# Explore Day

The *Take Action for Water* Explore Day enables students to see first hand the issues that have been presented and discussed in both the Native Ecosystems and Human Impacts sections of the programme. With Greater Wellington funded buses each class travels to a native bush site where they explore both the stream and catchment through a series of tests and observations. After lunch students then travel to a second site that may be quite degraded by human activity where they once again test and observe. The contrast between both sites enables students to identify and discuss possible causes and solutions to the issues they have identified. The itinerary of a typical Explore Day would be as follows:

| | |
|---|---|
| 9.15 am | Bus picks up class from school and transports them to the first site (usually the closest regional park). |
| 10.00 am | Class arrives at the first site. |
| | Morning tea (hot drinks and biscuits provided for adults). Health and safety briefing. |
| 10.20 am | Introduction to the day's learning by the Take Action facilitator. |
| | Class splits into the two learning groups. One group works with the classroom teacher exploring the catchment, while the remaining students work with the Take Action facilitator testing the stream. |
| 10.40 am | First group activity. |
| 11.30 am | Groups swap over and participate in their second group activity. |
| 12.20 pm | Class re-groups to discuss their learning and draw conclusions about the stream and catchment's health. |
| 12.30 pm | Lunch. |
| 1.00 pm | Bus transports the class to the second stream site. |
| 1.30 pm | Introduction to the second site by the Take Action facilitator. |
| 1.40 pm | Students complete testing and observations of the second stream site. |
| 2.00 pm | Class regroups to discuss their learning and draw conclusions about the stream and catchment's health. |
| 2.15 pm | Bus takes the class back to school. |

# 16 Stream testing - Teacher notes

## Linking to curriculum

*Science - L 3/4 Living World: Ecology*

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

*Social Studies - L4*

Understand that events have causes and effects.

## Land cover and water quality

The land cover of a catchment influences the health of its waterways. Native forest covered catchments usually contain waterways that are in excellent condition. Catchments where urban areas cover more than 20% of the total catchment area are likely to have degraded waterways due to stormwater pollution. Catchments with intensive farming and unprotected riparian margins are likely to have degraded waterways due to animal waste, fertilisers and pesticides.

The location of the stream testing site within a catchment influences test results. Streams higher up in a catchment often have bush cover and are usually in good condition. Streams lower in a catchment are often heavily impacted by urban and agricultural activities and are usually found in a poorer condition.

## Stream testing and observations

Students investigate the health of stony bottomed streams by carrying out the following tests and observations relating to the habitat of the stream, the quality of its water, the presence or absence of aquatic animals, and the impacts of human activities.

### Stream habitat

1. The **stream bed** observation is a visual assessment of the stream bed substrate.

   The stream bed has a major influence on what can live in the stream. Many aquatic animals rely on stony stream beds, where they live on and in between the stones. Most of the sites that we test are or were stony or gravel bottomed streams. This does not usually change much, however, if there are significant changes in the catchment (eg. earthworks or deforestation) the stream bed can become covered in sediment.

2. The **algae** observation is a visual assessment of the algae growing on the stones in the stream bed.

   Algae is very important to many invertebrates (animals without backbones), who graze on short algae as their main food source. The thickness or length of algae (eg. thin layers, thicker layers and long filaments) usually depends on the amount of nutrients in the water, the amount of sun on the stream and the length of time since the last flood that washed away the algal growth.

3. The **pool/riffle/run** observation is a visual assessment of the different habitat types in the stream.

   A healthy stream will have pools, riffles and runs which provide a variety of habitat for aquatic animals. A pool is an area of slow flowing, deep water which is often on the outside bend of a stream. A riffle is an area of fast, shallow water which flows over stones that break the surface of the water. A run is a smooth, unbroken flow of water that connects pools and riffles.

4. The **stream shading** observation is a visual assessment of plants and trees shading the stream.

   Stream shading by native trees is very important to the health of the stream. Shading reduces temperature extremes, limits algal growth and the falling leaves provide a year round supply of food for invertebrates. Exotic, deciduous trees are not as good a food source as native trees as they lose all their leaves at once, which then decompose reducing oxygen levels in the water. Pine needles contain resins and decompose slower than other leaves. The leaves of exotic trees are not as palatable for aquatic invertebrates.

5. The **bank stability** observation is a visual assessment of how effectively plants are holding the stream banks together.

   Bank stability is provided naturally by trees and plants. Root systems hold the banks together and are particularly effective when they grow right down to the water's edge. This limits the amount of sediment entering the stream.

