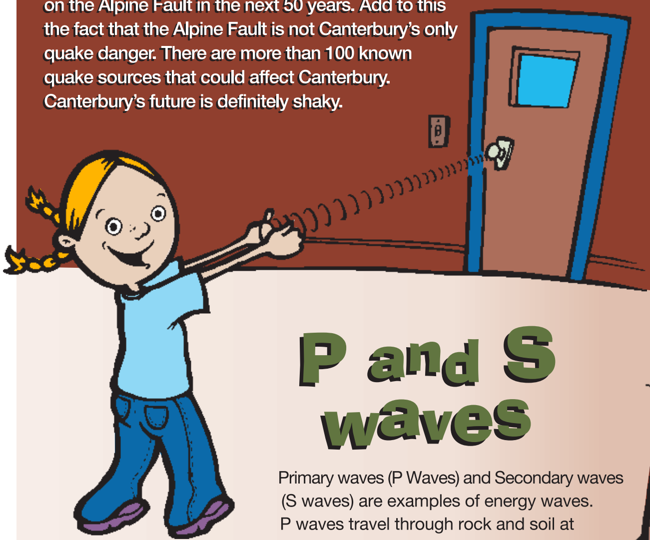
kids Living Here

What on Earth...? Quake!

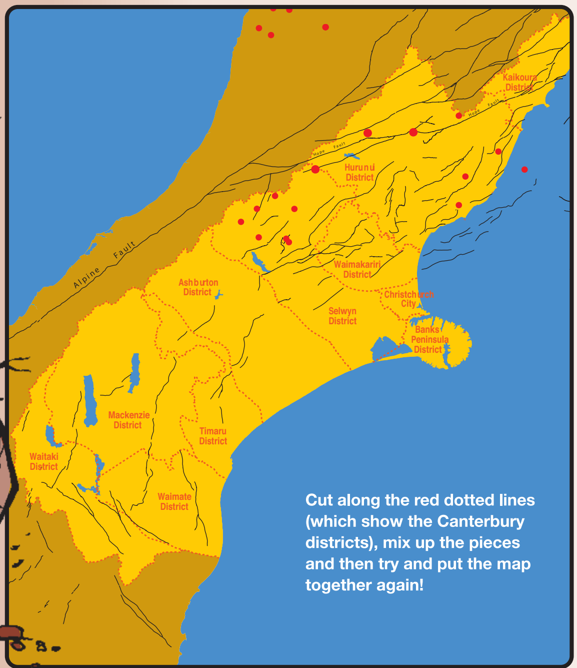
Earthquakes are a natural event in Canterbury. They occur when the 'tectonic plates', sections that make up the Earth's surface, fracture releasing stress through weak zones called faults. Energy is created and moves through the Earth's surface in the form of waves, which we feel and call an earthquake.

The situation is made even more extreme for Canterbury because of the Alpine Fault. It is the "on-land' boundary of the Australian and Pacific Plates. It is New Zealand's largest active fault, running underneath the Southern Alps for over 500km. Scientists estimate there is a 65% chance that there will be a magnitude 8 quake on the Alpine Fault in the next 50 years. Add to this the fact that the Alpine Fault is not Canterbury's only quake danger. There are more than 100 known quake sources that could affect Canterbury. Canterbury's future is definitely shaky.



We're cracking up

This map illustrates approximately where faults lie in the Canterbury area (shown by the black lines). The red dots show you where major earthquakes have been centred between 1840 and 1998.

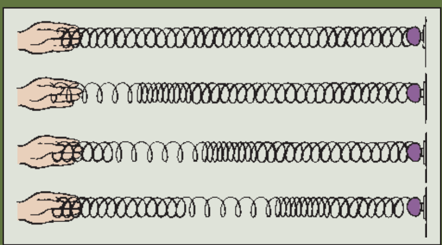


Cut along the red dotted lines (which show the Canterbury districts), mix up the pieces and then try and put the map together again!

P and S waves

Primary waves (P Waves) and Secondary waves (S waves) are examples of energy waves. P waves travel through rock and soil at about six kilometres per second and water at about two kilometres per second. S waves come after P waves and travel through solids (rocks) only. Even though they are slower than P waves they are more powerful and destructive. A seismograph measures the power or magnitude of the earthquake on the Richter scale.

Making P Waves

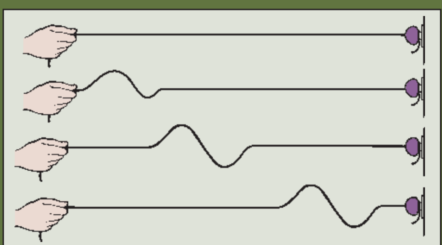


Here's how you do it:

1. Tie one end of your Slinky® to a hook on the wall or a doorknob (close the door first).
2. Holding the other end of the Slinky®, walk away from the wall or door.
3. Stop walking when the Slinky® isn't sagging anymore.
   Don't pull the Slinky® tight; just take up the slack.
4. Quickly jerk your end of the Slinky® toward the wall then back. Don't let go of it.

You'll see waves similar to P waves moving back and forth along the Slinky® like those in the picture above.

Making S Waves



This is probably even easier than making P waves.

1. Tie one end of your rope to a hook on the wall or a doorknob (close the door first).
2. Holding the other end of the rope, walk away from the wall or door.
3. Stop walking when the rope is barely sagging.
   Don't pull the rope tight; just take up most of the slack.
4. Quickly jerk your end of the rope up and down once. Don't let go of it.

You'll see waves similar to S waves moving along the rope like those in the picture above.

Liquefaction

Try this!

Liquefaction sometimes occurs during an earthquake. The small particles in the soils move and mix with the water in the soil. The soil becomes more like a liquid than a solid. After all the shaking they resettle, making the ground surface lower than before. Often, not only is the ground lower, but parts of the ground have moved sideways as well.

Loose, sandy and silty soils are most commonly affected. These types of soils can occur in estuaries, coastal areas, river channels, floodplains and man-made fills.

Liquefaction in action

Next time you go to the beach, take a walk on the wet soft sand left behind after a wave races back to the sea. Gently put weight on your foot and wriggle about and watch what happens? The mixture of sand and water move under the pressure of your foot, and your foot sinks into the wet sand. Liquefaction is much like this.

Watch out for the next wave!

Quake Quiz

A	L	F	E	P	S	I	C	P	E	C	R	E
S	N	I	A	L	B	S	O	O	L	F	K	M
U	D	S	R	U	N	E	M	T	M	A	G	A
R	L	E	T	I	L	E	R	E	U	P	T	G
F	P	I	H	S	C	A	W	Q	K	T	F	N
A	H	S	Q	G	E	H	S	A	L	A	U	I
C	L	M	U	U	A	T	T	U	V	T	Q	T
E	P	O	A	G	E	M	A	E	P	E	A	U
V	I	G	K	L	N	F	S	L	R	S	S	D
S	T	R	E	S	S	C	A	L	P	I	N	E
A	W	A	C	O	M	P	A	C	T	E	D	Y
F	A	P	U	H	L	A	I	V	T	L	R	V
R	K	H	Q	L	T	D	G	T	E	I	G	A
U	E	Y	G	R	E	N	E	N	U	A	O	W
S	F	L	O	O	D	P	L	A	I	N	S	N

Up, down, diagonally, sideways and backwards! Can you find these words?

Earthquake	Fault
Plates	Seismograph
Energy	Alpine
Stress	Compacted
Waves	Floodplains
Magnitude	Richter
Liquefaction	Surface