



Super Site

Borland Lodge

SUPER
SITE



SUPER
site

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Conservation
Te Papa Atawhai

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1 1 These icons refer to curriculum areas and levels. Please see the curriculum breakdown on page 5.

introduction

p3 Using this resource
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section 1

An overview to using Super Site® resources



NEW ZEALAND environmental CARE CODE

- Protect plants and animals
- Remove rubbish
- Keep streams and lakes clean
- Keep to the tracks
- Take care with fires
- Respect our cultural heritage
- Enjoy your visit
- Toitu te whenua (leave the land undisturbed)



1. Plan Ahead and Prepare
2. Travel and Camp on Durable Ground
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimise the Effects of Fire
6. Respect Wildlife and Farm Animals
7. Be Considerate of Others

Using this resource

SUPERSITE resources are designed to help teachers plan exciting and educational learning experiences both inside and outside the classroom. They are aimed at upper primary and lower secondary students.

Materials are provided for both classroom and field based activities. The sections are designed to be independent; each can be completed in isolation.

The suggested activities encourage learning in the environment, enabling the development of skills, attitudes and values that students gain from experiences outdoors. Background notes and activities assist study about the environment, raising levels of knowledge, understanding, awareness and sensitivity to the environment.

Cross-curricular, specialized or enquiry-based learning

Getting students motivated in the classroom and then giving them the opportunity to apply this outdoors gives them the chance to study the whole environment. Sites can be used to meet goals from specific curriculum areas or different curriculum areas simultaneously. This is an approach which mirrors the interconnectedness of the environment. For specific curriculum objectives used in this Super Site refer to the curriculum breakdown.

Education for the environment

Take the opportunity to make students aware that the places they are about to visit are part of the heritage of all New Zealanders and therefore the responsibility of all. The Leave No Trace Principles to the left are a good resource for reinforcing this point.

Contact and feedback

For all enquiries and any feedback on this resource please contact:

Community Team
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Te Anau 9640

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The tracks

Borland has a variety of excellent walking tracks. Those most often used by schools include the Burnt Ridge Track, an easy 1½ hour walk from Borland Lodge to Lake Monowai, the 45 minute return Borland Nature Walk that begins close to the lodge and the one kilometre predator trail loop that starts directly behind the lodge. More strenuous walks include South Borland track, 3 hours one way, and the North Borland track to the rock bivvy, 2½ hours one way.

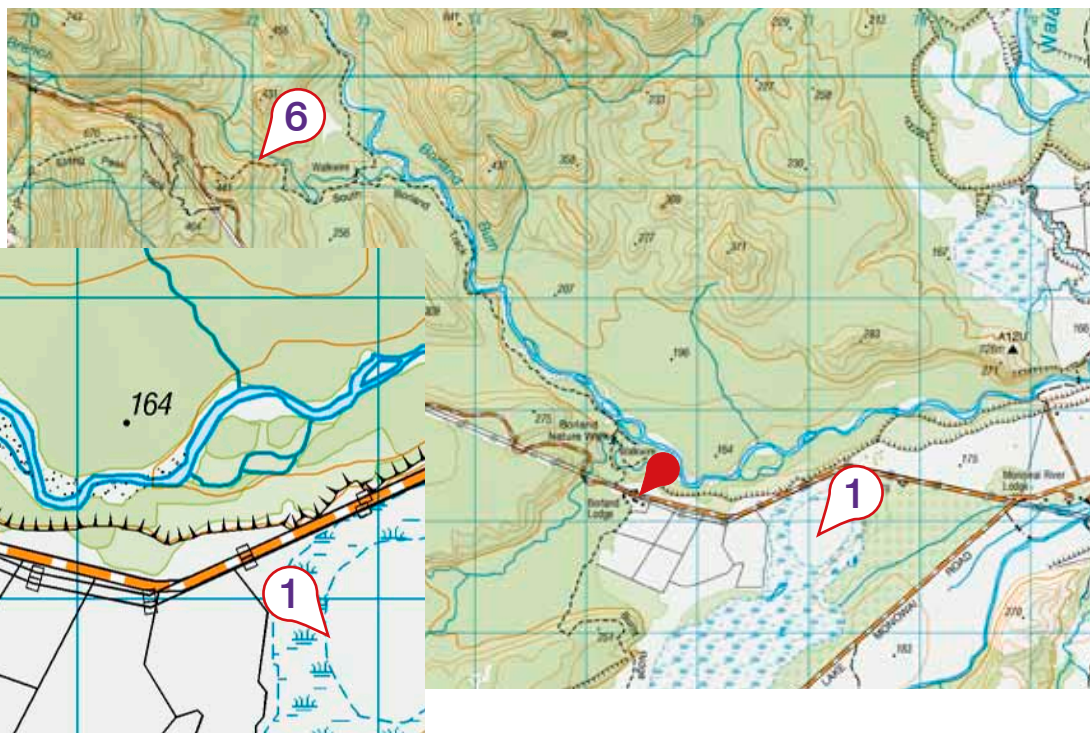
The environment

Borland Lodge is backed by majestic beech forest and has wide views across open farmland to the Takitimu Mountains. Schools staying at Borland Lodge have easy access to natural features including forest, mountains, lakes, rivers and the Clifden Caves, as well as the historic Monowai Power Station and amenities like the heated swimming pool at Blackmount.

Key

② Study sites

● Borland Lodge



Outdoor activity site location overview

Many of the activities listed below are intended to be at specific sites around the Lodge.

- ① Borland Mire
Activity 5c - Capturing the wetland (p45)
- ② Burnt Ridge/predator control trail
Activity 4a - Predator trail tale (p29)
- ③ Borland Lodge grounds
Activity 3a - Lodge grounds plant hunt (p17)
- ④ Pig Creek
Activity 5a+b - Tuna and kōaro spotting (p43+44)
- ⑤ Borland Nature Walk
Activity 5a+b - tuna and kōaro spotting (p43+44)
- ⑥ South Borland Track
Activity 2a - Time travelling at Borland (p11)



Section 1 – Introduction curriculum breakdown

How this Super Site relates to the national curriculum

1+2 Science

PEB Planet Earth and beyond

PEB **ES** Earth Systems

Explore and describe natural features and resources

LW Living world

LW **LP** Life processes

Recognise that all living things have certain requirements so they can stay alive

EC Ecology

Recognise that living things are suited to their particular habitat

EV Evolution

1. Recognise that there are lots of different living things in the world and that they can be grouped in different ways
2. Explain how we know that some living things from the past are now extinct

3+4 Science

PEB Planet Earth and beyond

PEB **ES** Earth systems

Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources

LW Living world

LW **LP** Life processes

Recognise that there are life processes common to all living things and that these occur in different ways

EC Ecology

Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced

EV Evolution

1. Begin to group plants, animals, and other living things into science-based classifications
2. Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world

2 Social science

PPI People and place influence

Understand how places influence people and people influence places

CP Cultural practices

Understand how cultural practices reflect and express people's customs, traditions and values

3 Social science

PUP People using places

Understand how people view and use places differently

RD Resource decisions

Understand how people make decisions about access to and use of resources

RP Recording the past

Understand how people remember and record the past in different ways

4 Social studies

CH Cultural heritage

Understand how people pass on and sustain culture and heritage

CC Community challenges

Understand how people participate individually and collectively in response to community challenges

Activities overview

1a Knowledge wall _____ p9

2 PPI

3 PUP RD

1b Be prepared _____ p9

2 PPI

2a Time travelling at Borland _____ p11

1 2 3 PEB ES

2b Rock eaters _____ p11

1 2 3 4 PEB ES

3a Lodge grounds plant hunt _____ p17

2 LW EC

3b Borland beech forest quiz show p20

2 LW EC

4a Predator trail tales _____ p29

1 2 3 4 LW EC

5a Night time tuna/eel spotting _____ p43

2 LW EC

5b Night time kōaro spotting _____ p44

2 LW EC

5c Capturing the wetland _____ p45

2 LW EC

6a Fun with harakeke/flax _____ p48

2 CP

6b Pehu/bracken spears _____ p50

2 CP

6c History, what's in a name? _____ p52

2 PPI CP

3 PUP

4 CH

notes activities

section 2

Teacher notes and activities

Topic layout

This resource is organised by habitat type, with each area focusing on a different topic. Each section includes supporting information (great background reading for teachers and parent helpers) and at least one activity to be carried out in the field, plus activities that can be done in the classroom.

Curriculum level based

The activities in this resource are aimed primarily at meeting the objectives of the Science and Social Science curriculum levels 1-4. These curriculum areas are clearly laid out in Section 1, page 5.

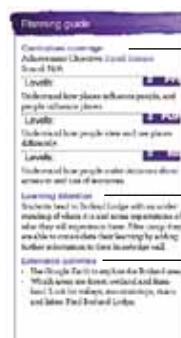
Using the activity sheets

Planning outline

Each topic's activities have a brief overview box with a quick run-down of the curriculum objectives, materials needed, and additional health and safety issues you may need to be aware of as well as any other points of note.

Achievement levels and objectives

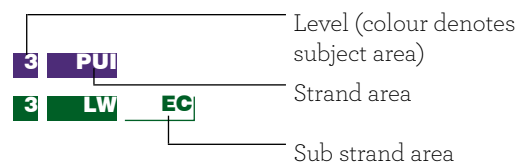
Achievement objectives are colour coded in line with subject areas in current curriculum documents. Numbers refer to levels while letters refer to strands and sub-strands. See page 5 for a breakdown of these.



Curriculum objectives covered and curriculum excerpt

Learning intention

Any EXTENSION activities suggested

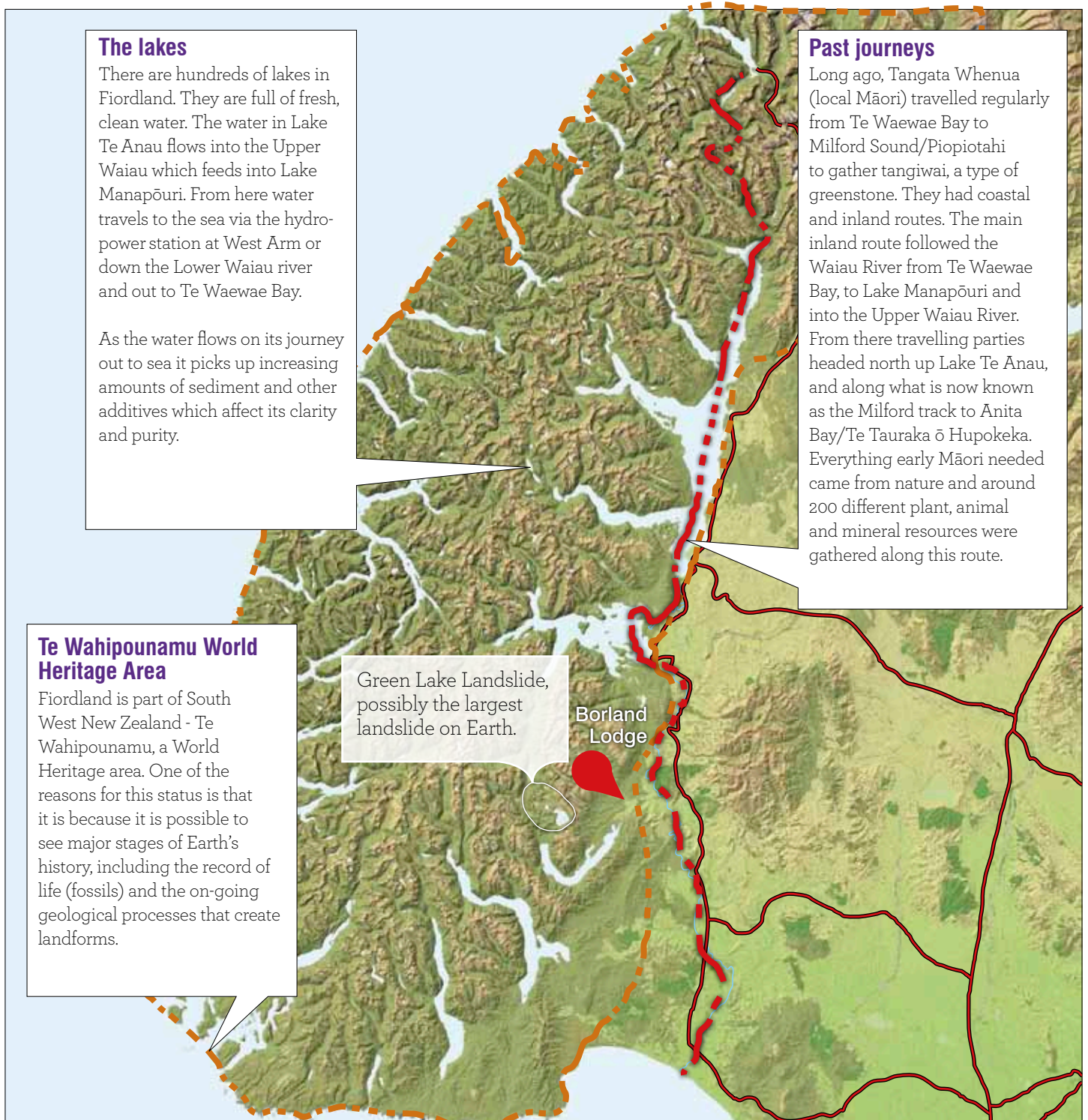


Pre and post activities

Pre and post-visit activities

This resource includes suggestions for lead in and follow up activities.

If students have some formative ideas about what they might be about to find they will observe in a more focused way.



#1 Activities

Planning guide

Curriculum coverage

Achievement Objective: Social Science
Strand: N/A

Levels: **2 PPI**

Understand how places influence people, and people influence places.

Levels: **3 PUP**

Understand how people view and use places differently.

Levels: **3 RD**

Understand how people make decisions about access to and use of resources.

Learning intention

Students head to Borland Lodge with an understanding of where it is and some expectations of what they will experience there. After camp, they are able to consolidate their learning by adding further information to their knowledge wall.

Extension activities

- Use Google Earth to explore the Borland area.
- Which areas are forest, wetland and farmland. Look for valleys, mountaintops, rivers and lakes. Find Borland Lodge.

Activity 1a – Knowledge wall

Location

Classroom

Activity description

Classes create a knowledge wall using what they know about the Borland area prior to their trip. After camp, they add their new knowledge to the wall.

Materials required

- Fiordland Map (a simple map is available via DOC)
- Drawings/photos/brochures/text to add to wall

Delivery

- 1] Use the enlarged map of Fiordland to start a class knowledge wall (or have students work in groups to create posters).
- 2] Hold a discussion to assess students' current knowledge of the area. Add information to the wall/poster under headings such as, what does the area look like? What native and introduced wildlife lives there? Use the code of conduct to discuss what people can and cannot do in a national park.
- 3] Locate and mark the route you will take to travel to Borland Lodge.
- 4] Name some of the lakes and fiords.
- 5] After the trip, revisit the headings on the wall and add the group's new knowledge to create a fuller picture of Fiordland.



page 8 and on file

Planning guide

Curriculum coverage

Achievement Objective: Social Science
Strand: N/A

Levels: **2 PPI**

Understand how places influence people, and people influence places.

