

# When the earth moves



Objectives for yr 9-11

Science - Planet Earth and Beyond

Social Studies - Social Organisation

NCEA: Geography A.S. 1.1 Examine extreme natural events

Geography U.S 5083 Natural hazards

## Programme will include:

- Viewing images and hearing stories about the Inangahua and Murchison earthquakes. (Primary sources for research)
- Discussing the sequence of events that produced them.
- Learning about the way in which people respond to crisis.
- Describing these earthquakes as geological events and as hazards.

## Introduction

Have you ever been in an earthquake? What did it feel like?  
What can you tell us about earthquakes?

Points to develop

Korero Purakau (Maori legend) tells us that when the descendants of Rangi the sky father and Papa the earth mother quarrelled, Ruamoko was sent down to the underworld. He remains there today and when he turns his huge body over we have an earthquake.

Science tells us that:

Earthquakes are the result of movement in the earth's crust.

They happen where plates in the earth's crust meet.

Tears or breaks in the crust occur where the plates meet. Smaller tears may appear parallel to the first tear. These tears are called faults.

When faults move the crust shakes and we have an earthquake.

## Measuring earthquakes

An earthquake is measured by its size, known as its magnitude. A Californian seismologist (earthquake researcher), Charles Richter, developed his scale as a way of comparing one earthquake with another. The Richter scale calculates the size of an earthquake by the amount of movement of the ground at the epicentre, using the height of the biggest shockwave and the time between the waves. These measurements are taken by a seismograph. The force of an earthquake can also be affected by the depth of the earthquake.

Another way of measuring an earthquake is the Modified Mercalli scale which measures the effect on people, buildings and the ground itself.

## Murchison earthquake, 17 June, 1929

### Immediate effects

At 10.17 am on Monday, 17 June, an earthquake shook New Zealand from Auckland to Dunedin, and was measured at 7.8 on the Richter Scale.

17 people died in the earthquake, many as a result of the landslips and floods.

Where the fault ran across the Buller Gorge road a wall 2 metres high was formed. At one point where the faultline crossed the Maruia River, and the land on one side was raised up by the quake, a new waterfall was created, Maruia Falls.



*The 14ft upthrust near Murchison, 1929, NPM F N Jones Collection, 1/2 26321*

Cracks appeared in the ground.

*Fissures in Road, Murchison, 1929, NPM, F.N. Jones Collection 1/2 263128*

Buildings collapsed.



*After the Quake, Hodgeson's Store, Murchison, 1929, NPM F N Jones Collection, 1/2 26347*

There were huge slips down the surrounding hillsides, blocking roads and rivers. One of the worst slips dammed the Matakītiki River and formed a lake, while another in the Maruia Valley swept a house and its inhabitants away under a massive mountain of rocks and rubble.



*Busch's Slip and Morel's House, Murchison earthquake, 1929 NPM, F.N Jones Collection, 6x8 16*



*Murchison earthquake (bush destruction and river changes) NPM FN Jones Collection 6x8 1853*



*Murchison earthquake, Gibson's rock 1929, F N Jones Collection 6x8 16*

The first reports of serious damage came from Greymouth Nelson and Westport. In Greymouth most chimneys were destroyed and gas, water and sewage pipes had broken.



*Murchison earthquake. Griffin's Chimney (Nelson)  
1929 Kingsford Collection 167341/6*

At Nelson College the tower had fallen and dormitory roofs had been smashed by falling stonework. There were no injuries.



*Nelson College,  
Murchison earthquake  
1929, Kingsford  
Collection 162195/6*

## Long Term effects

Earthquake tremors continued for the next fortnight, adding to the confusion and terror.

With their houses unliveable or completely destroyed, the residents of Murchison camped in tents or took shelter in sheds. Water and sewage services were not working properly, and the risk of disease was high.



*After Murchison earthquake (people living in tents), 1929, NPM F N Jones Collection 1/2 28910*

It took 18 months to open the road between Westport and Reefton. Food normally was brought into the area from Westport, but with the roads blocked by landslips, and bridges destroyed, supplies soon began to run low.



*Murchison earthquake, 1929 (destroyed bridge) Kingsford Collection, 162198/5*

## Inangahua earthquake, 24 May, 1968

Inangahua Junction is at the point where the Inangahua River meets the Buller River, 30 kilometres north of Reefton and 45 kilometres south-west of Westport. At 5.24 am on Friday 24 May, 1968, an earthquake measuring 7.1 on the Richter scale struck the West Coast.

Around the Inangahua area landslides and other upheavals blocked the roads, buckled the railway lines, and cut off the town. Communication with the outside world was not possible until two and a half hours after the earthquake. In the meantime the local inhabitants had to be ready to spend the night in the stricken town in case help could not reach them.



*Inangahua Earthquake ( buckled railway lines), 1968, NPM Barry Simpson, Nelson Photo news Collection 1226 fr10*



*Near Inangahua School, 1968, NPM Barry Simpson, Nelson Photonews Collection 1226 fr 8*

The Buller River was dammed by a massive landslip about 6 kilometres upstream from Inangahua, and threatened to flood the town.