## Water quality

6. The **water temperature** test uses a thermometer to measure the water temperature.

   The temperature of the water affects the amount of oxygen in the water. Cool water contains more oxygen than warm water. As the water temperature increases, the water is less able to dissolve oxygen. Water at 0°C has twice as much oxygen than water at 30°C. Most invertebrates prefer temperatures of 10 to 15°C. As the water temperature increases animals become stressed and eventually die if they are unable to move to a cooler stretch of stream.

7. The **water clarity** test uses a metre long clarity tube to measure how far you can see through the water.

   Water clarity is affected by the amount of sediment in the water. Too much sediment reduces the ability of light to penetrate the water. This has a negative impact on algae which needs light to grow. If algae does not get enough light it will die. This has consequences for the animals that eat it and the rest of the food chain. Too much sediment in the water can also damage the gills of animals and prevent hunters such as blue ducks from seeing their prey. Too much sediment may cover the stream bed making it unsuitable habitat for many aquatic invertebrates and fish.

8. The **conductivity** test measures the level of enrichment (eg. nutrients) of the water. Conductivity is measured in micro siemens per centimetre (µs / cm).

   All streams have some nutrients in them due to natural processes. Additional nutrients may enter the water through runoff from cultivated land and from animal faeces and urine. Increased nutrient levels can intensify algal growth. This may lead to fluctuations in the amount of oxygen in the water, which is harmful to invertebrates and fish.

# 16 Stream testing - Teacher notes

## Aquatic animals

9. The **invertebrate** observation is a visual assessment of different types of invertebrates found in the stream.

   Invertebrates are good indicators of stream health. Some aquatic invertebrates cannot tolerate pollution (eg. mayflies and cased caddisflies) whereas others can survive in quite polluted waters (eg. worms and snails).