Learning intention

Students understand how to prepare for going into the outdoors and what they can do to look after the environment while on a field trip.

Activity 1b – Be prepared

Activity description

One of the most important risk minimization strategies you can undertake is to involve students in planning the safety aspects of a trip.

Location

Pre-visit activity, classroom based

Materials required

- Map of Fiordland

Delivery

- 1] Undertake this discussion as a whole class.
 - What kind of place or environment will you be visiting? Has anyone been there before?
 - List what students already know about the site. In small groups ask students to look at the list and think of dangers to themselves. For every danger see if they can think of a way to make it safe. (e.g. getting lost: stay with my group.)
- 2] In small groups ask students to think about how they can be a danger to the environment and what they can do about it. (e.g. Trampling plants: keep to the track.)



page 8 and on file

#2

Information notes 2

Geology of the Borland area

Dramatic forces shaped the Fiordland landscape

In a nutshell

Explore a timeline of geological features on the South Borland Track and uncover the story of how the dramatic Borland landscape was formed.

Use chocolate bars to make rocks and eat your way to understanding the difference between igneous, metamorphic and sedimentary rocks.

Site overview

The South Borland Track is a forest walk that passes through a number of interesting geological sites.

Thirteen thousand years ago, much of the landscape you can see from Borland was bare rock. The ice ages that carved the lakes and fiords had scraped the land clear of vegetation. On a geological timescale, this makes the recognisable Fiordland

landscape pretty much brand new. Most of the features we recognise such as the mountains, lakes and fiords, have come into being over the past 2.5 million years. To give that some perspective, the granite that makes up the body of the mountains of coastal Fiordland is as much as 400 million years old.

As students walk the South Borland track they can see and touch a sequence of rock formed at different stages of the area's geological history and gain an understanding of how the landscape around them was formed.

World Heritage area

Borland Lodge sits within Fiordland National Park, an area that has World Heritage status because it is possible to see major stages of Earth's history, including the record of life (fossils) and the on-going geological processes that create landforms.



Mollusc shell in mudstone, Borland.



A fossil 'clam' *Lima colorata* found on gravel beach opposite cliffs of shelly sandstone, Waiiau River, Clifden.

© Jon Lindqvist

#2 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science
Strand: Planet Earth and beyond
Substrand: Earth systems

Levels: **1 2 PEB ES**

Explore and describe natural features and resources

Levels: **3 PEB ES**

Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources

Learning intention

Students understand that the Earth has changed over time and that this process is ongoing.

Extension Activity

By taking their own photographs and using information gathered on the trip, students can create a time-line poster explaining the geology of the Borland area.

Activity 2a - Time travelling at Borland

Location

South Borland Track. This three hour walk starts from the Borland Road approximately six kilometres from the access gate. It drops down from the road, past impressive limestone cliffs and through beech forest, before joining the Borland Nature Walk near Borland Lodge. NB The first site is on the road, the other five sites are within the first 2km of the walk.

Activity description

Students walking the South Borland track identify a time-line of six geological features using photographs.

Materials required

- Time travelling at Borland activity sheet and pen
- Camera (optional)

Delivery

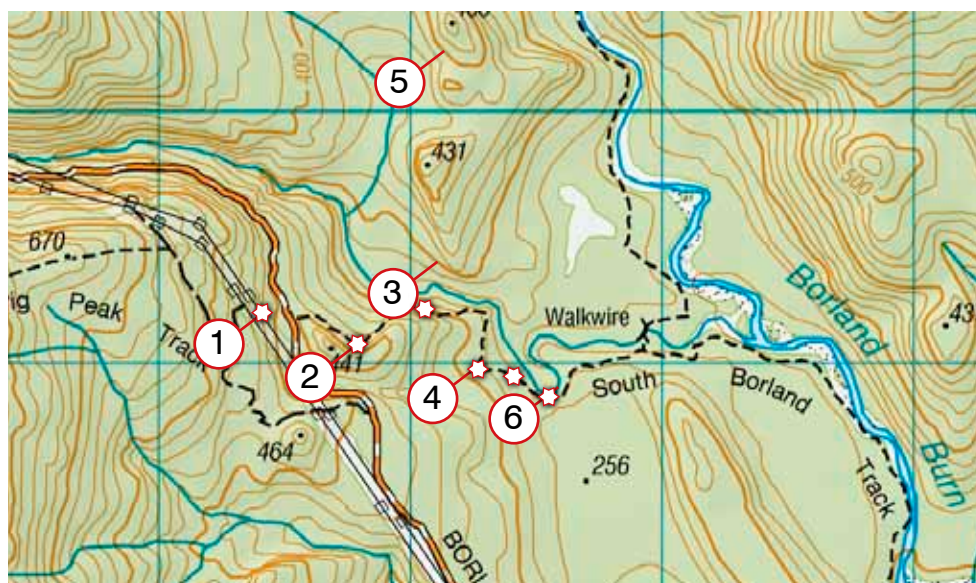
- 1] Give each group of students a Time travelling at Borland activity sheet and pen.
- 2] Ask groups to use the photographs to identify each site and choose a student or parent helper to read the text, ask the questions and record the answers.
- 3] The evening after the walk students can do the 'Rock Eaters' activity, using their observations during the walk to identify whether the sites they visited were made of igneous, metamorphic or sedimentary rocks.

What's that rock?


The climbing rocks are igneous, the sandstone bluffs, limestone bluffs and mudstone are all sedimentary, the river cliffs which are made up of water-worn igneous rocks.



page 12-13



Site locations

Each site used in the activity is marked above using the . The location of the topic they refer to are shown by the numbered discs.

Time travelling at Borland

120MYA



1 - CLIMBING INTO BEDROCK

GRANITE CLIMBING ROCKS – AROUND 120 MILLION YEARS OLD.

These climbing rocks are granite, a type of rock formed when magma (molten rock) is pushed from the Earth’s core towards the surface, but doesn’t break through. Instead of erupting like lava from a volcano, the magma cools slowly beneath the ground and crystalizes into granite. Sometime after these rocks were formed, the ground above them was broken and eroded and the granite became exposed, making a great place to practise handholds, belaying and abseiling.

When these rocks were forming, dinosaurs (and tuatara) walked the land above. New Zealand did not exist, it was still part of the supercontinent of Gondwana.

LOOK...

Look at how plants are managing to grow on the rock. Look for areas with no plants so you can see the bare rock.

ASK...

What does the rock feel like?
 What does it look like?

30MYA



2 - GRAB YOUR BOOGIE BOARD

SANDSTONE BLUFFS – AROUND 30 MILLION YEARS OLD

These sandstone bluffs were formed on the seafloor, close to a beach. They were on the seafloor for a long time, long enough for a great depth of sand to build up. The sand is made of small bits of eroded granite, worn into grains by millions of years of sun and ice, wind and water. The bluffs won’t collapse like a sandcastle because the grains are cemented together with lime and compressed by the weight of the rock above.

When this sandstone was forming, dinosaurs had been replaced by birds and mammals. New Zealand had broken away from the supercontinent Gondwana.

LOOK...

Look for different grains of sand, little stones of light-coloured granite, pieces of shell.

ASK...

What does the rock feel like?
 What does it look like?

30MYA



3 - SHELL STACKS

LIMESTONE BLUFFS – LESS THAN 30 MILLION YEARS OLD

Across the valley from here there are huge limestone bluffs. This limestone formed on the seabed millions of years ago. There is also limestone on top of the sandstone bluffs beside you, and there are a few limestone rocks down beside the track (how they get there?).

When this limestone was forming, the climate was really warm. Southland was subtropical and the forests were lush with palms trees and other exotic plants.

LOOK...

Look across the valley – can you see the pale limestone bluffs?

Look down – can you see chunks of limestone? Look closely and see if you can spot a shell fragment in the rock .

ASK.....

What does the rock feel like?
 What does it look like?

Time travelling at Borland cont...

20MYA

4 - MUDDY BOTTOM

MUDSTONE IN STREAM BED – AROUND 20 MILLION YEARS OLD

This mudstone was made from old New Zealand, back at a time when sea levels rose and the land sank and eroded and nearly disappeared under the sea. Soil washed from the submerged land and built up on the sea bed. Sometimes, when streams and rivers are low you can find broken mudstone containing small marine shells and the leaves and seeds of ancient plants. The mudstone is slowly softening back to mud as it is exposed to water and air. These delicate fossils are around 20 million years old.

By the time this mudstone was forming, what was left of New Zealand was home to bats, lizards, birds, invertebrates and...crocodiles!

LOOK...

Look for soft, slippery mudstone in the streambed. This mudstone may contain fossils.

ASK....

What does the rock feel like?

What does it look like?



8MYA

5 - UP THE MOUNTAIN

UPLIFTED LAND – LAST 8 MILLION YEARS

Fiordland's mountains are growing! The rock that forms them is being pushed upwards because, beneath the land, two pieces of the Earth's crust are in collision. As the Indo-Australian plate is driven alongside and under the Pacific plate, rock is forced upwards as well as down.

It's hard to imagine, but Fiordland didn't used to have mountains. And it didn't have alpine plants or animals. Over the eight million years it took the mountains to grow, a lowland parrot adapted to its home becoming colder. It is now the kea, the only alpine parrot in the world.

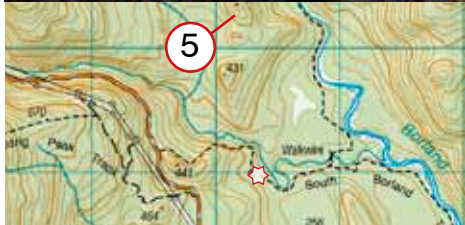
LOOK...

Look through the trees and across the river - can you see mountain peaks?

ASK....

These mountains grow 6mm a year but they get worn down too.

What could wear down a mountain?



2.4MYA - 13,000YA

6 - ICE CARVING

GLACIAL DEPOSITS – FROM THE ICE AGES, A 2.4 MILLION YEAR PERIOD, ENDING AROUND 13,000 YEARS AGO.

These river-side cliffs are made up of material that was once solid rock. During the ice ages, sheets of ice and glaciers ground rubble from mountainsides. Wild rivers of ice melt at the end of each ice age rounded the rocks and pounded gravel to powder. Lake Monowai and its surrounding valleys were carved by a massive glacier, but this valley was cut out by water. The river will continue to cut a deeper and deeper path through the stony and sands that melting ice dumped here. Eventually, it will reach bedrock, and its downward cutting will slow, but not stop.

The ice ages were another challenging time for New Zealand wildlife as large areas of forest were destroyed by ice sheets. Pockets of cold-tolerant plants like beech survived and eventually spread to become today's forests.

LOOK

Look down-river to see the stony cliffs.

ASK...

What is underneath the moss and tree roots we are standing on?



present day

#2 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science
Strand: Planet Earth and beyond
Substrand: Earth systems

Levels: **1 2 PEB ES**

Explore and describe natural features and resources

Levels: **3 4 PEB ES**

Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources

Learning intention

Students understand that there are three main types of rock and that they are formed by different processes.

Activity 2b - Rock eaters

Location

Hostel

Activity description

Students follow instructions and read a script to use Moro bars to demonstrate geological processes.

Materials

- Activity sheet (page 15)
- One Mini Moro bar (or similar layered chocolate bar) at room temperature and one square of greaseproof paper
- One mini Moro bar that has been completely melted and set (Tip - pop on a piece of greaseproof paper and use a microwave for a few seconds... watch closely!)
- One mini Moro bar for every student
- Plate
- Sugar
- Knife

Delivery

- 1] This activity can be delivered by a student or group of students reading the text and carrying out the actions on the recipe sheet.
- 2] Depending on the group, students can either watch the Moro bar demonstration, or they can all take part.
- 3] At the end, each student can have a mini Moro bar, but the first ones can go to the students who can answer these questions:

1. *What type of rocks do you think sandstone, siltstone and mudstone are?* Sedimentary
2. *What do you call rock that has been changed by being heated and compressed?* Metamorphic
3. *How does magma in the Earth's molten core become an igneous rock?* Volcanoes are one way that magma can reach the surface and become igneous rock.



page 15

Rock eaters recipe sheet

Instructions

1 Have the (soft) Moro bar, the extra Moro bars, the paper and plate for sugar on a table where your audience can see them.

2 Read the text and carry out the actions.

"All rocks are either igneous, metamorphic or sedimentary. This demonstration is going to show the difference between the three different types."

"All rocks, even the really hard ones, get worn down by frost and sun and rain until they are just tiny grains."

2 Use a teaspoon to sprinkle sugar onto the plate to demonstrate grains

"These tiny grains build up on the beds of seas, rivers and lakes until they become so deep that they get compressed and turn back into rock. Rocks that form like this are called sedimentary."

3 Unwrap the Moro bar and press the top surface into the sugar so that it sticks to the softened chocolate.

"Sedimentary rocks often have different layers because the grains they are made of have come from the erosion of different rocks at different times."

4 Cut the end off the Moro bar to show the layers including the grainy sugar layer on top.

"The sediments build up over millions of years and eventually the bottom layers get pushed down into the earth's crust."

5 Fold the greaseproof paper over the Moro bar and press down on it hard. Fold it over and squash again.

"The rock layers get heated and compressed which causes chemical changes. Rocks that have changed are called metamorphic."

6 Cut the end off the Moro bar again to show how the layers have changed.

"In the end, the rock at the bottom of the layers gets pushed down to become part of the earth's molten core and it gets completely melted. This molten rock is called magma. When bits of molten rock cool, they form igneous rock."

8 Hold up the melted mini Moro bar to demonstrate igneous rock.

"Rock keeps getting recycled from one type to another. This is called the rock cycle."



#3

Information notes 3

Southern beech forest

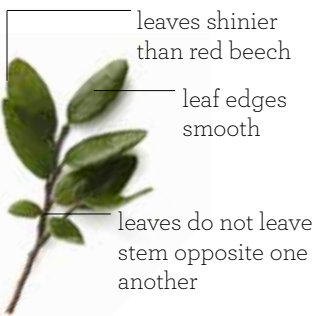
All life in the forest is connected

In a nutshell

Learn to identify native plants in the lodge grounds and discover links between these plants and native birds.

Stage a Borland beech forest quiz show and find out who helps to keep the forest healthy.

