

The Bones of our Land



Objectives for yrs 3 -10

Science – Planet Earth and Beyond

Achievement Objectives

Students can

L2/3 explore and describe resources such as rocks.

L4 develop an understanding that rocks are one of the earth's resources

Opportunities for learning include

- investigating the origins rocks and rock formations of Te Tau Ihu, eg Boulder Bank, Farewell Spit, Mt Arthur, Caves in limestone.
- gathering information by hands-on investigation of rocks. Developing ideas about texture, grain size, colour, density and use.
- gathering information about fossils found in the Nelson region
- modelling rock forming processes and sorting rocks into groups, eg sedimentary, metamorphic and igneous.
- gathering information about use of non-renewable resources such as iron ore extraction at Onekaka , copper and chromite mining at Dun Mt, gold in the Aorere, pakohe (Argillite) for tools.
- Investigating Maori tools made with pakohe.

There are three parts to the programme

Introduction (in museum classroom) 15 minutes

We will discuss what the students know about Nelson's rocks and landforms. The questions will be adapted to the age of the children, e.g;

Yr 1/2 What can you tell me about Nelson's rocks? How do you think the Boulder Bank got there?

Yr3/4 What can you tell me about the types of rock that we have in Nelson, the Boulder Bank, Mt Arthur?

Yr5/8 What can you tell me about the way that the Boulder Bank or Mt Arthur were made?

Student's responses will be used to make the introduction more appropriate. During the introduction rock samples will be passed round the class.

Key ideas for introduction:

New Zealand sits on the margin of two crustal plates that are always moving.

New Zealand was once part of a super-continent called Gondwana. (Gondwana model)

Hot rock from the area under the crustal plates is called magma.

Hot rock makes its way to the surface and cools. Some reaches the surface in volcanoes and cools quickly and some just gets close and cools slowly.

Rock at the surface gets worn away with the help of ice, wind and water to make sand, mud and dust. All this eventually ends up in the sea as sediments.

More and more sediments collect and squash each other to make rock. After millions and millions of years these rocks get so squashed that they change and you can't see the grains or layers any more. Students will see mudstone and pakohe samples.

The rocks on the Boulder Bank are mostly rocks that have cooled slowly deep in the earth's crust, then they have been lifted up as the plates of the earth's crust have moved and they have been lifted to the surface. The moving has broken them up and then as the land above has been eroded they have been exposed. Some have fallen down onto the beach and have been rolled down the bank to make boulders like this. Students will see a big Boulder Bank boulder.

Mt Arthur is made from very old rock that started out as limestone and has been squashed and changed to make marble. As Mt Arthur has been lifted, up the plates move the marble to the surface. It is harder than limestone and takes a long time to wear down. Students will see a big marble rock.

Dun Mountain is made of some rocks that have moved a long way. There is a fault right along the length of the South Island. The nearest rocks for a match with the rocks in the Dun Mountain area are in Fiordland. Students will see a sliding NZ model that tracks the movement of these ultramafic rocks.

Sometimes animals and plants get stuck in the mud or sand and their bodies get squashed. We see these bodies or the patterns of their bodies as fossils. Students will see fossils. In Takaka there is rock that was made 500 million years ago. The mountains that are around us were built about 12 million years ago. Fossils help to tell us how old rocks are.

Geologists are people that study the Earth's rocks and they sort the rocks out according to their age and type. Geologists learn to recognize different rock types. Geologists also find rocks that are really useful to man.

Ask students about rocks they think are useful.

Rock that we can get useful things from is called ore. Copper, chromite and gold have all been mined in the Nelson area. Students will see ore samples.

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Activities 60 mins max

We are going to work in five groups. The teacher should identify the five groups and assign at least one adult to each group. Try to leave museum teacher and the classroom teacher without a group.

Talk to the students about keeping focused on *The Bones of our land* as they move around the museum.

1. Our boulders - outside the museum and inside the doorway.
2. Fossils - fossil identification
3. Geology Console - minerals and other useful rocks
4. Taniwha cave - limestone formations
5. Boulder Bank and Farewell Spit – sedimentary, igneous and metamorphic rocks

Group activities: 10 minutes at each site

Outside the door with Our Boulder



- Identify the rock as coming from the Maitai river. It has rolled down in floods from the rocks that are part of Dun Mt.
- Text on big rock. Parents have photo that highlights the structures e.g concoidal fractures, layers in the mud.
- Geological origin of the big rock. Metamorphosed mudstone.
- Before you leave the rock ask students to suggest how Maori worked this type of stone.
- Investigate serpentine boulder in foyer and sample of black pakohe hanging over stairs.
- Look at the tools made from pakohe. There will be a hands-on box containing pakohe in various stages of working.

In foyer and just inside the museum: Fossils

These rocks represent geological eras.

- Parents have text that explains fossil type e.g. impression, cast, true fossil, pre-fossil.
- Students are guided through fossils display from oldest to youngest? They will be made aware that all these fossils come from our local area.
- Students then explore their fossil box. This shows the range of fossils that can be found. Some of the fossils in this box come from other countries

In Museum: Cave formations and local rock types



- Parents have text that explain the features e.g how caves are formed and where we can expect to find them, how the Boulder Bank was made, what Farewell Spit is made of.
- Explore the Taniwha cave.
- Investigate ways of identifying limestone and marble
- Use geology console (TV screen) to investigate the uses of local rocks.

In Museum: Useful Rocks

- Box for sorting useful rocks. Some are not Nelson rocks. Clues available in box. Talk about the ones that can be found in local area.
- Investigate display of mining activities and sample of ores. Relate this to the geology console.
- Text for parents: brief story of Nelson mining.
- Discussion of how mining affects the land.

In Types of Rock (igneous, sedimentary and metamorphic)

- Sorting boxes of sedimentary, igneous and metamorphic rocks
- Allow students to investigate rocks provided. They mostly local rocks.
- Apply descriptive labels to rocks.

Summative activity in museum classroom. 15minutes

These are some key local landforms

Caves on Takaka Hill, fossils in sandstone on Richmond Range, marble of the Mt Arthur range, granite boulders of the Boulder Bank, Farewell Spit.

Possibilities:

- Each group dramatizes the formation of one of our landforms.
- Each group draws large in thick felt pen the formation of one of our landforms.
- Each member of the group says a word or phrase about the formation of our landforms and these are written onto a big sheet of paper by the parent and the group rehearses and then reads them as a group 'poem'.