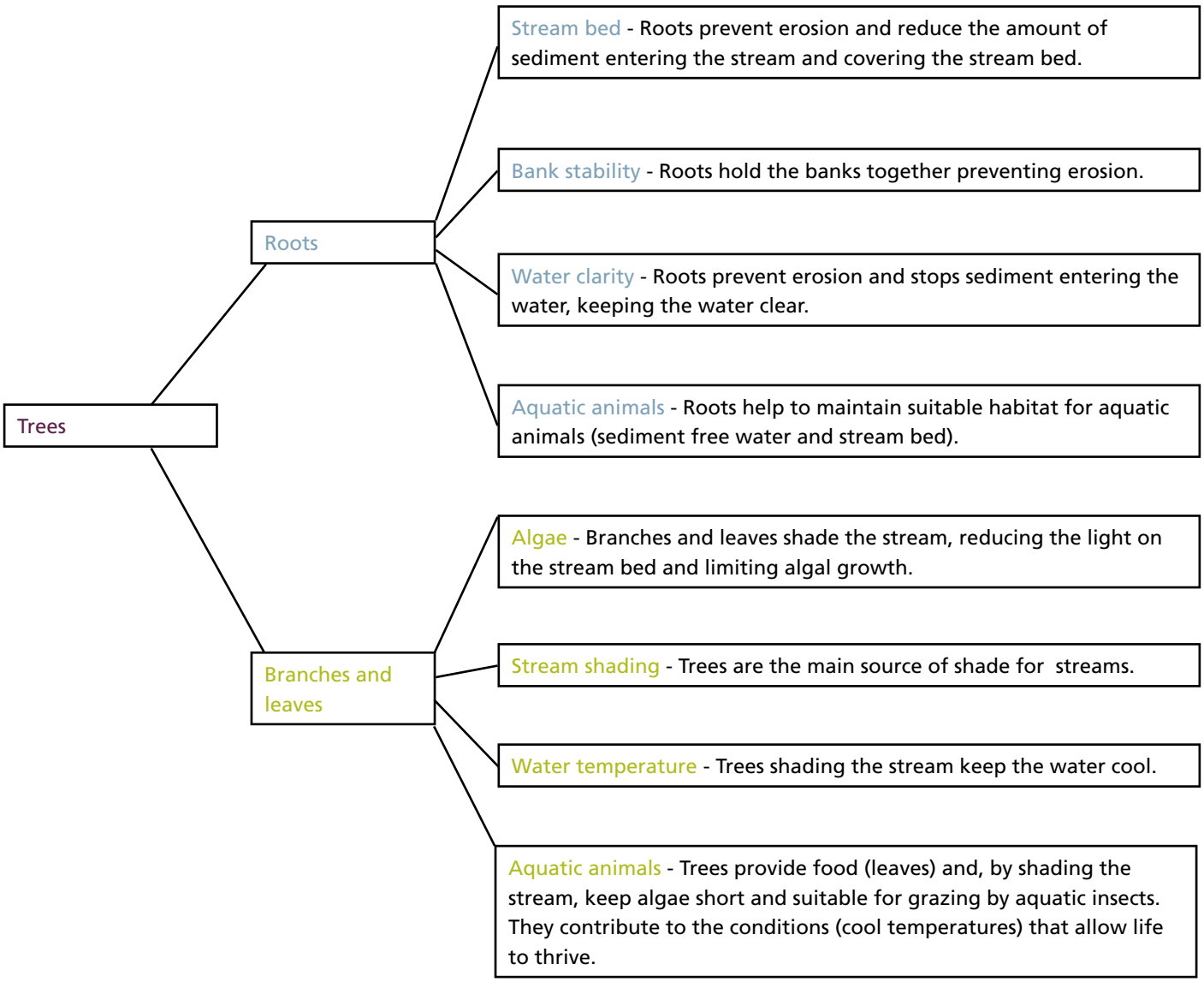
## Human impacts

10. The **human impacts** observation is a visual assessment of human activities that have a negative impact on the stream.

    Some human actions have a direct effect on the stream and the animals within it. This includes stormwater and animals (eg. cows) that pollute the water, culverts and weirs that stop the migration of native fish, and the straightening and concreting of stream beds that change the habitat available for aquatic animals.

## The importance of trees

Trees can have a significant bearing on the outcome of stream tests and observations. The chart below explains how:



# 16 Stream testing

These activities are facilitated by Greater Wellington staff on the explore day.

## Site One

### Introduction with class

- Share the learning intentions with students.
- Hand out a student folder to each pair of students. Ask students to enter their names and the name of the stream on the BLM 38.
- Hand out the land cover catchment map for site 1 and discuss the legend with students.
- Students use the map to complete the introduction section of the BLM.

  ? (Looking at the map) Do you think the mauri of this stream will be strong, ok or weak? Students justify their answer.

  *Answers will vary.*

- Explain to students that they will be trained as water quality scientists and will investigate the health of the stream and the surrounding catchment.

  **Students now split into two groups. One group will do stream testing and the other group will go for a catchment walk. Groups will then change over so that each group completes both activities before making conclusions as a class.**

### Group stream testing

- Explain to students that they are going to be water quality scientists. Their task is to determine the health of the stream. Explain and discuss the tests and observations on BLM 38 with students.
- Students carry out tests and complete the stream habitat, water quality, aquatic animals and human impacts sections of the BLM.
- On completion of their testing and observing, students complete the conclusion statement about the health of the stream on the BLM and justify their findings.

  ? Ask students to share their conclusion and thinking with the group.

  *Answers will vary.*

- Discuss students' conclusions and answer any questions they may have.

  ? How do trees influence the results of the different tests?

  *Refer teacher notes page.*

  ? Will this stretch of stream always be this healthy?

  *No. In winter there will be higher flows, less algae and sometimes invertebrates will be washed downstream. In summer there will be lower flows, warmer water and more algae.*

  *Isolated events also affect the stream's condition (eg. pollution, storms, earthquakes).*

  ? Does this test tell us the condition of the whole stream?

  *No. The testing only tells us about this site and gives an indication of what may be happening upstream.*

### Learning intentions

- Learn to test and observe a stream (context - stream health)
- Learn to identify human causes of environmental change (context - stream health)

### Success criteria

Students can…

- Assess the health of a stream and justify their findings
- Discuss how human activities have affected the health of the streams tested

### Resources

(are provided on the day)

Land cover catchment maps for site 1 and site 2

Stream testing kit (includes thermometer, clarity tube, conductivity meter, trays)

Student folders (includes **BLM 38**: stream testing, invertebrate identification card, pencil)

# 16 Stream testing

## Conclusion with class

- Discuss the land cover in the catchment with students again.

? Was your prediction about the mauri of the stream correct? Explain.

Answers will vary.

? What are the main things on the catchment map that explain your results?

Land cover in a catchment will influence stream testing results. Refer teacher notes.

# BLM 38: Stream testing

Names: ..... Date: .....

## Introduction

Using the land cover map, answer the following:

1. Name of the stream .....

2. Where does the water from this stream enter the sea? .....

3. What are the three main types of land cover in the catchment?

a. ..... b. ..... c. .....