Identifying beech trees



mountain beech



silver beech



red beech

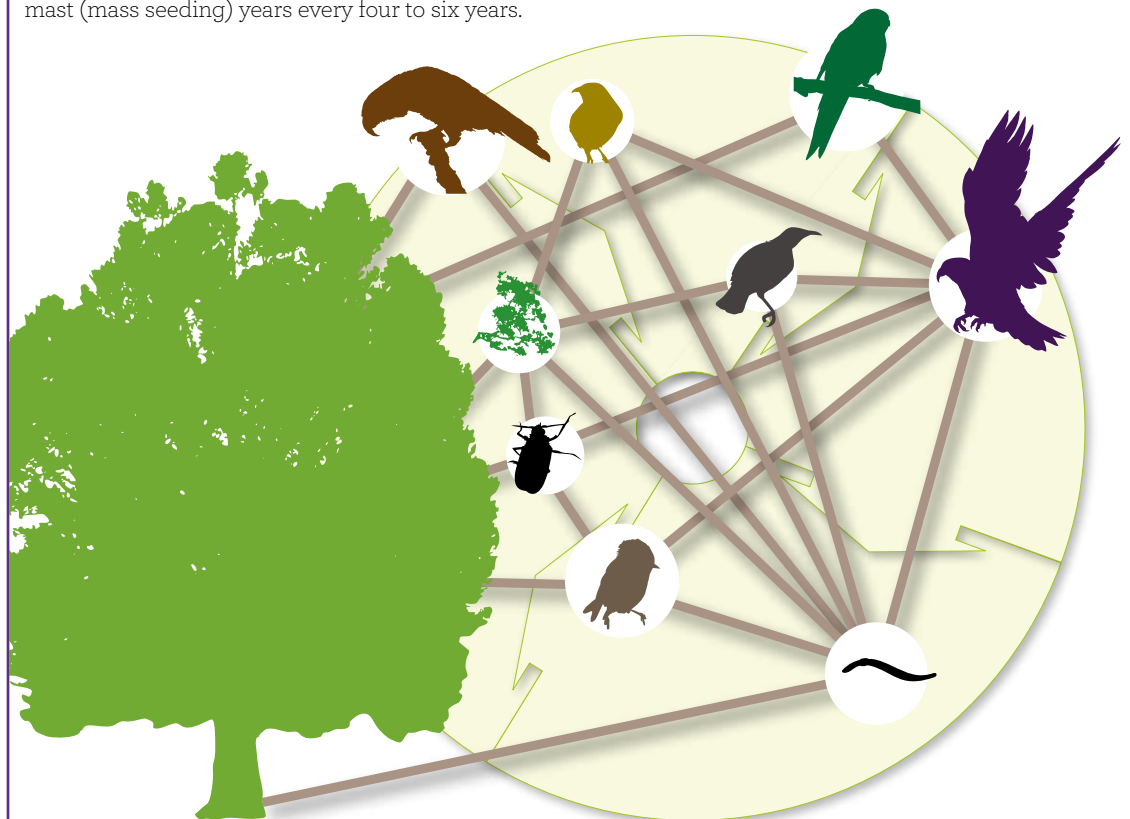
Southern beech

Beech trees form the main body of the forest that students explore while on camp at Borland. In their shelter, shrubs, ferns and mosses create an environment that supports a variety of native birds and insects. Here and there tall podocarp trees, the miro, mataī, kahikatea and tōtara, poke through the canopy and act as beacons to kererū and other fruit-eating birds.

Beech trees have a dynamic cycle of flowering and seeding that affects life in the forest. Instead of making seed every year, beech forest has mast (mass seeding) years every four to six years.

This irregular seeding saves the trees energy, and ensures that there will be more seeds than there are seed eaters! In the past, beech mast years were good news for forest wildlife, but today the seeds also feed mice and rats, which in turn feed stoats and weasels. The big increase in introduced pests caused by mast years is now one of the greatest threats native species face.

The following activities focus on the interconnectedness of life in the forest.



Balance

The beech forest food web is made up of thousands of different connections. These connections create an ecosystem which is in balance.

#3 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: **2** **LW** **EC**

Recognise that all living things have certain requirements so that they can stay alive.

Learning intention

Students recognise some native plants and understand why they are important to native birds.

Activity 3a - Lodge grounds plant hunt

Location

Outside - in the lodge grounds

Activity description

Students use ID cards to identify native plants and learn why these plants are important to birds.

Materials

- One set of plant ID cards per group
- Pen

Delivery

- 1] Send students out in groups to find the 12 plants on their activity sheets and answer the questions.
- 2] Gather the groups together and find out what they observed when answering the questions on their sheets.
- 3] Help the students reflect on learning by asking for answers to any of the following questions:



page 18-19

Question	Answer
Name one place that kiwi make their nests.	Beneath the roots of beech trees.
Name an insect that eats holes in kāpuka/broadleaf leaves.	The caterpillar of the brown evening moth.
What foods would a tūi get from a pikiraki/mistletoe plant?	Nectar and berries.
What helps houhere/ribbonwood seeds get away from the shadow of the tree they come from?	Little wings.
Which native bird eats the birds that feed on beech tree seeds?	The kārearea/falcon.
Name one bird that eats the flowers of the wineberry.	Kererū or kākārīki.
Which plant produces an oil that kākārīki use to clean their feathers?	Mānuka.
Name one or more birds that nest in holes in trees.	Mōhua, ruru, kākā and kākārīki.
Name three birds that drink the nectar and eat the berries from pikiraki /mistletoe plants.	Tūi, korimako/bellbird, kākā.
Why is a tētēaweka/tree daisy a useful plant for birds?	Because it attracts insects.
What bird eats the leaves of kōwhai trees?	Kererū.

Plant hunt



Red beech/tawhairaunui *Fuscopora fusca*
Red beech are the longest lived of the three types of beech that grow in Fiordland. Old beech trees usually have holes high in the trunk. These holes make great nests for birds like mōhua, ruru, kākā and kākānki.

Walk through Dainty's Way and you will find a red beech, a silver beech and a mountain beech.

What differences can you see between the barks of these three different types of beech?



Broadleaf/kāpuka *Grissilinia littoralis*

Kererū eat the leaves and berries of this tree. Other birds including tūi just eat the berries.

The caterpillar of the brown evening moth eats holes in kāpuka leaves.

Can you see any holes?

Can you see any caterpillars?



Mountain beech/tawhairauriki/tawai

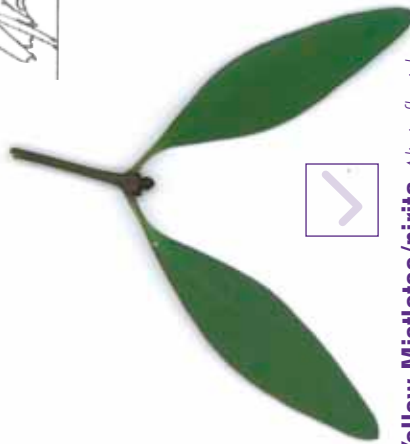
Fuscopora cliffortioides

Beech trees make a lot of seeds. Seed-eating birds feast on the seeds, and bird-eating birds like native kārearea/falcons feast on the birds!

Beech seeds grow in small cases that drop to the ground when ripe.

Look in the leaf litter beneath the tree.

Can you find any?



Yellow Mistletoe/pirita *Alipis flavida*

To find this plant, look up into the branches of the mountain beech tree growing beside a cabbage tree near the hall.

This rare plant brings life to the forest. Its flowers and berries attract birds that also eat insects that can harm the beech tree on which the mistletoe grows. Tūi, korimako/bellbird and kākā come to the forest to find mistletoe.

Look carefully at the mistletoe, where do its roots go?



Silver beech/tawhai *Lophozonia menziesii*

Kiwi nest in burrows beneath large forest trees like silver beech. The kiwi find natural hollows and use their powerful feet to dig them deeper.

Why do you think these trees are called silver beech?



Scarlet Mistletoe/pikiraki *Peraxilla colensoi*

To find this plant, walk through Dainty's Way and look for red beech trees. Can you spot leaves like this one growing from a red beech tree?

This plant's flowers and berries attract birds that also eat insects that can harm the beech tree the mistletoe grows on. Tūi, korimako/bellbird and kākā come to the forest to find mistletoe. Scarlet mistletoe leaves look like broadleaf leaves.

Look at both plants.

What colour are the leaves and stems?

Where do the plant's roots go?

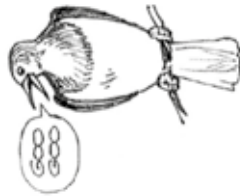
What pattern do the leaves come off the stem in?

Plant hunt



Wineberry/makomako *Aristotelia serrata*
 Kererū, kākā, tūi, korimako/bellbird and kākāriki all eat the berries of this plant. Kererū and kākāriki eat the flowers and leaf buds too.

Can you see flowers or berries on the tree? What about leaf buds?



Ribbonwood/houhere/houhi *Hoheria populinea*
 Native bees, flies, moths, beetles and butterflies visit this plant when it is in flower.

They come to the flowers to drink the nectar and eat the pollen.

Piwakawaka/fantails are an insect-eating bird that this plant attracts.

Does the tree have flowers? If so, what colour are they? Look for seed cases: can you see the little wings that help the seeds to float away from the tree?



Kōwhai/kōhai *Sophora microphylla*
 Kererū feed on the new leaves of kōwhai in spring and early summer.

Tūi, korimako/bellbird and kākā come to the kōwhai to drink nectar from its yellow flowers.

Can you see any seed pods hanging on the tree? Each bump on the seed pod contains a seed. How many bumps do the seed pods have?



Tree daisy/tētēaweka *Oleria cheesemaniai*
 Native bees, flies, moths, beetles and butterflies visit this plant when it is in flower.

They come to the flowers to drink the nectar and eat the pollen.

Miromiro/tomtits are an insect-eating bird that this plant attracts.

Describe what the underside of a tree daisy leaf looks and feels like.



Mānuka *Leptospermum scoparium*
 Kākāriki/parakeets eat the seeds of this plant. They also use their beaks to squeeze oil from the leaves. They use the oil to clean their feathers.

Mānuka flowers attract lots of insects, especially native bees and honey bees. Native bees are very small and do not sting.

Carefully pick a mānuka leaf and crush it. How would you describe the smell of the crushed leaf?



Celery pine/tanekaha/toatoa

Phyllocladus alpinus

This small tree grows nut-like fruit that kākāriki, kākā and kea eat.

Bury your nose in the leaves. What can you smell?



#3 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: **2** **LW** **EC**

Recognise that all living things have certain requirements so that they can stay alive.

Learning intention

Students understand why native species are more beneficial to the health of the forest than introduced species.

Students recognise some of the adaptations that help different species survive.

Extension activities

Come up with some extra script for the game show host so that you can include a human character in team B. What extra questions could you add to the script to reflect ways in which humans can help or harm the forest (for example, humans can light forest fires, or put forest fires out)? You'll need to write in an extra native species for team A too.

Activity 3b - Borland beech forest quiz show

Location

Indoors

Activity description

Two teams of students use information cards to answer questions in a game show-style activity that demonstrates which species help to keep the forest healthy.

Materials

- Tables and/or chairs
- Contestant cards (pages 21-25)
- Presenter 'script' (pages 26-27)
- Improvised/imaginary buzzers to press
- Score board and pen
- You may wish to make name cards or badges so that the audience can identify contestants
- You will need:
 - two teams of five contestants each
 - an adult or older student game show host (ideally someone who can 'ham it up')
 - a score keeper
 - an audience!

Delivery

- 1] Set up tables and put out name cards and buzzers for contestants
- 2] Give each team member a contestant card; this is their character. Allow contestants a minute to think about how they will introduce themselves.
- 3] Explain that they must look at their card to find the information they need to answer the questions put to them by the game show host. When they think they know an answer they must press their 'buzzer' (and buzz!) before giving their answer. Contestants who press the buzzer, buzz, and answer the question correctly get a point as directed in the script.

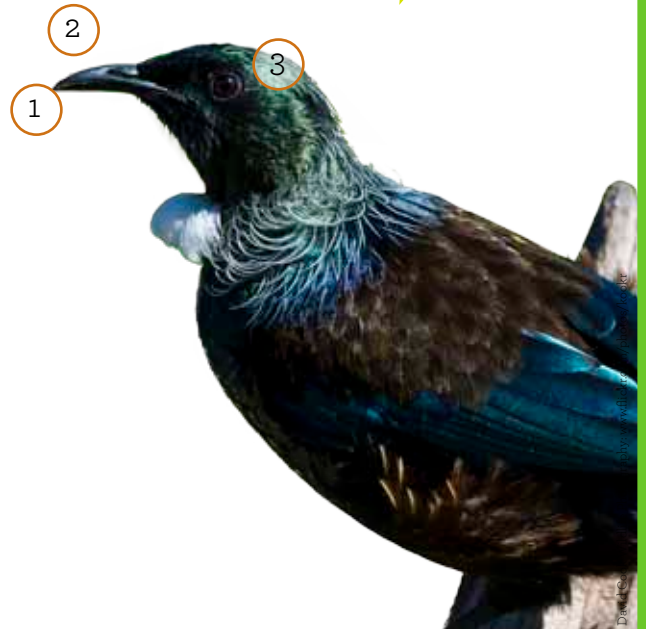


page 21-27

BEECH FOREST QUIZ

Tūī

- Hairy tongue** – A long, feathery tongue helps tūī lap nectar from flowers. While the tūī is drinking, pollen sticks to its beak and **pollinates** the next flower the bird visits.
- Sharp beak** – This sharp beak is handy for snapping up **small** and large **insects** including caterpillars and borer beetles, and for plucking berries. Tūī eat berries but can't digest the **seeds**, which pass through the gut and land on the forest floor with a little splat of fertiliser.
- Colour vision** – Tūī eyes can see more colours than human eyes. Flowers, berries and bugs look more brightly coloured to a tūī than they do to a human.



BEECH FOREST QUIZ

Miromiro/Tomtit

- Sharp** – The miromiro's small pointed beak is great for catching small insects and plucking **berries**.
- Large** – Big, round eyes help spot prey like **spiders**, **caterpillars**, borer beetles and **moths**.
- Loud** – A loud, clear call (ti-oly-oly-oly-ho!) helps the male defend his territory from other males.



BEECH FOREST QUIZ

Kererū

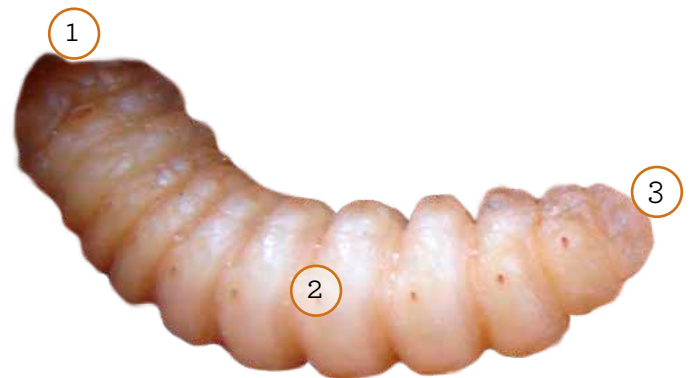
- Small head, big gape** - A kererū's mouth (inside its beak) is its gape. The kererū's gape is larger than the gape of any other forest bird. The kererū's big mouth means it can swallow the large fruit and spread the seeds of forest trees.
- Storage tank** - Kererū have a crop, which is a sort of storage tank for food. Kererū can stuff themselves with berries until they are too full to fly, but they will never get indigestion because the crop is just a holding place for food. The crop releases food to the stomach a little at a time.
- Strong wings** - The kererū's strong wings make it very valuable to the 70 or so plants that need their seeds spread by birds. Kererū will also hit out with their wings to defend themselves.



