



Measure a Quake Shake - Teacher's Notes

Geohazards

Geohazards are changes in the geological structure of the Earth that may lead to damage or even a risk to health. They can involve short-term or long-term geological processes and vary in their impact greatly. Events such as earthquakes, volcanic eruptions, landslides and tsunamis are all considered geohazards.

Geoscience Australia has many excellent resources on geohazards in their education resources found at <http://www.ga.gov.au/education/classroom-resources>

They also have a map showing earthquakes around the Australia in the last seven days <http://www.ga.gov.au/earthquakes/> and the United States Geological Society (USGS) also has some excellent resources <https://earthquake.usgs.gov/>

Earthquakes

The Earth's crust is broken up into large pieces, named tectonic plates, which are constantly but very slowly moving in different directions. These tectonic plates also have cracks and fault lines within them which can build up stress as the plates move. When this stress is released, an earthquake is generated, which may cause whatever is on the surface to shake.

Earthquakes most commonly occur where two or more tectonic plates meet; however, they can also occur at fault lines within a plate. They can also occur underwater which sometimes results in a tsunami forming.

This You Tube video shows the earthquakes that occurred around the world between 2004 and 2014 <https://www.youtube.com/watch?v=Ls3T5Of690I> and this one is a visualisation of all of the earthquakes in Japan in 2011 including the series of very large ones in March that resulted in the devastating tsunami in the Tohoku area. This shows how frequently Japan experiences earthquakes <https://www.youtube.com/watch?v=NSBjEvPH2j4>





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The continent of Australia sits completely on one of these tectonic plates so we have relatively few large earthquakes compared to somewhere like New Zealand which has the boundary of two plates running through it. You may be surprised to know that small earthquakes still occur quite frequently here, and occasionally larger ones also.

Meckering in the WA wheatbelt, about 130km east of Perth, experienced an earthquake in 1968 of magnitude 6.5 which was felt in Perth city. In 1989, Newcastle in NSW sustained a 5.6 magnitude earthquake, claiming thirteen lives and causing significant damage to infrastructure.

Measure a Quake Shake

Earthquakes can be measured using a seismometer, which records seismic waves. A simple version of this can be done with a pen on a roll of paper. This paper recording is called a seismograph. Whilst seismometers are more often computer based now, giving an electronic seismograph, the principle is still the same.

Students can make their own simple seismometers using some basic equipment. This idea comes from Cindy Blobaum's 'Geology Rocks' book.

Materials

- Shoe box
- Rolling pin (or wooden dowel)
- Four sheets of blank paper taped together to form a continuous loop
- Pen
- Tape or plasticine
- Scissors
- Table or other moveable flat surface
- At least two students





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1. Cut a u-shape groove out of each of the short sides of the shoe box, so it forms a holder for the rolling pin.
2. Place the loop of paper over the rolling pin then rest the rolling pin in the cut out grooves.
3. On one of the long sides of the shoe box, cut a small groove to hold the pen. Secure the pen in place with the plasticine, with the writing end facing in to the box. The pen should be positioned so it will touch the rolling pin.
4. Position one person on the table edge so they can shake the table. The other person should hold the loop of paper taut and pull it slowly as the table is shaken, to make a seismograph. If you have a third person, they may like to hold the pen steady.
5. Vary the force with which the table is shaken to show the change in seismic waves.



Variation

You could make a similar style of seismograph using a roll of paper with a dowel or tautly held rope through the centre. Students holding either end of the dowel or rope could provide the 'earthquake' (as long as they only make horizontal movements) and another student could hold the pen onto the paper. A fourth student could then slowly pull on the end of the paper to unroll it as the movement is recorded.