4. Where is the stream testing site in the catchment?

Upper catchment  Middle catchment  Lower catchment

**Prediction**

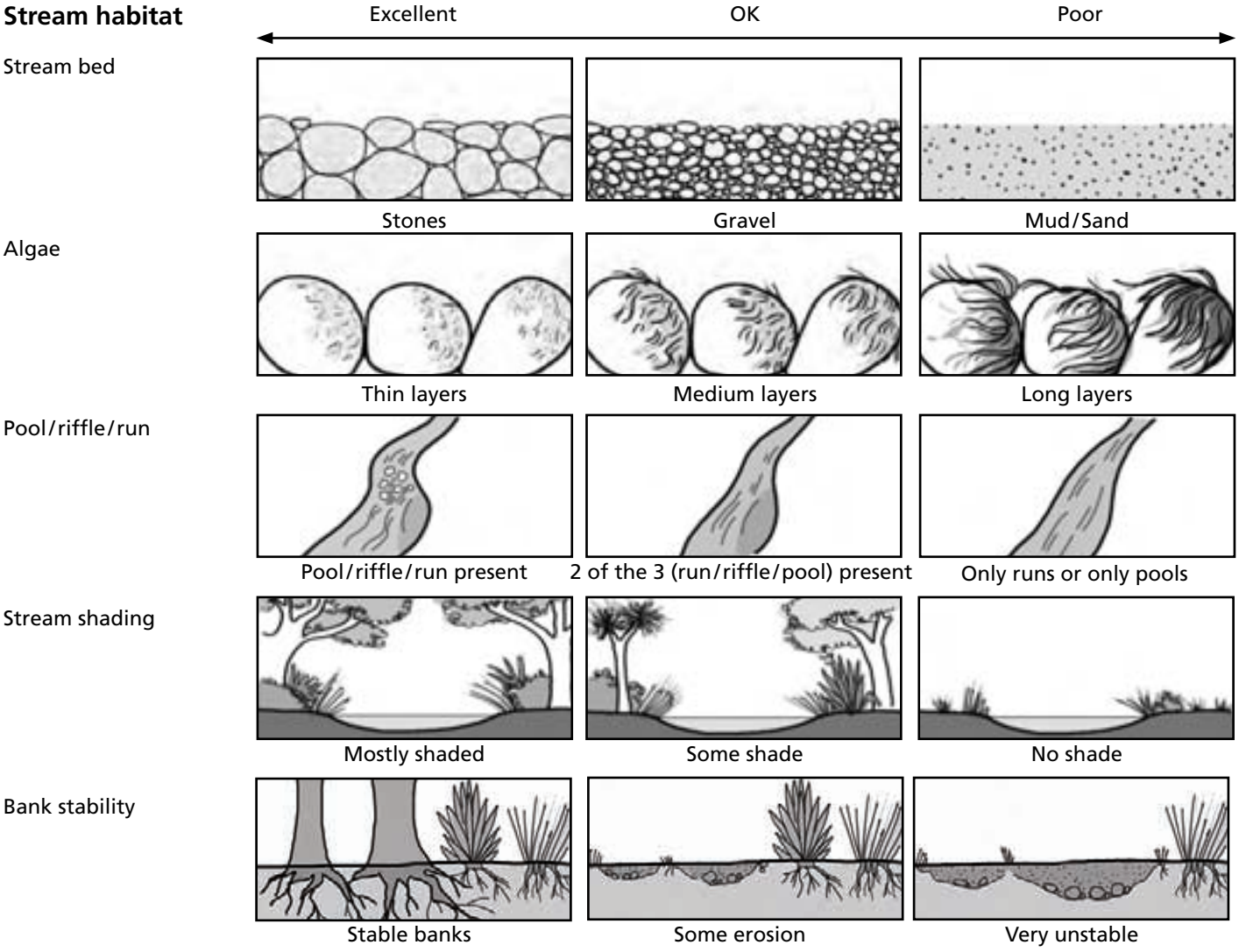
We think the mauri (life force) of the stream and the life within it will be because: Strong / OK / Weak

1. .....

2. .....