BEECH FOREST QUIZ

Huhu Grub

- Nippers** - Large, sharp jaws are used to bore tunnels through dead wood.
- Helpers** - A gut full of helpful microbes helps the huhu to digest dead wood.
- Huhu poo** - Frass is woody bug poo and is great compost.



BEECH FOREST QUIZ

Noke/worm

1. **Fuzzy wuzzy** – Tiny bristles help the worm move forward through the soil.
2. **Gummy** – Instead of teeth worms have lots of mouth muscles for ‘chewing’ up dead leaves and wood, possum droppings and other waste and turning it into **compost** that plants can use.
3. **Tummy** – Worms have a stomach-like organ called a gizzard. The gizzard has tiny stones in it to help worms grind up and digest **dead wood**.



BEECH FOREST QUIZ

Contestant card

Ship's rat

1. **Sharp** – Chisel-like teeth help rats nibble **berries** and **seeds**, crunch up **small** and large **insects** including caterpillars and borer beetles, gnaw eggshells and bird and mouse bones.
2. **Twitchy** – Long, moveable whiskers help the rat feel its way in the dark.
3. **Dainty** – Small paws help rats groom their friends. Grooming is an important activity for social animals like rats.



BEECH FOREST QUIZ

Contestant card

Possum

- Sharp teeth** - The possum's sharp front teeth or incisors nip off seedlings, strip bark, and kill small birds and large insects like weta. Further back in the mouth, molars crush food like flowers, eggs and berries. Most seeds escape crushing and pass through the possum's gut unharmed.
- Grippy tail** - The naked underside of a possum's tail helps it to grip branches. Tails like this are called prehensile.
- Baby pocket** - Female possums have a pouch where the baby possum or joey can grow. Having a pouch makes possums marsupials, like kangaroos.



JJ Harrison

BEECH FOREST QUIZ

Contestant card

Deer

- Strong teeth** - The deer's front teeth or incisors crop grass, seedlings, leafy twigs, flowers and berries. Further back in the mouth molars crush food but most seeds escape crushing and pass through the deer's gut unharmed.
- Long legs** - Long legs and a long neck allow deer to stand on their hind legs and reach up high to browse leaves and bark, and also reach down low to feed on the forest floor.
- Powerful voice** - The sound of a stag's roar travels many kilometres. This helps the stag attract mates and defend its territory.

1

3

2

U.Sonnenberg

BEECH FOREST QUIZ

Contestant card

Pig

- Strong snout** – Pigs dig with their snouts, rooting out tasty roots and tender seedlings.
- Super power** – Pigs have an amazingly good sense of smell. Great for sniffing out fallen fruit and large insects like grubs and juicy weta.
- Weapons and tools** – Males have tusks which help with digging and fighting. Both males and females have molars to crush leaves, flowers, fruit, bones and eggshells. Most seeds escape crushing and pass through the pig's gut unharmed.



G Roberts

BEECH FOREST QUIZ

Contestant card

Mouse

- Sharp** – Chisel-like teeth help mice nibble berries and seeds and crunch up small and large insects including caterpillars and borer beetles.
- Large** – The shape of a mouse's ears help it to listen out for predators like rats, stoats and owls.
- Long** – A long slender tail gives the mouse great balance when climbing.



George Shuklin

Beech forest quiz



Host: *(To audience)* Welcome to the Beech Forest Champions Game Show. We are here tonight to find out which team does the most to keep their beech forest home healthy. ★

Host: *(To contestants)* Contestants, please introduce yourselves
Each contestant can now say something (anything!) about their character.

Host: Contestants, the rules are simple. If you can answer the question, press the buzzer and make a buzzing sound.

Here is the first question.

Kōtukutuku/tree fuchsia is a beautiful forest plant. It has pretty flowers and tasty fruit. The more fuchsia plants a forest has, the more birds will live there and this is the sign of a healthy forest. BUT, if the pretty kōtukutuku flowers are not pollinated they won't make seeds, and without seeds, no more fuchsia plants will grow. Can YOU pollinate flowers?

Tūi is the only contestant who can pollinate flowers so only tūi can press the buzzer.

Host: Correct! When you drink nectar from the flowers, you pollinate them. Tūi, what helps you to drink nectar from the flowers?

Tūi names an adaptation that helps it to drink nectar from flowers.

Host: Thank you tūi – 1 score to team A!

1	0
TEAM A	TEAM B

Host: Question number two. ★

Forest trees can live for hundreds of years, but eventually they will crash to the forest floor. BUT, dead wood can't just lie there forever, taking up space.

Can YOU help to get rid of dead wood?

Huhu grub and worm can both eat dead wood so they can both press the buzzers.

Host: Thank you huhu and worm. What helps you to eat something as hard to digest as dead wood?

Huhu and worm name an adaptation that helps them digest dead wood

Host: Well done huhu and worm, 2 more points to team A.

3	0
TEAM A	TEAM B

Host: Question number three. New trees and shrubs need to grow to replace old ones, or the forest will eventually disappear. ★

Some types of trees and shrubs cannot grow unless their seeds are carried away from the shade of the parent plant. Fuchsia, peppertree and miro are three trees that hide their seeds inside fruit to get them taken to new places. Do YOU like fruit?

Possum, deer, mouse, rat, pig, kererū, tūi, and miromiro/tomtit all like fruit, so all can press their buttons for the first question.

Host: 3 to team A, 5 to team B

6	5
TEAM A	TEAM B

Host: But wait, you like fruit, but if you nibble the seeds, that is not good news for the plants. ★
(to audience) Audience, why is it not helpful to a plant if its seeds get eaten?

Audience responds (if the seed gets eaten they can't germinate/grow)

Host: *(to contestants)* Put your hand up if you nibble seeds.

Mouse and rat put their hands up.

Host: Mouse and rat, what do you have that helps you nibble seeds?

(Mouse and rat name an adaption that helps them nibble seeds)

Host: Thank you mouse and rat. Right then, press your buzzer if you eat fruit, but don't nibble seeds.

Possum, deer, pig, kererū, tūi and miromiro/tomtit can all press their buzzers.

Host: Well done, contestants! 3 three points to team A, 3 points to team B.

9	8
TEAM A	TEAM B

Beech forest quiz - continued

Host: And which of these contestants likes to eat seedlings? (turns to audience)
Audience, help out our contestants by reminding them what a seedling is.

Audience responds (a seedling is a young plant / baby plant / plant that has not long germinated from a seed).

Host: Thank you. So, put your hand up if you eat seedlings.
(Pig, deer, and possum all eat seedlings, so put their hands up.)

Host: I will award extra points to contestants who eat fruit but do not nibble seeds and do not eat seedlings.

(Kererū, tūī and miromiro/tomtit do not nibble seeds or eat seedlings so can press the buzzers).

Host: 3 hard-won points to the team A.

5

12 8
TEAM A TEAM B

Host: Next question. Contestants, trees make food from sunlight through a process called...
(turn to audience) can anyone help me here, what is the name given to how plants make food from sunlight?

Audience responds (photosynthesis).

Host: Ah, thank you. Photosynthesis. Photosynthesis makes sugar, but plants need more than just sugar to survive. They also need nutrients that come from the compost-like part of the soil. Can YOU make compost?

Worm and huhu are the only two contestants who can make compost. The others all make poo, but that needs to be broken down before it can feed the trees.

Host: Worm and huhu, remind us how you can break down dead wood and turn it into compost.
Worm and huhu explain.

Host: Well done, 2 more points to team A.

6

14 8
TEAM A TEAM B

Host: (to audience) Insects and other invertebrates do some really useful things in the forest, and in our gardens. What are some of the good things they do?

Audience responds (worms make compost and aerate the soil; bees pollinate; maggots get rid of dead and rotting things)

Host: Thank you audience. But insects can also cause harm. There are insects that eat beech trees. Beech moth caterpillars eat the leaves and lemon borers drill into the living wood. If there were too many of these insects in the forest then beech trees could die. Our final question today is... Do YOU eat the caterpillars and borer beetles that harm beech trees?

Mouse, rat, tūī and miromiro/tomtit all eat small insects so can press the buzzers.

Host: Amazing! Tomtit, what helps you catch these insects?

Miromiro/tomtit names an adaption that helps it catch small insects.

Host: Splendid! We have the last scores to add to our board. We have 2 points to team B ...and 2 to team A giving us a final score of..

Score keeper: Team B - 10 points. Team A - 16 points.

Host: We have a winner!

(The crowd goes wild!)

7

16 10
TEAM A TEAM B

#4

Information notes 4 Predators and competitors

Upsetting the balance of life in the forest

In a nutshell

Enjoy stories, find out how to 'read the forest' and understand the impact of introduced species.

Some New Arrivals – a timeline of animal introductions

1280 – First ecological and archaeological evidence for kiore and kurī.

1769 – Norway rat and domestic cats arrive with Captain James Cook's ship the Endeavour.

1769 – Two pigs are gifted to Māori in Northland by French explorer de Surville.

1777 – Domestic rabbits liberated on Motuara Island in Queen Charlotte Sound by Captain James Cook.

1824 – House mice reach Ruapuke Island after the wreck of Henrietta. Mice become locally known as 'Henriettas'.

1850s – First release of wild rabbits in the South Island.

1858 – Australian brushtail possums released into forest at Riverton in Southland.

1870 – A pair of hedgehogs are liberated in Canterbury.

1879 – First ferrets released.

1851 – First release of red deer. First deer released in Fiordland at Hope Arm, Lake Manapouri in 1913.

1885 – Stoats and weasels released at Lake Wakatipu in Otago.

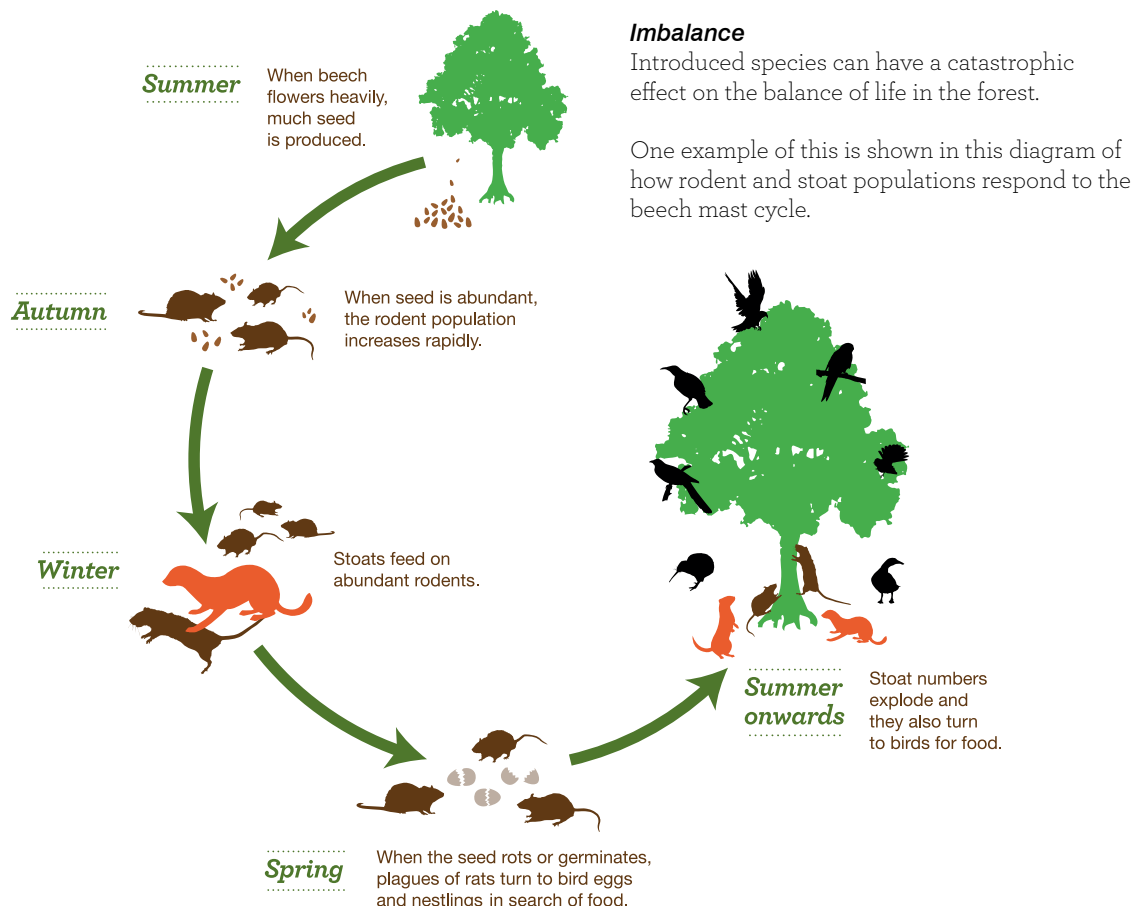
1890 – Ship rats begin to spread outward from South Island port areas.

Predators and competitors

When the Polynesian ancestors of Māori arrived in New Zealand they brought with them kiore and kurī, the Polynesian rat and dog. The dogs stayed with the people, but the kiore went bush, bred and quickly wiped out several species of land-nesting seabirds. The land lost the benefit of the guano (fishy bird poo) fertilizer and the kiore became New Zealand's first introduced pest. Hundreds of years later, other, larger rats arrived with European explorers, whalers, sealers and settlers. These rats were stowaways, but many other animals were brought to New Zealand deliberately. Europeans brought animals to New Zealand to trade with Māori, to farm, to provide transport, to hunt,

to remind them of home, and as companions. They introduced bumble bees to pollinate clover, German owls to hunt birds that were damaging crops, and trout for fishing.

Some of the animals we introduced have become predators or competitors to native species and are having a disastrous effect on the health of our forests. In the forests around Borland, hunting helps to control deer and possums, and the trapping of stoats and rats gives protection to birds near the lodge.



#4 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: 1 2 LW EC

Recognise that things are suited to their particular habitat

Levels: 3 4 LW EC

Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced

Learning intention

Students learn to read signs that reveal information about life in the forest.

Extension activities

- Red, scarlet and yellow mistletoes are on New Zealand's endangered plant list. These small shrubs are parasitic to beech trees, but actually improve the health of the forest by supporting birdlife. Six host trees have been tagged so that schools can monitor the health of plants using a monitoring sheet for each tree (see page 41). By keeping an ongoing record of plants, schools may be the first to notice and improvement or decline in mistletoe health. Schools can also create a monitoring project with Nature Watch NZ, a website set up to enable groups and individuals to record what they see in nature, meet other nature watchers and learn about the natural world (see Supporting resources page 56).
- Borland deploys DOC 150 traps to protect birds on the predator trail. Schools wanting to take action to protect birdlife at Borland could look at investing in Goodnature traps. These traps automatically reset up to 24 times. Visit www.goodnature.co.nz to learn more about this technology.