*Inangahua Earthquake 1968 Geoffrey C Wood Collection 5417,fr16*

Brick walls and brick veneers collapsed or were severely cracked.



*Inangahua earthquake, house damage, 1968 Barry Simpson, Nelson Photo news Collection 1226 fr6*

“ I remember hanging onto the bed as it was tossed around the room. The noise was horrendous. It was like nothing I’ve ever heard. Our fridge was flipped on its side, a heavy three-seater sofa was thrown across the lounge, ceilings were ripped open, windows exploded out of their frames, cupboards were completely emptied, broken ornaments and crockery littered the floor.” (Ruth Inwood)



*Inangahua earthquake, 1968 ( hole in the ceiling)  
Geoffrey C Wood Collection, 5415 fr 45*

Three people were killed. If the earthquake had been centred in an area where there was a higher population, there would probably have been a greater loss of life.

Helicopters were used to take people out of the disaster area. By 9.30 pm on the day of the earthquake almost 200 people had been lifted out and then taken to Reefton.



*Inangahua earthquake, 1968, Geoffrey C Wood  
Collection, 5415 fr33*

## Long Term effects

The earthquake damage was made worse by aftershocks. 15 earthquakes measuring more than 5 on the Richter scale were recorded over the next four weeks.

The railway line was reopened three weeks later and people returned to their homes in Inangahua after a month. The roads took longer to clear.

Residents were billeted in Reefton. Police set up roadblocks and declared Inangahua a no-go area for one month, although farmers were allowed in to look after stock. This was to prevent looting of local homes and shops.

Roadblocks were set up outside Inangahua Junction to control who went into the disaster area. Police were on patrol to keep out sightseers and looters of the empty houses.

## Interview with John Reid of Paton's Rock, Golden Bay.

Date: 25 Jan 2005

Topic: Inangahua Earthquake 24 May 1968

*John Reid's voice can be heard on the DVD showing downstairs in the museum. It can be borrowed from Education at Nelson Provincial Museum. Here is an introduction to his interview.*

John Reid had a helicopter company called Helicopters(NZ)Ltd. John Reid and his wife lived in Grove St Nelson in 1968. The house was built on stone piles. They woke at about 5.30am to feel the house moving in a circle on its piles. At 5.35 am the phone rang. It was the Electricity Dept from Stoke saying they had lost communication with Inangahua.

They asked him to fly down and investigate. The engine was out of his Jet Ranger helicopter so the engineers and John worked very fast to get it back in again and they left Nelson at 8am. They were to spend over 10 hours in the air that day. His log book shows 9.05 daylight hours and 2.15 hours after dark.

It was rather a foggy morning so he had to fly above the fog as much as possible. As he flew over the Buller River there was a gap in the cloud and he saw the slip above Dublin Terrace that had all but closed the river. A lake was building up upstream of the slip and scarcely any water was flowing on down the river.

A Helicopters(NZ) pilot, Ray Wilson had been at John Reid Hut that night and at 3pm he joined John Reid in Inangahua.

## What would happen if there was an earthquake in the same area tomorrow?

Today we have new technologies available to help in an emergency.

- Cell phones
- Satellite phone
- 4WD vehicles
- Helicopters with longer range

Cell phones work near Nelson town but the local cell phone tower was destroyed in the big snow of 2008.

Civil Defence in Nelson has a satellite phone but it can only be used if there is a receiver. The newly set up Rural trust funded by MAF will have one of these. This group focuses on the needs of farmers eg, Dairy farmers without power.

Community support groups with response plans are being set up in New Zealand. In Murchison the plan is to set up a welfare centre in the new sports complex in the event of an earthquake. Radio communication with Nelson and other Civil defence centres is based around this group.

Modern 4WD vehicles are able to travel in many areas where roads have been destroyed using tracks and riverbeds.

The community is encouraged to have a 'three day pack' to carry them over the immediate period after an event such as an earthquake.

The following websites give information about household planning for a natural hazard such as an earthquake.

[www.civildefence.govt.nz](http://www.civildefence.govt.nz)

[www.whatstheplanstan.govt.nz](http://www.whatstheplanstan.govt.nz)

Ideas to include when answering questions

Effects on the land:

Horizontal and vertical movement along fault lines

Soil liquefaction

Land slides, mudslides and slips



River flooding  
Tsunami and coastal flooding

Effects on people and property:

Injury or death

Mental stress, trauma

Damage to property

Disruption of business

Suspension or loss of public amenities such as schools and hospitals

Damage to infrastructure such as electricity supplies and water mains.

Damage to transport networks

Damage to communication networks.

Sample question:

Choose examples from either the Murchison earthquake 1929 or Inangahua earthquake 1968 to answer the following question:

- a. What were the effects of the earthquake on the land and on economic and social activities?
- b. What happens before, during and after the natural hazard?
- c. What systems are in place today to reduce the effects of a natural hazard such as an earthquake?