*Walk along the selected stretch of stream and assess which picture below best represents the stream*

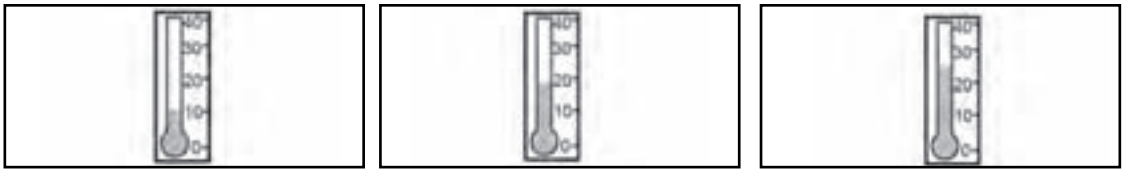
**Stream habitat**



## Water Quality

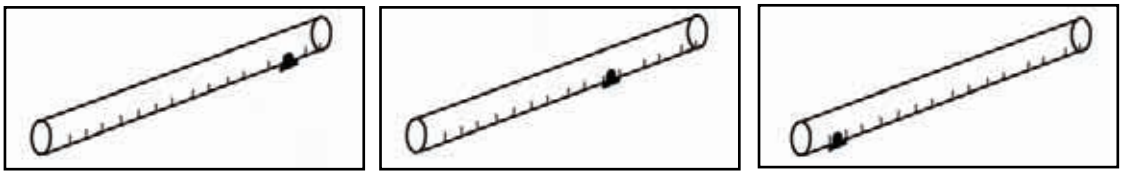
Excellent — OK — Poor

Water temperature



Less than 15°C | 15°C to 20°C | More than 20°C

Water clarity



70 to 100cm | 30 to 70cm | 0 to 30cm

Conductivity

0–149 µS/cm | 150–399 µS/cm | 400 µS/cm or more

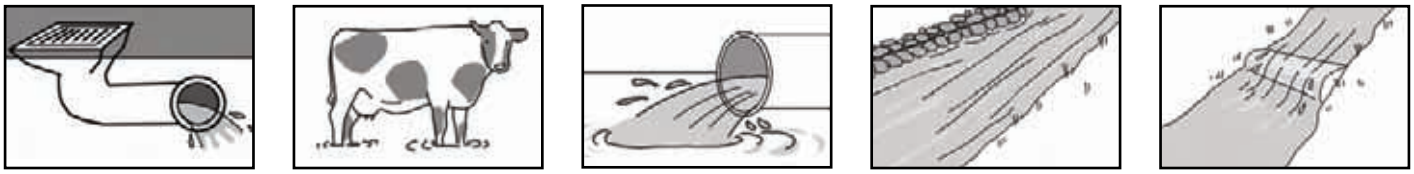
## Aquatic animals

Excellent — OK — Poor

Invertebrates

Lots of cased caddisflies, mayflies and stoneflies | Mixture of animals | Mainly worms, snails and flies

## Human impacts



Stormwater drains or pipes | Animals in stream | Culverts | Straightened streams | Weirs or barriers

## Conclusion

We think the water quality and habitat for animals in this stream is excellent/ok/poor because of the following reasons:

1. .....

2. .....

Do you think the following fish will be in the stream?

Banded kōkopu

Yes No

Reason:

.....

.....

.....

.....

Longfin eel

Yes No

Reason:

.....

.....

.....

.....

## Site two

### Introduction with class

- Introduce the land cover catchment map for site 2 and another copy of BLM 38 to the whole class.
- Ask students to enter their names and the name of the stream on the BLM.
- Students use the map to complete the introduction section of the BLM.

? Do you think the mauri of this stream will be strong, ok or weak? Students should justify their answers.

Answers will vary.

### Class stream testing

- Explain and discuss the tests and observations on BLM 38 with students.
- Students carry out tests and complete the stream habitat, water quality, aquatic animals and human impacts sections of the BLM.
- On completion of their testing and observing, students complete the conclusion statement about the health of the stream on the BLM and justify their findings.

? Ask students to share their conclusion and thinking with the group.

Answers will vary.

### Conclusion with class

- Discuss the land cover in the catchment with the students again.

? Was your prediction about the mauri of the stream correct? Explain.

Answers will vary.

? What are the main things in the catchment that help to explain your results?

Land cover and human impacts in a catchment will influence stream testing results. Refer teacher notes.

### Overall conclusion of the day

? Which stream is healthier? How do you know?

The first site should be in better condition but the reasons will vary.

? Which stream has better habitat for banded kōkopu and longfin eel?

In most cases the first site will have better habitat for fish because: it has cool, clean pools; it has lots of aquatic insects to eat; and it is forest covered which provides food (eg. insects and spiders) and places for banded kōkopu to lay eggs.

? How does land cover in a catchment affect the health / mauri of a stream?

Catchments with a lot of native tree cover generally have good water quality, habitat and aquatic life. Catchments with large urban or farming areas are degraded to some degree due to human activities (eg. deforestation, stream habitat destruction and pollution).