Activity 4a - Predator trail tales

Location

A one kilometre track beginning at the start of the Burnt Ridge Track behind the lodge and returning to the lodge along a track parallel to the road.

Activity description

Students walk the 1 kilometre predator trail and identify a variety of sites that have a story to tell about the forest.

Materials required

- Activity story book sheets.
- Optional - Tracking tunnels, pitfall traps, bait and tool for traps.

Delivery

- 1] The forest has a story to tell at each of the ten stoat trap markers along this trail. Ask a student or parent helper to read the story at the site.
- 2] Have students identify the plants by the photographs that accompany stories.
- 3] Each of these plants can be found in the lodge grounds so you may want to challenge students to find and name the plants when you finish the predator trail.

NB Stories could also be read before or after the walk, and only the activity "Reading the forest - what can you see?" done at the site.

For the extension activity, use the "Pikiraki/Mistletoe Health Monitoring" activity sheet on page 41.

Checking traps

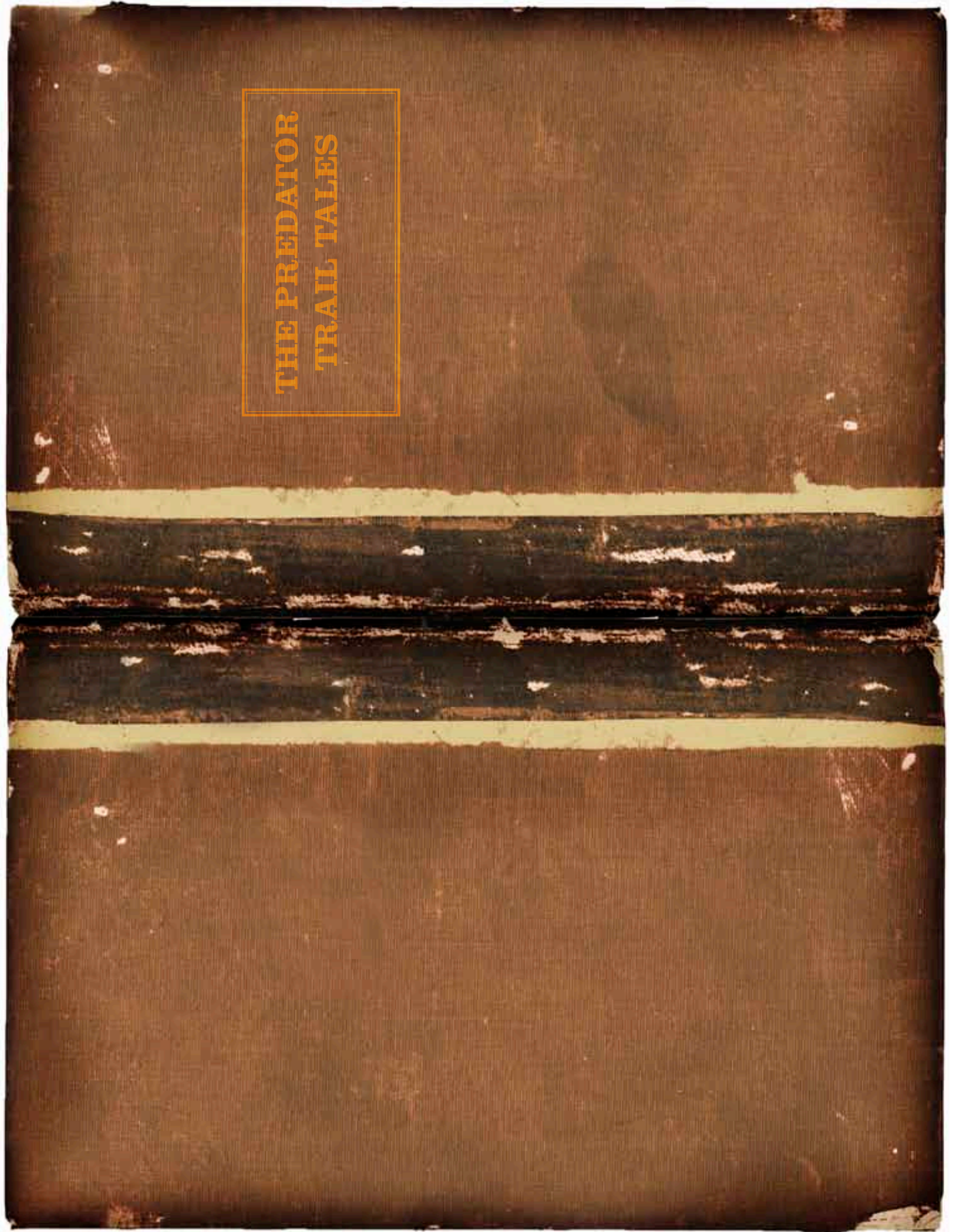
Traps may be checked and possibly re baited (please see Borland Lodge Manager).

Why not make tracking tunnels to record the inky footprints of small animals, or set pit fall traps to see what insects you catch overnight? Instructions on how to make tracking tunnels and pit fall traps are available on the Department of Conservation website (see appendix for links).



page 30-40

Predator trail tales



Predator trail tales - 2

1 - The mystery of mistletoe

At stoat trap marker number one look for these leaves. Hört, look up!



Pikiraki/scarlet mistletoe flowers

Once upon a time our beech forests blazed red and orange with mistletoe flowers every summer. Tūi and korimako guzzled nectar from the flowers while tautou, the silvereye, gazed on enviously. Tautou hadn't learnt the trick of twisting the closed flowers to make them pop open. In the autumn, the birds feasted on mistletoe berries and fattened themselves up for the long winter ahead.

Then one dreadful day, stoat arrived. Stoat and his family killed all the tūi and korimako in the forest, and there was no one left who knew the secret to opening the flowers. The mistletoe plants carried on flowering, but the flowers were never opened, so they were never pollinated and never made seeds, and no new plants grew.

The next arrival was possum. Possum and her family ate the mistletoe plants, down to the very last leaf. The forests no longer blazed red and orange in summer and the birds no longer sang. Instead, the forests stayed green and quiet all year, except for some special South Island places, like Borland.

Reading the forest - what can you see?

How many of these rare plants you can spot as you walk the tracks around Borland?

Can you spot where this plant's roots go to get water?

Do the plants look healthy, with lots of leaves?

If they do, the forest is telling you that there aren't too many possums around.

If you see little mistletoe plants as well as large ones, the forest is telling you that there are enough birds around to spread the mistletoe seeds.



Pikiraki/scarlet mistletoe

Predator trail tales - 3

2- The story of stoats

At stoat trap marker two look for the stoat trap.



The story of the stoat might have begun 150 years ago, when a farmer and his family sat down to a dinner of stringy weka stew and wished it was rabbit stew instead. The family had always eaten rabbit stew when they lived in England, but New Zealand didn't have any rabbits. They weren't the only family missing rabbit meat, and soon the ships that brought settlers to New Zealand were carrying rabbits as well.

The rabbits were released onto the farmland. They liked it! There were no foxes, or ferrets or stoats to eat them. At first people were glad to have rabbit back on the menu (and the wekas were probably glad too) but very soon there were too many rabbits and they were eating the pasture that the sheep and cattle needed. What could be done?

Cages of ferrets and stoats were shipped across the oceans. These animals ate rabbits at home in England, so surely they would eat rabbits in a new land.

At first, stoats hunted and killed the kicking biting bunnies, but when they slipped into the forest they found birds that sat in nests on the ground or in holes in trees like dinner served up in a bowl. The stoats made the forest their new home.

Reading the forest - What can you see?

Look in the trap. Provided the trap is baited with a fresh egg and some meat, it will attract a rat or stoat. So, if there are no rats or stoats in the trap there are unlikely to be any rats and stoats nearby. A well baited empty trap tells you that this part of the forest is a safer place for birds right now.

If you are not clearing and re-baiting the traps, students can still peer inside to see if anything has been caught.



(Squ)EEK!

Weasels and mice are tiny and can skip over the traps without setting them off. These small predators have huge impacts in the forest.

Predator trail tales - 4

At stoat trap marker number three look for the large trees with leaves like this.

3 - Feast and famine in the forest



Tawhai/silver beech

One year all the beech trees in the forest made seeds. The trees made so many seeds that the mice and rats that lived in the forest woke up one morning to find a carpet of food spread across the forest floor. With so much food to eat, all the mouse and rat babies quickly grew into strong and healthy adults and soon had families of their own. The stoats that lived in the forest couldn't believe their luck as they feasted on the easy-to-catch rodents! The female stoats all had big litters of stoat pups which grew up fast and left home to find their own way in a world where there was plenty of food.

But, one day, the seeds ran out. They'd all been eaten, or had sprouted roots and shoots and grown into tough little seedlings. Without seeds to eat, the mice and rats became hungry and stopped having families. The rats began to eat the mice, and the stoats carried on eating them both... until only a few very quick and clever rodents were left.

Suddenly, the feast had turned into a famine. What could the hungry stoats do? They began to eat the birds.

Reading the forest - what can you see?

Are there seeds on the ground? Are there a lot of seeds, only a few or none at all? If you can see a lot of seeds, the forest is telling you that there's plenty of food around for mice and rats, so it is time to put out the tracking tunnels and check the traps!



Predator trail tales - 5

Reading the forest - What can you see?

Horopito can tell you that there were once a lot of deer here, but it can tell you something else as well... rats and mice eat horopito seeds. When there are a lot of mice and rats in the forest they eat all the seeds and no new plants grow. Look for horopito seedlings (baby plants). Can you find any? What do you think the forest is telling you if you see lots, or none at all? Try nibbling a horopito leaf to find out why deer don't like it.



At each trap marker number four look for plants with leaves like this. These are horopito or pepper trees.

4 - Oh deer!



Horopito/pepper tree

Long ago, this area of forest looked very different to the way it does today. It was like a jungle with lots of different plants with different sizes and shapes of leaves and different flowers and berries. Then one day, about 100 years ago, deer were released in Fiordland. The deer ate all the plants that they liked and when these had gone, they ate the plants they didn't like. There were just a few plants that they really didn't like and horopito was one of them. This is why horopito is one of the most common small trees in the beech forest today.

The deer have done a forest makeover, changing the forest understorey from many types of plants to just a few. The horopito have done a forest takeover, so even though there are fewer deer now, it will be hard for the other plants to come back.

Predator trail tales - 6

At each trap marker number five, look for the fenced area.

5 - Forest trails



In ancient New Zealand, before humans arrived, the only really large creatures to tread through this forest were moa. Kiwi and kākāpō lived here, and takahē came into the forest in winter to dig up the roots of the summer green fern. Trails formed in the forest where they walked, but birds walk carefully and the paths were narrow. All of these birds have disappeared from this forest, and moa have disappeared from all forests, forever. Today, people and deer are the largest creatures to walk here and the impact of our feet and hooves can be seen by comparing the forest floor inside the enclosure to that outside the enclosure as you follow the path from marker number 5 to marker 6.

Reading the forest - What can you see?

The message is clear, the forest is telling us that plants struggle to grow where the ground is trampled.



Look at the forest floor outside the enclosure, you may see deer droppings.

Predator trail tales - 7

Reading the forest - What can you see?

Look at the 'starvation soil' revealed by the uprooted tree. It's telling you that this is hardscrabble land, best left to the beech trees. Dig a finger into the soil at your feet and feel the mesh of roots crowded into the thin layer of humus just below the leaf litter.



Dark humus soil



Nutrient starved soil

6 - The secret's in the soil...
Between winter 6 & 7 a fallen tree has been cut to clear the track. Look at the soil at the base of this tree.



Sometimes, the most common plants in a forest are the plants that browsing animals like deer don't like to eat. Deer don't like to eat beech trees, but that's not the reason that nearly all the trees in mountain forests are beech. There's a much bigger story. The soils decide what type of forest can grow. Mountain soils are made of ground down rock. They are starvation soils, with very little food in for plants. They are often shallow soils, with solid rock not far below the surface. Beech trees survive in these soils because they have shallow, spreading roots that stay near the surface to recycle leaf litter back into food. Beech trees also have a partnership with fungi which grow on and in the tree roots, swapping minerals that the fungi collect, with sugars that the tree makes.

Predator trail tales - 8

7 - Tell tales

At each trap marker seven look down the bank for plants with leaves like these (these plants are among the very few natives to be deciduous so in winter look for shrubs with bare branches).



It must be wonderful to be a possum. If you are a possum you can eat exactly what you want, whenever you like. No one tells a possum that it should eat a balanced diet. A possum not only eats dessert first, it eats dessert all the time! Possums eat bird's eggs and chicks and insects, but most of their diet is made up of leaves, buds and fruit. Possum hunters know what plants the possums like best. These plants are called indicator species which means types (species) of plants that show (indicate) that possums are around. How healthy these 'tell-tale' plants are gives us a clue as to whether there are possums around.

Possums were brought to New Zealand from Australia to start a fur trade but they have become one of our most serious pests. Luckily for Borland, they don't eat beech trees.

Reading the forest - What can you see?

There are two indicator species among the plants growing down the bank. If you can see kōtukutuku/tree fuchsia and makomako/wineberry then the story is a happy one - there aren't many possums around!



Kōtukutuku/tree fuchsia



Makomako/wineberry

No leaves?

These two trees are two of only five native deciduous trees - they may lose their leaves in winter.

Predator trail tales - 9

Reading the forest - What can you see?

The moss that covers the ground here tells us that there are no starving deer, and that people are staying more or less on the tracks. There are at least five different types of moss growing here, see if you can find them.



*At stand trap marker number 8
compare this photograph with the
forest around you.*

8 - The cupboard was bare ...



A lot of people were very excited when the first pair of red deer were brought to New Zealand from Scotland in 1821. One person was too excited, and shot the doe. The red deer population of New Zealand dropped to one. In the 1850s, more deer were introduced and this time they survived. In a surprisingly short time they became a pest. Between 1932 and 1954 as many as three million deer were shot. This photo was taken in the 1970s, when deer numbers were still very high in Fiordland.

There were not enough plants in the forest to keep so many deer healthy. The deer were starving so they ate not only the shrubs and ferns, but the moss and fallen leaves and the bark off the trees as well. This was a disaster for the forest, there were no plants to feed the birds, and no leaf litter to feed the trees, and no moss to protect the soil from washing away. It was a disaster for the forest and it was a disaster for the deer. Many of the deer died, and now the forest has recovered.

Predator trail tales - 9

At stant trap marker number 9,
look for the dead-standing tree trunk.

