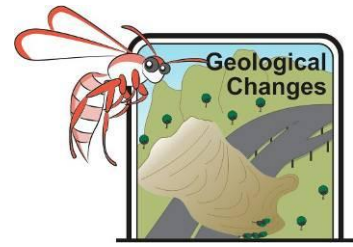
When two plates are pushed together the denser plate will slide below the less dense plate. As the plate slides downwards it grates against the overlying structure. Seismic evidence demonstrates a zone of earthquakes originating at the convergence and sloping downwards away from it.

Name two convergent boundaries from the diagram above. **Any two boundaries E.g. Indo-Australian Plate & Eurasian Plate, Pacific Plate & Eurasian Plate.**

Areas where one plate slides past another are known as **Transform Boundaries** or zones. (Green above). Name one transform boundary. **A transform boundary in New Zealand where the Pacific Plate rubs against the Australian Plate is responsible for most of the major earthquakes there including the recent Christchurch earthquakes in February 2011. Similarly the San Andreas area is where the North American Plate rubs along the Juan De Fuca Plate.**

Areas where tectonic plates move apart are known as **Zones of Divergence**. (Blue in the diagram) Here two plates move apart and the Earth's crust between them thins and sags to create an ocean basin. Molten material can burst up through the thin crust from the asthenosphere and form undersea shield volcanoes such as the main islands of Hawaii. Name two divergent boundaries. **North American Plate & Eurasian Plate, Pacific Plate & Antarctic Plate.**

# Earthquake Data – Teacher Notes



Although the continent of Australia lies well within the Australian Plate stresses caused by moving such a large plate north-eastwards result in local earthquakes along fault lines such as those felt in Newcastle in 1989 and Boulder in 2010.

## Using “Real Time Data”

Geoscience Australia provides data on earthquake activity not only for the Australian region but also collates information from around the World. This data is updated regularly. Students will have to use the key provided and the map on their worksheet. It is a good idea to visit the website before class to update yourself on locations of recent activity.

## Materials

- Internet access either through the student’s own laptops or through a class data projector. If your area has problems with Internet access create paper prints.
- Student worksheet.
- Pen or pencil.

## Method

Visit Geoscience Australia’s site at <http://www.ga.gov.au/earthquakes/initRecentQuakes.do> and use the real time data.

1. Take 5 minutes to familiarise yourself on the variety of information provided. (After each selection, students must press the update “button” to refresh the map).
2. Plot any significant earthquakes (red circles) in the last 30 days in the World on the tectonic map provided.
3. Plot the magnitude of each significant earthquake beside its location.
4. How many earthquakes happened in the last 4 hours? *Will vary depending on day of activity*
5. How many earthquakes happened in the last 24 hours? *Will vary depending on day of activity*

Has anyone in your class experienced an earthquake? What would you expect to happen? *Any reasonable answer.*

**Vocabulary** Tectonics, tectonic plates, convergent, divergent and transform boundaries