# 17 Catchment walk - Teachers notes

## Linking to curriculum

*Science - L 3/4 Living World: Ecology*

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

*Living World: Ecology*

Recognise that there are life processes (**moving, breathing**) common to all living things and these occur in different ways.

## Why walk in the catchment?

This walk gives students the opportunity to engage with native bush and the animals living in it. This is an important part of the day as many students are not given opportunities to connect with the natural world and can be unaware of the native animals and plants of Aotearoa.

## Introduction to the catchment walk

To introduce the catchment walk students revisit their understanding and prior learning of what a catchment is and identify the physical boundaries they can see. On the catchment walk students will visit five stations where they will stop to investigate different aspects of life in the catchment.

## Station 1: Aquatic insects

- At station one students will investigate the movement and breathing of two aquatic insects they have studied throughout the programme. Students will closely observe and record how the insects breathe and how they move.

## Station 2: Fish habitat

- At station two students will look closely at habitat areas and discuss whether they are suitable for the banded kōkopu and longfin eel, which they have studied in prior activities.

## Information to support discussion on BLM 39

Longfin eel adults lay their eggs at sea in the Tongan Trench in the Pacific Ocean. The young eels drift in ocean currents until they reach the New Zealand coast where most of them swim upstream into the upper catchment. Most feeding and growth takes place in fresh water. As adults they migrate downstream and out to sea where they reproduce. Longfin eels can live up to 80 years of age, breed once and then die. Longfin eels can live up to 80 years of age, breed once and then die. Adult longfin eels are often found in the pools of streams where they eat fish and even small birds, while smaller eels eat aquatic insects.

Banded kōkopu adults lay their eggs in leaf litter at the stream edge. After the eggs hatch the young fish are washed out to sea where they live for a short time. The young kōkopu (one of the whitebait species) then migrate back to fresh water. Most feeding and growth takes place in fresh water. Adults can breed every year and can live for more than nine years. Adult banded kōkopu are often found in the pools of streams. Banded kōkopu eat a variety of insects (eg. weta, beetles and ants) and spiders that fall into the water. They also eat young aquatic insects (eg. caddisflies and mayflies) from the streambed or when they drift in the water.

## Answers to BLM 39

2a. Yes

2b. The habitat will include some or all of the following: the water is shaded and cool, there are pools, food (eg. insects and spiders) falls in the water from the trees, and there is leaf litter on the forest floor where the banded kōkopu can lay its eggs.

## Station 3: Native birds

- At station three students will learn about and identify native birds that live in the catchment.

### Information to support discussion on BLM 39

The list below outlines the main food items recorded in the diets of the native birds which may be seen or heard during the catchment walk.

| | |
|---|---|
| Tūī | nectar, fruit, cicadas, stick insects and spiders. |
| Kererū | fruit and leaves. |
| Fantail | moths, flies, wasps, beetles and spiders (usually taken while flying). |
| Bellbird | nectar, fruit, insects and spiders. |
| Silvereye | nectar, fruit, caterpillars, spiders, bugs and beetles. |
| Kingfisher | kōura, small fish, cicadas, weta, stick insects, dragonflies, spiders, lizards, mice and silvereyes. |
| Grey warbler | spiders, caterpillars, flies, beetles, bugs and some small fruit. |
| Harrier | carrion and live prey including rabbits, rats, mice, small birds, frogs, fish, lizards and insects. |

## Station 4: Plant and animal interactions

- At station four students learn about the interactions between plants and animals by investigating life on a kawakawa tree.

## Answers to BLM 39

4a. Looper moth

4b. Forest gecko

4c. Tūī

4d. Parasite wasp

4e. Looper caterpillar

4f. Orbweb spider

## Station 5: Conclusion and questions

- At station 5 students discuss their learning and what they found interesting on the catchment walk.
- Students write questions about the things they wish to investigate further on their return to school.

# 17 Catchment walk

These activities are facilitated by the classroom teacher on the explore day.

## Site One

## Group bush walk

- Share the learning intentions with students.
- Explain to students that they are going to look more closely at the animals in the catchment.

  ? What is a catchment?

  *A catchment is an area of land drained by a river or stream, bordered by hills and ridges.*

  ? Show me some of the boundaries of this catchment.

  *The ridges and hills surrounding the valley are the boundaries.*

**Lead students around the designated walk, stopping at the stations outlined below.**

## Station 1: Aquatic insects

- Explain to students that this activity allows them to closely observe aquatic insects to learn more about how they move and breathe.