9 - Kākā clues



© Leon Bevard

South Island kākā

Long ago there was more din in this forest than the noisiest school group could make. It was a forest bursting with birds, all noisily competing with each other for territories food and mates. The noisiest of all was kākā, the crazy cousin of the clever kea. Back then, kākā gangs came to Borland to demolish rotten tree trunks as they hunted for grubs. They mobbed flowering harakeke/flax to scull the nectar, hung upside down like pekapeka/bats to pick berries from branch tips, bounced from bush to bush nipping off buds, and talked with their mouths full the whole time. They squawked and warbled and fluted and whistled and all the small birds in the forest tagged along to catch insects disturbed by the ruckus.

Kākā don't stay in one place, they travel. Like early Māori, they have mahinga kai, or food gathering routes and they move from place to place as different plants come into flower or berry. Once, when there were more kākā and fewer stoats, this forest was part of their mahinga kai. One day, when the predators that kill them are under control, they will be back.

Reading the forest – what can you see?

If you're here when the kākā return, you'll hear them! If not, you can still keep a look out for clues that they have been. Look at the standing rotten tree trunk. If there are kākā using the forest they will visit trees like this one and use their powerful beaks to dig out grubs living in the rotten wood. Is there a ring of rotten wood scattered on the ground at the base of the trunk? Then the kākā are back!



© Judd Lapsley Miller

Predator trail tales - 10

10 - Look behind you...

At least trap maker number ten...

Ever get the feeling you're being watched? Imagine that you are walking here six hundred years ago. Suddenly, you have the feeling that eyes are upon you. Your blood runs cold as you realise that the forest around you is quieter than it should be. You're standing in a pool of silence, while the rest of the forest is loud with birds. Your skin prickles and you look up, because you know the greatest danger comes from above. If you're lucky, you see the nightmare bird, a gigantic eagle, in time. If you're lucky, you live to tell the tale.

Just because there didn't used to be stoats and ferrets and cats and dogs in New Zealand, doesn't mean there were no predators. New Zealand was home to one of the most terrifying predators the world has ever seen. It was the giant pouākai or Haast's eagle, a bird large enough to prey on human children. Its natural food was moa, and when these giant birds were hunted to extinction, the pouākai also disappeared.

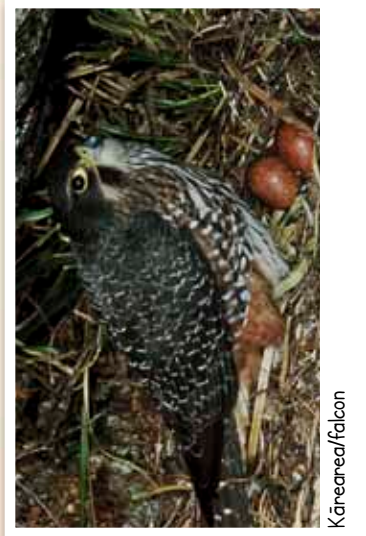


actual size...run!

Reading the forest - What can you see?

The pouākai is 'mate a moa', gone like the moa, two other birds of prey still hunt this forest. Ruru or morepork hunt at night, while kārearea the bush falcon is active during the day. Look around you and see if you can spot the things that make this forest a good home for these birds.

Can you see or hear their prey (other birds)? Can you see any ruru nest sites (holes in the trunks of tall trees) or kārearea nest sites (sheltered spots beneath fallen trees)?



Kārearea falcon

© Barry Halcourt

The end

...but just the beginning of learning to read the forest!

PIKIRAKI/SCARLET MISTLETOE HEALTH MONITORING

Date: ____ / ____ / ____ Time of year _____







Location/tree number _____

Host tree: Silver beech tree tag number _____

Birdlife

Before monitoring plants, spend two minutes in silence and record any birds seen or heard.

Monitoring table

Host tree health	Mistletoe health
 Very healthy - no large dead branches.	 Very healthy - lots of green leaves, no bare branches.
 Not so healthy - some large dead branches.	 Not so healthy - some bare branches, leaves may be yellow.
 Not healthy - half of the large branches are dead or have broken off.	 Not healthy - one quarter of the branches have few leaves or no leaves.
Notes	Notes

Other observations

Is the pikiraki in flower? (Yes/No)

Can you see any fallen flowers? Are they joined at the top (un-pollinated) or open at the top (pointed)?

If you can see fallen flowers - what percentage have been pollinated?

Does the pikiraki have berries? (Yes/No)

If yes - What colour are most of the berries? How many berries make up each cluster (on average).

Do fallen pikiraki leaves show signs of insect damage (holes in leaves and on leaf edges) or possum damage (half or more of the leaf is missing).

If possum - can you see scratch marks on the tree trunk or possum droppings?

Photopoint

Take a photograph from the same spot each time you visit to keep a visual record of the plants.

#5

Information notes 5

Streams and wetlands

Water is a vital part of the Fiordland landscape

In a nutshell

Arrange for the use of a stream studies kit and do an in-depth stream study or venture out at night for an encounter with rarely seen water dwellers.

Use your camera to capture images as you explore a beautiful wetland area.

Streams and rivers

The streams and rivers around Borland are clean and healthy. The roots of forest trees bind the soil and prevent it washing into the waterways, while over-hanging vegetation helps to keep water cool. The water is oxygenated as it flows over small rapids, supporting aquatic insects like mayflies which breathe through fin-like gills. Where trees have fallen into the water, eddies deliver food to trout, native fish and eels waiting in the shadows. The unique-to-New Zealand kiwi and kākāpō are no longer found in the forests around Borland Lodge, but, with a little care, students can see two equally special endemic species that live in our waterways, the tuna/eel and kōaro/native trout.

The Borland Mire

The Borland Mire is one of only a few wetlands of its type remaining in New Zealand. It formed in a depression in glacial outwash at the end of the last ice age. Over thousands of years, vegetation built up over the outwash gravels, with more dead plant material accumulating at the centre of the bog than at its drier edges. This eventually led to the centre of the bog being raised, so the pond stands higher than the surrounding ground. In the 1990s the area was home to some of New Zealand's less common birds, including the marsh crake, bittern, and fernbird, but increased numbers of wild cats, stoats and ferrets make it unlikely that you will see them today. Although there are fewer birds, the Borland Mire is still a great place to visit to look at insects and wetland plants.

Study the streams

Environment Southland have a stream studies kit called Stream Connections that can be borrowed by schools, and may have an educator available to help. This kit includes introductory information, classroom activities, worksheets for in the various stations in the field and follow-up classroom activities for Levels One through to Level Eight, plus nets, trays and other equipment needed to go fishing for aquatic insects.

<http://www.es.govt.nz/for-schools/educational-resources/stream-studies/>



#5 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: **2** **LW** **EC**

Recognise that all living things have certain requirements so that they can stay alive.

Learning intention

Quiet and patient students have been rewarded with an encounter with creatures that many New Zealanders will never see.

Extension activities

- Watch the DVD *Longfin* before going eel spotting. This is available from the Lodge Manager.

Keep them for the future!

Although longfin tuna have the same conservation status as great spotted kiwi, there is a surprisingly high daily bag limit of six eels per person. They cannot be taken from National Parks or protected waterways however.

These amazing creatures breed once in their lives, then die. Habitat destruction, pollution and over-fishing means they are in danger of disappearing from our waterways forever.

Help spread the word - our eels are in danger.

Activity 5a - Night-time tuna/eel spotting

Location

Outside - Pig Creek culvert, a short walk along the Borland Road into the national park, and the swing bridge on the Borland Nature Walk are two possible sites for this activity.

Activity description

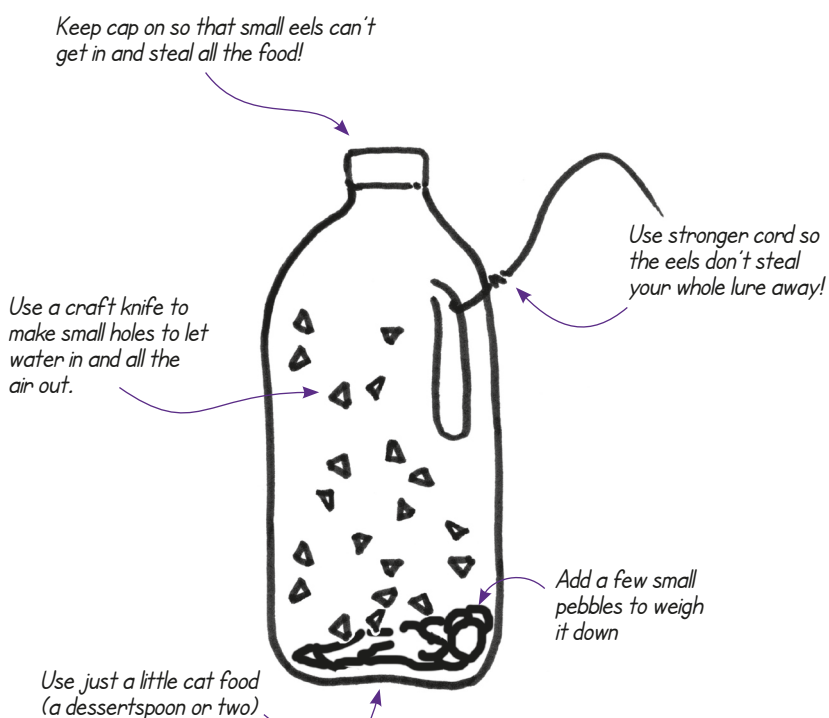
Students learnt how to make a simple tuna/eel lure and go spotting at night.

Materials for tuna/eel spotting

- Torches
- Spotlighting torch
- Tuna lure - 1 or 2 litre plastic milk bottle, light cord, pebbles, and a craft knife
- Small tin of cat food

Directions - tuna spotting

- 1] During the day (or prior to camp) make a tuna lure.
- 2] Suspend the bottle in a pool in the creek.
- 3] After dark, return to see if any tuna have been attracted to the lure. Avoid shining torches across the water. Instead, have torches off and aim the spotlight directly down at the lure.
- 4] Spend some time observing tuna.
- 5] Remove the bottle after the activity.
- 6] Back at the lodge, hold a discussion to find out if there are things students would like to know about tuna. Collect a list of questions and try to allocate time for research back at school.



#5 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: **2** **LW** **EC**

Recognise that all living things have certain requirements so that they can stay alive.

Learning intention

Quiet and patient students have been rewarded with an encounter with creatures that many New Zealanders will never see.

Extension activities

- Kōaro are also known as climbing galaxias. Find out why they are described as climbing, and what the name galaxias means.

Fishing with marmite!?

Why do kōaro like marmite? We just don't know!

Researchers working with native fish use it to bait their traps. They say Vegemite works too, but not as well.

Activity 5b - Night-time kōaro spotting

Location

Outside - Pig Creek culvert, a short walk along the Borland Road into the national park, and the swing bridge on the Borland Nature Walk are two possible sites for this activity.

Activity description

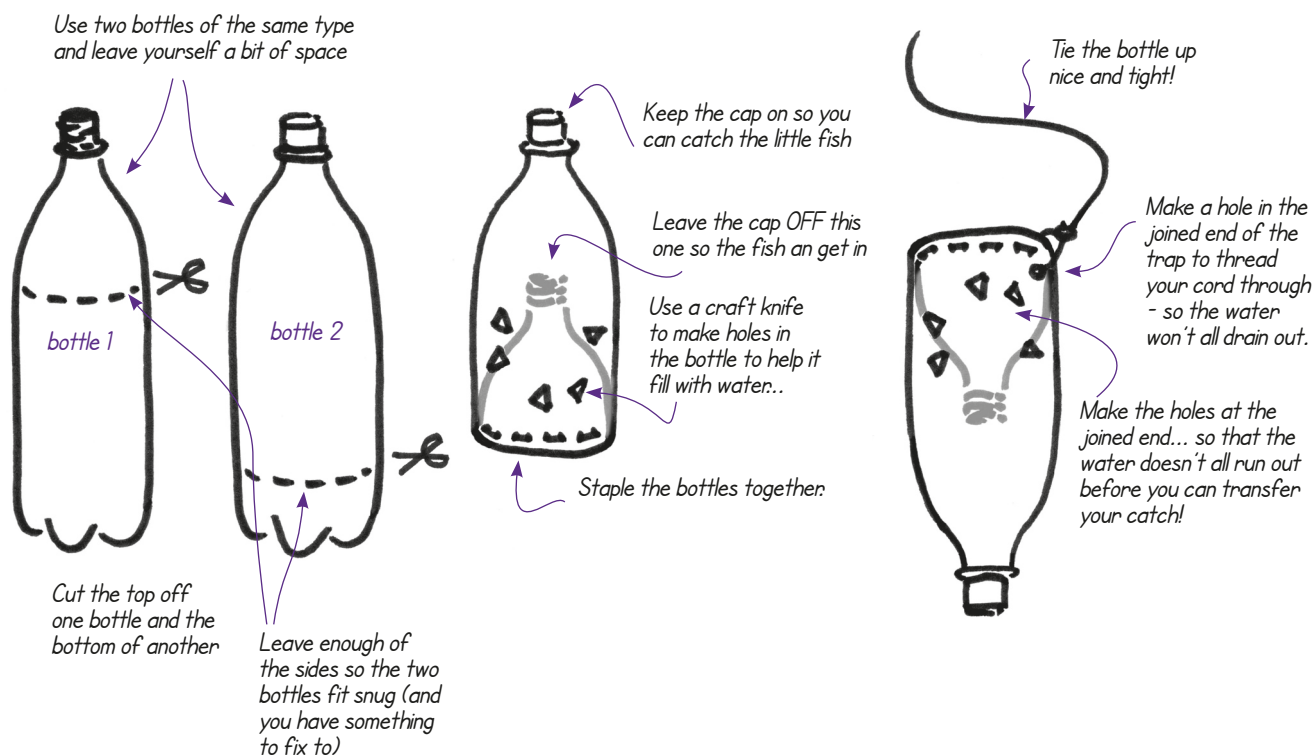
Students learn how to make a minnow trap and catch and release kōaro/native trout.

Materials for kōaro spotting

- Torches
- Spotlight
- Spotlighting torch
- Minnow trap - two 2 litre clear plastic fizzy drink bottles, string or light cord, and a craft knife
- Marmite and crackers/toast
- Bucket

Directions - Kōaro spotting

- 1] During the day (or prior to camp), make a minnow trap.
- 2] Suspend the bottle in a pool in either Pig Creek.
- 3] After dark, return to see if any kōaro have gone into the minnow trap. Avoid shining torches across the water. Instead, have torches off and aim the spotlight directly down at the trap.
- 4] Quarter fill the bucket with water. If there are kōaro in the trap, pull it up, unscrew the bottle lid and gently pour the kōaro into the bucket.
- 5] Spend some time looking at the kōaro's camouflage-patterned skin. Wait quietly and the little fish may try to climb out of the bucket.
- 6] Return fish to the water.
- 7] Back at the lodge, hold a discussion to find out if there are things students would like to know about kōaro. Collect a list of questions and try to allocate time for research back at school.



#5 Activities

Planning guide

Curriculum coverage

Achievement Objective: Science

Strand: Living World

Substrand: Ecology

Levels: **2** **LW** **EC**

Recognise that all living things have certain requirements so that they can stay alive.

