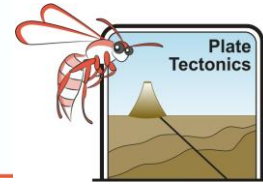


Locating an Earthquake – Student Activities



Being human we tend to think of an earthquake only as it affects us on the surface of the Earth. The earthquake however starts at the **FOCUS** within the Earth. The spot on the Earth's surface closest to the focus is called the **EPICENTRE**. Draw a simple labelled diagram of this below.

Humans only usually feel earthquakes registering above magnitude 3. Other animals and birds are more sensitive and will display changed behaviour because they can feel early tremors. Australia lies well away from its plate boundary but we still register seismic movement as our plate adjusts to external seismic movement.



The cliffs behind collapsed into the Redcliffs school's back yard during the 2011 Christchurch earthquake. Rock rolled and crashed right up to the back door. There was no damage to the fabric of the school and nobody was at school at the time

What are your school's rules about safety during earthquakes? _____

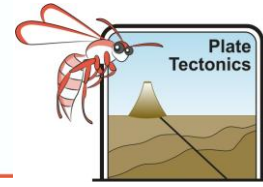
How much time do you have to reach the safe assembly point after feeling the first P waves arrive?

Seismic scenario

We know

1. P waves are the fastest waves to arrive. Their average speed is 7km/s.
2. S waves arrive next. Their average speed is 4km/s.
3. Very destructive surface waves may arrive later.

Locating an Earthquake – Student Activities



Materials per student

- An atlas
- A pencil (Not 2B)
- A ruler
- A pair of compasses
- A calculator
- An eraser
- Scrap paper

An earthquake is triggered at a plate boundary near Indonesia 3,500km away.

How long will it take for the P wave to reach your school? _____

How long will it take for the S wave to reach your school _____



Being a sensible science student you know that you should evacuate before the S wave arrives.

How much time do you have to get from the classroom to the evacuation point before the S wave hits? Use the space below for your calculations

How long would it take you to get safely to your assembly point? _____

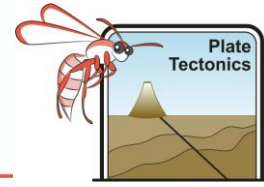
If you do not have sufficient time to get out of the classroom, what should you do to remain as safe as possible?

1. _____
2. _____
3. _____
4. _____
5. _____

The distance from an earthquake's epicentre can be roughly inferred by the interval in time between the arrival of P waves and S waves.

Interval in minutes	Distance in kilometres
1.5	900
3	1,800
5	3,300

Locating an Earthquake – Student Activities



An earthquake was registered on your school's seismograph. The interval between P and S wave arrivals was 4 minutes. Estimate the distance to the epicentre using the information in the table and the graph paper provided.

What kind of graph should this be? _____

What should be on the horizontal axis? _____

What should be on the vertical axis? _____

What should the title be?

Distance to epicentre _____

You now know the distance to the epicentre. Can you use this to find its location? _____

You quickly call your cousin's school in Auckland New Zealand 5,360km to your east. They estimated that the epicentre was 3,500 km away from them.



Can you now locate the epicentre with these two pieces of information? Explain your answer.

As luck would have it your adventurous aunt was doing scientific research on the Malaysian Peninsula 4,000 km to your north. Data from her seismometer inferred that the epicentre was 2,500km away.

Draw up you data with your cousin's data and your aunt's data to infer where the epicentre is.

Why do the arcs not intersect at exactly the same spot? _____

Only some of the seismic waves caused ripples in your aunt's flask. Explain why?

Have you ever experienced an earthquake? _____

What did it feel like? _____