  ? What are the main features of an insect?

  *Share Photocard 1 with students. Insects have three body parts (head, thorax and abdomen), six legs attached to a thorax and adults of most species have wings.*

  ? How are aquatic insects different from other insects?

  *Share Photocard 2 with students. Aquatic insects spend some of their life in the water and some like the mayfly (Photocard 2) have gills to get oxygen from the water.*

- Allow the students 5 - 10 minutes to look closely at the insects in the trays and to complete the first section of their BLM.

  ? How does your chosen insect move?

  *Answers will vary.*

  ? Could you see how it breathes? Explain what you saw.

  *Many aquatic insects breathe with gills on the side of their bodies. Water passes over the gills which take oxygen from the water.*

### Learning intentions

Students will…

- Examine suitable habitat for native animals (context - a catchment)
- Observe breathing and moving behaviour of animals (context - aquatic animals)

### Success criteria

Students can…

- Identify habitats for specific native animals
- Identify breathing and moving behaviour of aquatic animals

### Resources

(are provided on the day)

Student folders (includes **BLM 39**: Living in a forest catchment, invertebrate identification card, pencil)

**Aquatic insects station**

Trays of aquatic insects

**Photocard 1**: Insect features - damselfly

**Photocard 2**: Breathing - mayfly nymph

**Fish habitat station**

Photos of banded kōkopu and longfin eel

**Native birds station**

Photos of native birds

# 17 Catchment walk

## Station 2: Fish habitat

- Discuss the photos of banded kōkopu and longfin eel found at the station.

  ? What do you know about these fish?

  Refer teacher notes.

- Explain to students that they need to look closely at the stream and forest habitat to decide whether or not this would be good habitat for these fish.
- Allow five minutes for students to complete the second section of their BLM.
- Discuss answers. Refer to teacher notes.

  ? How do these fish interact with the young aquatic insects we've just seen?

  The fish eat the aquatic insects.

## Station 3: Native birds

- Discuss the photos of the native birds found at the station.

  ? Have you seen any of these birds before?

  Tūī and kererū are referred to earlier in the unit.

  ? What do you already know about these birds?

  Answers will vary.

- Explain to students that they need to sit quietly for five minutes and watch and listen for birds. If they see any of the birds on the photocard they tick the appropriate box. Each time they hear a different bird sound they put a mark on their tally chart.
- Students sit quietly for 5 minutes and complete their BLM. At the end of the time ask:

  ? What birds from the card did you see?

  ? Did you see any other birds?

  ? How many different bird sounds did you hear?

- Explain that birds interact with other things in the catchment.

  ? What might these birds eat?

  Refer teacher notes.

## Station 4: Plant and animal interactions

- Explain to students that they are going to investigate plant and animal interactions.

  ? Why do animals need plants to survive?

  Plants provide oxygen, food, shade and shelter for animals.

- Identify the kawakawa tree. Explain that this plant was used by Māori for medicinal purposes.

  ? How do you think Māori used this tree?

  The fruit was eaten raw or used to flavour a kind of jelly made from seaweed.

  Leaves were used to make tea for colds and stomach aches.

  Leaves were chewed to alleviate toothache.

  The shiny side of leaves was put on cuts and grazes, while the dull side was used for stings and bites.

  Branches and leaves were burnt around kūmara gardens to kill off pest insects.

- Humans are not the only ones to use kawakawa. Explain the chart in the fourth section of the BLM and then allow students 5–10 minutes to complete it.
- Discuss student answers. Refer to teacher notes.
- Ask the students to gently look under leaves to see if they can find a looper caterpillar. If you find a caterpillar ask:

  ? Why is it called a looper caterpillar?

  As it moves its body makes a loop.

## Station 5: Conclusion and questions

? What did you learn or find interesting during the bush walk?

? What would you like to investigate further?

Allow students time to write questions about things they would like to investigate further.

# BLM 39: Living in a forest catchment

Names: ..... Date: .....

## 1. Aquatic insects

Look in the tray of insects and watch the aquatic insects move and breathe. Choose one insect from each box and record what you see (write, sketch or draw).

Mayfly

Moving:

Breathing:

Stonefly/dobsonfly/caddisfly/beetle

Moving:

Breathing:

## 2. Fish habitat

Look at the stream and the land around the stream.

a. Is this good habitat for banded kōkopu and longfin eels? Yes/No

b. Explain your answer.

.....

.....

.....

.....

## 3. Native birds

Sit quietly for 5 minutes and watch and listen for native birds.

a. Refer to your native bird card and tick the box to record the native birds that you see.