Learning intention

Students appreciate that the Borland Mire is a very different environment to the beech forest and pasture that surrounds it.

Activity 5c - Capturing the wetland

Location

Outside - The Borland Mire is accessed through farmland about a kilometre from the lodge. Please see Lodge Manager to arrange access to the mire.

Activity description

Students work alone or in groups to collect photographs that illustrate different aspects of the wetland environment.

Materials

- Camera/cellphone
- Plastic bags for sitting or lying on
- A long dry bracken stem (or rod) to test the depth of the peat beneath your feet

Directions

- 1] Remind students that they are entering an environment that is both fragile and dangerous. Bright green areas are very wet and should be avoided.
- 2] Younger students may need to work in groups and have an adult to read the text to them.
- 3] Students can start collecting their photographs from the point the track leaves the mānuka. For safety reasons they should not stray too far from the remnants of the old board walk that leads from the mānuka to the pond.
- 4] Stop at the pond and test the ground for wobble. Choose an area where some students can lie down, and others can jump once on the spot near to them. This activity will help students understand that the ground beneath them is saturated and quite unlike the soil in the paddocks they crossed to reach the wetland.
- 5] Give students time to collect their images and then gather the group. Ask students to share the discoveries they made when choosing images for the last question on the activity sheet.
- 6] As you retrace your steps to the gate, notice whether you have had an impact on the environment. If so, can you think of ways to reduce harm to the wetland on your next visit?



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Capturing the wetland



1. Green means stop! Don't step where the ground is bright green. These patches are sphagnum moss and they are the boggiest parts of the bog and may be dangerously deep.

Photograph the bright green danger zones.



2. Wetlands act as giant sponges, soaking up water in times of high rainfall and releasing it slowly during dry periods. They help to protect the surrounding land from flooding, and from drought.

Find and photograph something that looks spongy.



3. Ponds and lakes usually form at the lowest point in a landscape. The largest pond in the mire is at the highest point, not the lowest. This is why the Borland Mire is known as a raised bog.

Can you take a photograph that shows that the pond is higher than the surrounding wetland?



4. 90% of New Zealand's wetlands have been drained and replaced by farmland or urban development. If wetlands were animals, they would be as rare as tigers, and raised bogs like the Borland Mire would be white tigers - super rare!

Imagine you need a photograph for a poster promoting how rare our wetlands are. Take a photograph that could help you communicate that message.



5. The plants that cover the mire have their roots buried in peat, not soil. Peat is plant material that is dead, but has not fully rotted. Peat bogs store greenhouse gases that would otherwise be released into the atmosphere.

If you brought a bracken spear, carefully poke it into the ground. How deep will it go? How deep can you push it into the soil in the paddocks you crossed to reach the wetland? Take a photograph to illustrate the depth of the wetland.



6. Wetlands are culturally and spiritually important to Māori. They were a vital source of food and resources.

Can you take a photograph that illustrates something that humans need to live? This could be water, or something that represents food, such as a bird or even a feather.



7. Some of the plants in this wetland look very tough. Some are ancient but are small and stunted because it is hard for them to get the nutrition they need from the cold, waterlogged soil.

Take a photograph of the oldest, toughest and most gnarly plant you can find.



8. Wetlands are full of tough plants, but they can be fragile too. Because they grow so slowly, they are slow to recover from damage.

Can you find an image to illustrate damage in the wetland environment?



9. Wetland weirdness...
Coral lichen is pale grey in colour and has a beautiful, coral-like structure. When dry, the lichen is fragile and will crumble to powder if crushed, but when wet it is soft and springy.

Sundews are tiny carnivorous plants. They are red in colour and have sticky leaves that ensnare small insects. They die back in winter when there are fewer insects around to catch.

Take a photograph that captures the strangeness of the wetland.



10. The Borland Mire looks and sounds and feels and smells (and probably tastes) different from the forests and paddocks that surround the Lodge.

Photograph something that you found interesting, different or special about this environment.

#6

Information notes 6

History at Borland

Places shape people, and people shape places

In a nutshell

Create things using natural resources and gain an understanding of the properties of two plant species that are taonga to Māori.

Act out historical skits to learn about Borland's human history.

Site overview

The human history of the Borland area began with the first explorers, ancestors of today's tangata whenua (local Māori). These first travellers discovered routes that were used for hundreds of years as people followed mahinga kai or food and resource gathering routes along the rivers and lakes. When European explorers and their local guides arrived, they recognised the potential of the land for farming and the first runs (farms) were established. Farming the west side of the Borland River was challenging until a bridge was built to allow the construction of the Monowai Power Station. The building of the Borland Road and transmission line for the Manapouri Power Station improved roads into the area and meant more people were able to visit the area for hunting and recreation. It also enabled Borland Lodge to become established as an outdoor education centre.

As people used the land, they named its features. The earliest known name for Lake Monowai was Manokiwai. This name was told to surveyor explorer James McKerrow but he did not speak Māori and had difficulty remembering it. McKerrow wrote down what he thought he heard and when the first maps of the area were produced, this was the name that appeared on them. That this error survives to this day, tells a story that links us to the human history of the land. Many of the stories behind names have been lost, but some survive (and others can be imagined!).

#6 Activities

Planning guide

Curriculum coverage

Achievement Objective: Social Science

Strand: Cultural practices

Substrand: N/A

Levels: **2 CP**

Understand how cultural practices reflect and express people's customs, traditions and values.

Learning intention

Students understand some of the qualities of harakeke and appreciate that it is a special New Zealand plant.

Activity 6a - Fun with harakeke/flax

Location

Outside or indoors (warning, activity needs a big clean up!)

Activity description

Students learn to prepare harakeke fibres and plait a simple friendship band or bag tag for their back packs.

Materials

- One harakeke blade per two students (less for younger students).
- Beads with large (2mm) holes.
- Mussel shells are the traditional tool for working flax, but non-serrated knives such as bread and butter knives or closed pairs of scissors can also be used.
- At least one pair of sharp scissors or snips.
- Copies of 'how to' sheets.

Delivery

Involve students in the harvest and preparation of harakeke if practical.

- 1] Give each group of students 'how to' sheets.
- 2] Encourage cooperative work (help with knot tying etc) by handing out beads once all members of a group have their harakeke prepared and anchored ready for plaiting.
- 3] Some students will not know how to plait so encourage those who can to teach the others.
- 4] Clean up! This activity can be messy.



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How to harvest flax



If weaving flax strips you can use the soft leaved harakeke, *phormium cookianum*.



If weaving muka/flax fibre, you should use the stronger, stiff leaved harakeke, *phormium tenax*.

If possible, get an experienced weaver to guide you in the tikanga (custom) of gathering and weaving harakeke. If no one is available, help students to understand the importance of respecting harakeke, and harvesting it in a sustainable way.



Harakeke leaves grow in a fan. To keep the plant healthy, do not harvest the centre three leaves. These represent the rito and awhi rito, or baby (in the centre) and parents (on either side).



Use a sharp, serrated knife to slice downward through the leaves at an angle, near the base.

Avoid harvesting in the rain or frost because the leaves will be hard to work. Avoid using insect damaged plants (leaves will have lots of holes and notches in them). Keep leaves from drying out by wrapping in damp newspaper or towels until needed.

Fun with harakeke

Preparing harakeke



Peel off the outside edges of the leaf.



Peel leaf away from the stiff mid-rib.



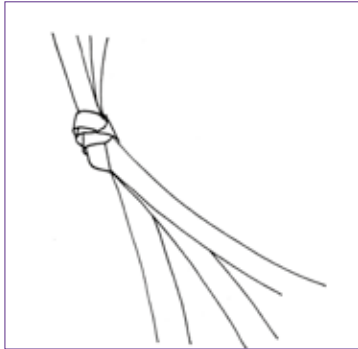
Cut strips so they are 40cm long from the leaf tip. (Older students may be able to work with longer lengths.)



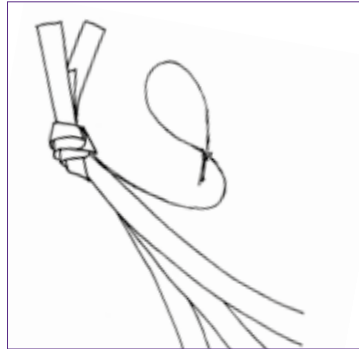
Soften the leaf by pulling it back and forward across your leg or running it through your hands. When the leaf has lost its stiffness it is ready to use.

Leaf strip friendship band or bag tag

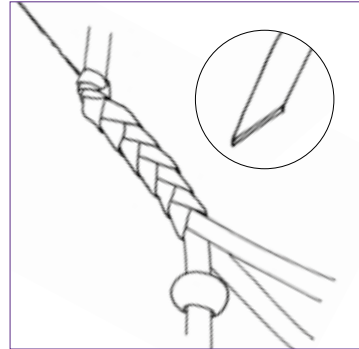
Strips of harakeke leaf can be used to weave bags and baskets, sandals and even rain capes.



Take three 2mm wide strips of softened leaf. Tie them in a knot at one end.



Secure your work by tying it to something with a spare strip of leaf (or ask a friend to hold it while you plait).



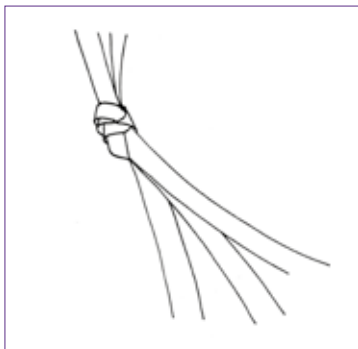
Cut the end of each strip at a sharp angle to make threading beads easier. Plait the three strips of flax. Add beads as you go.



Tie a knot to finish the plait. Leave a good length of flax after the knot, if you trim it too close it will come undone as the flax dries.

Muka friendship band or bag tag

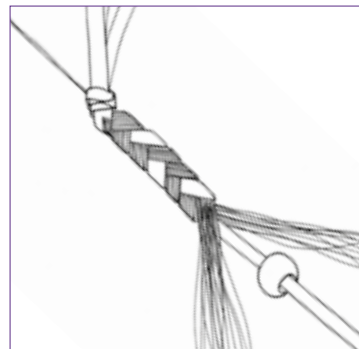
When the green leaf is scraped the remaining fibres are called muka. Muka can be used to make cord and rope and to weave delicate fabrics.



Take three 4mm wide strips of leaf. Tie them in a knot at one end.



Split one strip into two. Leave one half green and cut the loose end at an angle to make threading beads easier. Run the other strips gently over the back of a butter knife or closed pair of scissors, as though you were making paper curls. Experiment until you get the right pressure to remove the soft green layer and leave the long pale fibres. Do this until you have removed most of the green.



Secure your work by tying it to something with a spare strip of leaf (or ask a friend to hold it while you plait). Divide the fibres and the green strip into three and plait. Add beads as you go, threading them onto the thicker strand of leaf.



Tie a knot to finish the plait. Leave a good tuft of fibre after the knot, if you trim it too close it will come undone as the fibre dries.

#6 Activities

Planning guide

Curriculum coverage

Achievement Objective: Social Science

Strand: Cultural practices

Substrand: N/A

Levels: **2 CP**

Understand how cultural practices reflect and express people's customs, traditions and values.

Learning intention

Students have used mahinga kai plants and understand some of the properties of these materials.

Extension activity

Pehu were traditionally decorated with earth pigments. Paints can easily be made out of dried coloured soil/soft rock added to paste or PVA.

Games galore

Spears and darts were traditional but the games played with them were more elaborate than the simple throwing activity suggested here.

Activity 6b - Pehu/bracken spears

Location

Outside - bracken can be harvested from the area around the nature walk carpark.

Activity description

Students make pehu/spears from bracken stems.

Materials

- Secateurs or sharp serrated knives
- Instruction cards
- Permanent markers in dark colours
- Strips of flax approximately 1cm wide (please see flax harvesting guidelines for activity 6a), one per student.
- One ready-made pehu with sharp point at the narrow end, a flax knot at the thicker end and pen decoration.

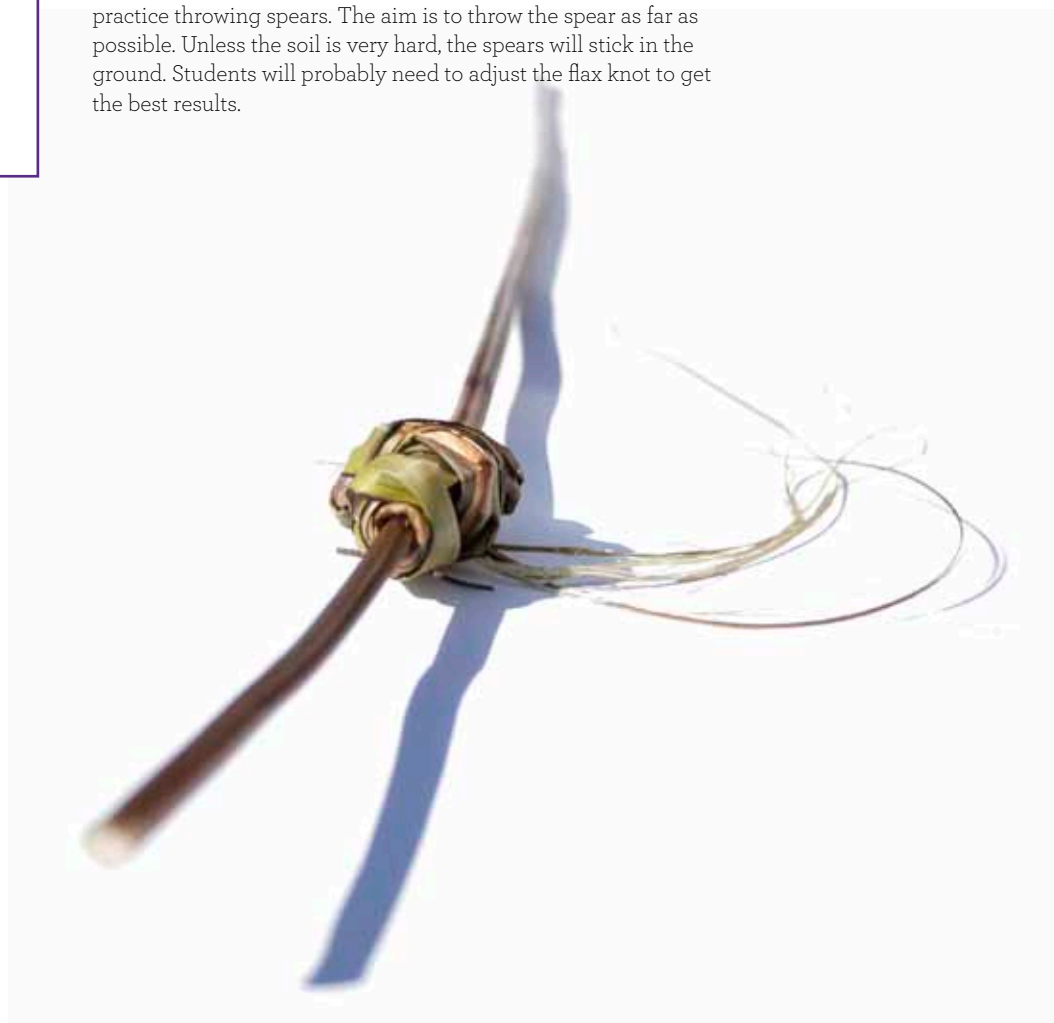
With large groups you may need to harvest long straight bracken stems, one per student, before the activity. Choose dry stems. Cut at an angle.

Delivery

- 1] Ask for five students or parent helpers to read out the instructions to the group. Give the first speaker the pehu that has already been made. Each speaker reads out the information on their card to explain the activity.
- 2] Hand out bracken sticks or take students to harvest their own.
- 3] Depending on the age of students, they may need help to cut one end of their pehu at an angle, and to tie on the flax knot. Encourage students to decorate their pehu with the pens.
- 4] Take the group to an open area such as the archery range to practice throwing spears. The aim is to throw the spear as far as possible. Unless the soil is very hard, the spears will stick in the ground. Students will probably need to adjust the flax knot to get the best results.



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All about pehu

Person One

Hold up the pehu and read the text

These days we don't think of bracken as special, but to early Māori it was a very important plant. Their ancestors had brought kumara with them to Aotearoa New Zealand, but it would not grow in the south where there were frosts. Instead of kumara, people ate aruhe, the starchy root of the bracken fern. Bracken was used for a lot of different things, including darts and spears for play. One of the names given to these spears was 'pehu'.

Pass pehu to next speaker.

Person Two

Hold up the pehu and read the text

To make your own pehu, choose a long, perfectly straight bracken stem that is one metre or more tall. Choose one with a hard, dry stem. Cut the stem close to the ground. Cut the stem at an angle, below the leaves. The sharp tip will help the spear stick in the ground.

*Stick the sharp end of the pehu into the ground then pull it out.
Pass to the next speaker.*

Person Three

Hold up the pehu and read the text

You need to add a weight to the pehu or it won't fly straight. Prepare a ribbon of harakeke/flax by running it through your hands and bending it gently until it softens. Wrap the harakeke around the unsharpened end of your pehu and tie it on tight. This knot of harakeke will help balance the pehu.

*Hold the pehu so it balances on your hand.
Pass the pehu to the next speaker.*

Person Four

Hold up the pehu and read the text

Use marker pens to mark your pehu so you will know which one is yours. The traditional way of marking pehu was with paint made from red ochre, a red or rusty coloured earth pigment.

*Point to the decorations on the pehu.
Pass it to the last speaker.*

Person Five

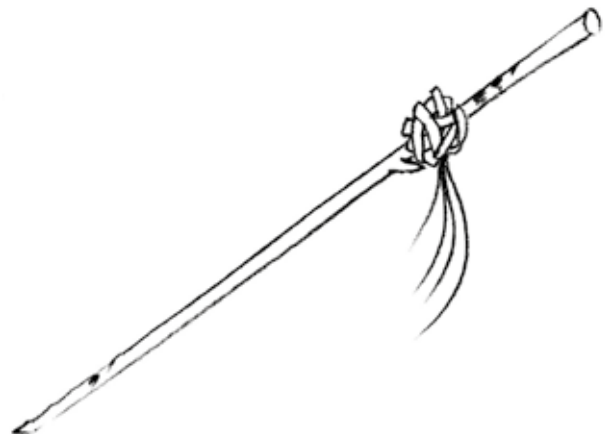
Hold up the pehu and read the text

Pehu can be dangerous weapons.

Do not throw your pehu until you have been given instructions by a teacher or other adult.

When you throw your pehu it should land tip down and stick into the ground. You may need to move the flax knot up or down the bracken stem until it flies right.

Pretend you are about to throw your pehu, but don't!



#6 Activities

Planning guide

Curriculum coverage

Achievement Objective: Social Science
Strand: People and Place Influence

Levels: 2 PPI CP

PPI - Understand how people influence places and places influence people.

CP - Understand how cultural practices reflect and express people's customs, traditions and values

Levels: 3 PUP

Understand how people view and use places differently

Levels: 4 CH

Understand how people pass on and sustain culture and heritage.

Learning intention

Students understand some of the human history of the Borland area.

Extension Activity

Look at a map of the area and find the sites named in the skits.

Activity 6c - History, what's in a name?

Location

Indoors

Activity description

With the help of a narrator and a script, students (or parent helpers) perform a series of five skits to illustrate how place names can have stories to tell about an area's past.

Materials required

- Cue cards
- Props/Characters (x13)
- Act 1 - Mount Burns*
 - Heavy day pack
 - Notebook and pen inside the day pack
 - A telescope (paper towel inner!)
 - *Characters:* James McKerrow (a surveyor) and his assistant
- Act 2 - Blackmount*
 - *Characters:* Farm manager and Meg (a collie)
- Act 3 - Duncalf point*
 - A table and chair
 - *Characters:* Power station worker and his boss
- Act 4 - Pig Creek Transmission Line Camp*
 - Three chairs
 - Three tea cups
 - One plate of biscuits
 - *Characters:* Three transmission line workers
- Act 5 - Borland Lodge*
 - Props: a table, three chairs, snack food/fruit, a back pack or bag
 - *Characters:* Mum, a little kid and an older kid. NB the student playing this character may want to write their own version of the long sentence in the skit

Delivery

If possible, give groups time to rehearse their skits.



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What's in a name?

ACT 1 - MOUNT BURNS

Props: a heavy day pack for the assistant. A telescope (paper towel inner!) and a notebook and pen inside the day pack

Characters: Two men: James McKerrow (a surveyor) and his assistant.

Scene: McKerrow and his assistant are standing on top of a mountain, shading their eyes from the sun and looking at the view.

Narrator:

James McKerrow was a surveyor who mapped large areas of Otago and Southland in the early 1860s. Surveying was necessary because when land shifted from the care of tangata whenua or local Māori into European ownership, it became important that there were known boundaries between properties.

Some place names help us remember important events in the past, like the wreck of the Takitimu waka. Some names help us remember people. When McKerrow named Mount Burns in 1864, the Scottish poet Robert Burns had been dead for over sixty years. Today, well over 200 years since his death his poetry is still known and quoted.

McKerrow:

Pass me the telescope laddie.

Assistant takes telescope out of (very heavy!) pack and hands it to McKerrow who looks through it.

McKerrow:

Ahh, lovely. It makes me think of a poem by fellow Scotsman Robbie Burns.

(recites dramatically)

Yon wild mossy mountains sae lofty and wide

That nurse in their bosom the youth o' the Clyde,

Where the grouse lead their coveys thro the heather to feed,

And the shepherd tends his flock as he pipes on his reed.

Assistant:

Hmm. I don't see any grouse, or heather, or shepherds piping on reeds, but the river is a bit like the Clyde. Wet. Just like most rivers I have known. And there is definitely plenty of moss.

McKerrow: *(importantly)*

I will call it Mount Burns in honour of the poet and Scotsman. Please add this to our list of names.

The assistant writes the name in his notebook and the and McKerrow start to walk back down the mountain.

What's in a name? continued...

ACT 2 - BLACKMOUNT

Props: None required

Characters: Farm manager, Meg, a collie

Scene: The farm manager and his dog are standing looking out over the landscape. The manager is being bothered by sandflies.

Narrator: By the late 1800s several very large farms called runs had been established in the area. The land surrounding Borland Lodge belongs to Sunnyside, one of the first runs. No record exists of how Sunnyside got its name, but it was probably because it was on the sunny side (north facing side) of the hill. How the Blackmount run got its name is known, and like Sunnyside it is a descriptive name.

Manager: Well Meg, we need to give this run a name.

Meg: Woof!

Manager: Ah, I don't think that will do girl.
Ouch, these sandflies are a pest. Hmm, Biters Run. Blood suckers Run... Vampire run.. No that definitely won't do!

Meg: Woof!

Manager: What is it girl... *(looks beyond Meg into the distance)*. Look at that mountain, the whole of it is black from being burnt off. I will call the run Blackmount. That name should help visitors find us for a few years!

The manager and Meg start walking to get away from the sandflies.

ACT 3 - DUNCALF POINT

Props: A table and chair for the boss to sit at.

Characters: A power station worker and his boss.

Scene: The boss is sitting at his office desk studying some papers.

Narrator: The Monowai Power Project began generating hydroelectric power for Invercargill in 1920. The water that turns the turbines flows from Lake Monowai which is over 46 metres higher than the Waiau River where the power house stands.
Some place names are given to honour people for their contribution to a local project. In towns and cities streets are sometimes named this way.

The worker, Mr Duncalf, knocks on the door and enters.

Boss: Mr Duncalf. Your work on the construction of the Monowai Power Station has been outstanding. We wish to reward you for your efforts.

Duncalf: Oh goody, a bonus!

Boss: (proudly) Not mere money Mr Duncalf! Something much better. There is a finger of land pointing out into Lake Monowai near the lake outlet. We have named it after you.

Duncalf: (without enthusiasm)

A long skinny piece of sandfly habitat with my name on it. Just what I've always wanted.

Boss: (very satisfied) Splendid.

What's in a name? continued...

ACT 4 - PIG CREEK TRANSMISSION LINE CAMP

Props: Three chairs and three tea cups. One plate of biscuits.

Characters: Three transmission line workers.

Scene: Two workers are sitting drinking cuts of tea and relaxing at the end of a long work day. The other worker, Martin, is messily eating his way through a plate of biscuits and slurping his tea.

Narrator: In the 1960s work began on another power project, this time at Lake Manapouri. A road had to be built from the South Arm of the lake and over the Borland Pass before power pylons could be constructed to carry electricity from the power station at the west arm of Lake Manapouri to Tiwai Point near Bluff. The men building the road and putting up the pylons needed somewhere to live, so a camp was built. It was named Pig Creek Transmission Line Camp because it was built near Pig Creek. Pig Creek got its name because there were once large numbers of wild pigs in the area.

Worker one: Why d'ya think Green Lake is called Green Lake?

Worker two: Mate, have you seen it? It's green.

Worker one: And that one next door to it? Island Lake?

Worker two: It has an island, right?

Worker one: Sooo... Pig Creek is called Pig Creek because of all the pigs?

Worker two: No, it was named after Martin over there.

Worker one: Really?

Worker two: *(rolls eyes)*

ACT 5 - BORLAND LODGE

Props: A table, three chairs, snack food/fruit, a back pack or bag.

Characters: Mum, a little kid and an older kid. NB the student playing this character may want to write her own version of the long sentence in the skit.

Scene: Mum is standing at the table preparing a snack. Little kid is sitting at the table. They are waiting for the older kid to come back from camp.

Narrator: Today school camps at Borland help young people experience the bush and gain valuable outdoor skills and knowledge. The need for this was being discussed as early as the 1960s, when several high schools and a range of organisations including Mountain Safety, Deer Stalkers, Forest Service and the Southland Tramping Club, felt that there weren't enough opportunities for kids to experience the outdoors. They agreed they needed an outdoor youth camp, and in 1972, when Pig Creek Transmission Line Camp was no longer needed for workers, the buildings were gifted to the community. The camp was renamed Borland Lodge after the nearby Borland Burn.

Mum: Here comes your big sister! Welcome back!

Older kid comes in with her overnight bag and a big grin.

Mum: How was Borland camp?

Older kid: *(excited/very fast!)* Awesome! We had a bonfire and toasted marshmallows and someone told a really freaky ghost story and rock climbing is sooo fun and there was self-saucing chocolate pudding and Jackie in my cabin snores and we opened the traps and there was a stoat and two rats and one night there was a mosquito in our cabin and we were trying to squash it with pillows and one of the parents thought we were having a pillow fight and growled us and there was a swinging bridge and we went cross country through the forest and didn't get lost because we used a map and a compass and there's a thing called a toe biter that lives in Pig Creek and *(pauses to grab a snack...)*

Little kid: So... why is called Bore land? It doesn't sound boring at all.


Mum makes a 'she's so adorable' face and older kid makes a 'duh' face.

section 3


Supporting resources

Recommended reading and research


Learn more about Borland by reading

 *Monowai – History and Natural History* by Lloyd Esler


Make and print your own native plant resource book for Borland.

 *New Zealand Plant Conservation Network*
Rōpū Hononga Koiora Taiao ki Aotearoa
(Home > Flora > Make your own book)
http://www.nzpcn.org.nz/page.aspx?flora_make_book

Set up your own monitoring project for a native plant or animal or ask for help in identifying a plant or animal you cannot identify.

 *Nature Watch NZ*
<http://naturewatch.org.nz/>

Do an in-depth stream study with the help of a Stream Connections Kit.

 *Environment Southland*
<http://www.es.govt.nz/for-schools/educational-resources/stream-studies/>

Research environments or species before or after your camp: Te Ara – the Encyclopaedia of New Zealand is a comprehensive guide to our peoples, natural environment, history, culture, economy and society. Information is presented as two options, the ‘short story’ and the ‘full story’ making it easy to use for younger and older students.

 *Te Ara*
<http://www.teara.govt.nz/en/wetlands>

Make your own tracking tunnels and pit fall traps.

 *Department of Conservation*

Tracking tunnel:

<http://www.doc.govt.nz/get-involved/conservation-activities/exploring-nature-with-children-booklet/in-your-own-backyard/make-your-own-tracking-tunnel/>

Pitfall:

<http://www.doc.govt.nz/get-involved/conservation-activities/exploring-nature-with-children-booklet/in-your-own-backyard/minibeasts-and-creepy-crawlies/>

The Line – a 1970 short documentary about the construction of the Borland Road and the power pylons.

 Available from Lodge Manager and online.
<http://www.nzonscreen.com/title/the-line-1970>

Longfin – a 2006 short documentary about the longfin eel.

 Available from the Lodge Manager and online.
<http://www.cultureunplugged.com/play/6235/Longfin>

Borland Super Site

Thank you for taking the time to complete this form. This information will be used to make improvements to this Super Site and to inform the planning of future education resources.

User profile

School or Group (optional):

Number of students:

Age of students:

Resource evaluation

How did you find out about this Super Site resource?

1. Do you think the students benefited from their involvement in this Super Site? (Please circle)
Not at all 1 2 3 4 5 Yes definitely

Comments:

2. Please indicate at what stages of the Super Site a DOC ranger provided support to you?

Planning stages Pre-visit activities Other:

Fieldtrip Post-visit activities

Comments:

3. What aspects of the Super Site were most valuable?

4. What aspects of the Super Site did not work so well?

5. Were there any significant comments from the students?

6. How do you think we could improve the Super Site resource?

7. Please provide any further comments:

Please return this evaluation to: Community Team, Department of Conservation,
Te Anau Office, P.O. Box 29, Te Anau 9640, Ph: (03) 249 0200

Email: fiordlandvc@doc.govt.nz