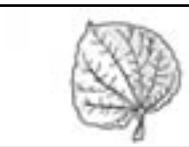
| | | | | | |
|---|---|---|---|---|---|
| Tūī | ☐ | Kererū | ☐ | Fantail | ☐ |
| Bellbird | ☐ | Silvereye | ☐ | Kingfisher | ☐ |
| Grey warbler | ☐ | Harrier | ☐ | | |

b. Use a tally chart to record how many different bird sounds you hear.

Tally: ..... Frequency: .....

# 4. Plant and animal interactions

Kawakawa is a common native plant which is important for many native animals. Look at the chart below and write the animal names in the correct boxes.

| Animal | What I use … | How I use it… |
|---|---|---|
| a. |  | I lay my eggs on the kawakawa leaves and rest on its branches. |
| b. |  | I crawl up the kawakawa and eat the fruit. |
| c. |  | I visit kawakawa to eat the fruit. I fly away and distribute the seeds. |
| d. |  | I lay my eggs in the looper caterpillar and my larvae feed on them, then hatch out of them. |
| e. |  | I live on kawakawa leaves and branches and munch holes into the leaves. |
| f. |  | I spin my web on plants like the kawakawa. |

| Forest gecko | Looper caterpillar | Parasite wasp | Tūī | Looper moth | Orbweb spider |
|---|---|---|---|---|---|
|  |  |  |  |  |  |

Gently bend over kawakawa leaves with holes in them and look at the underside.

Can you find a looper caterpillar? Yes / No

## Questions

You have learnt about some animals in a native bush catchment. Write three questions about things you would like to investigate further.

a. .....

b. .....

c. .....

# 18 Reflecting on explore day - Teachers notes

## Linking to curriculum

*Science - L 3/4 Living World: Ecology*

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

*Social Studies - L4*

Understand that events have causes and effects.

## What did we learn?

This activity provides an opportunity for students to reflect on the learning from the explore day, and the completed BLM is also useful for assessment.

This activity allows students the opportunity to compare the information they gathered from the two streams. The process of comparing will allow students to explain why the two stream testing sites showed different results.

## Graphs

Complete the bar charts on the BLM by shading in as you would for a bar chart. An example is provided below:

| Stream bed | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Clearwater Stream | Muddywater Stream |

| Algae | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Clearwater Stream | Muddywater Stream |

| Pool - riffle - run | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Clearwater Stream | Muddywater Stream |

| Stream shading | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Clearwater Stream | Muddywater Stream |

| Bank stability | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Clearwater Stream | Muddywater Stream |

# 18 Reflecting on explore day

This activity is facilitated by the classroom teacher following the explore day.

## Introduction

- Share learning intentions with the students.
- Explain to students that they are going to complete a stream health report that compares the two streams and the aquatic animals that live in them.

  ? What was the difference between the mauri of the two streams?

  Answers will vary.

## Activity instructions

- Hand out completed BLM 38 for both stream testing sites (completed on explore day).

  ? What results are the same at both sites?

  Answers will vary.

  ? What results are different?

  Answers will vary.

- Hand out and explain how to complete BLM 40. For each section students complete the bar charts for each of the tests for both streams (eg. BLM 38 - stream habitat, water clarity and aquatic animals sections). Once they have completed all the charts in a section they write a comparison of the two streams.
- Explain that for the human impacts section students will compare the catchment land cover for each stream (BLM 38 - introduction - question 3) and highlight the human impacts they observed on the explore day (BLM 38 - human impacts section).
- Finally students write an overall conclusion which states which stream is in better condition, with evidence to support their decision. The conclusion should also refer to both land cover and human impacts in the catchment.

## Conclusion

- Groups can compare results and conclusions.
- Share your explore day experience with others.

  - Display in school office / entrance for visitors or in the library.

  - Powerpoint presentation in assembly.

  - Article in school newsletter.

  - Talk to local media.

## Learning intentions

Students will…

- Examine the effects of human activity on the environment (context - stream habitats)

## Success criteria

Students can…

- Complete a report comparing two streams. Identify the impact of human activity on the health of both streams and the life within them.

## Resources

Completed **BLM 38**: Stream testing from site 1

Completed **BLM 38**: Stream testing from site 2

**BLM 40**: Stream health report

# BLM 40: Stream health report

Group: ..... Date: .....

On our explore day we compared two streams.

| | First stream testing site | Second stream testing site |
|---|---|---|
| Stream name | | |
| Where does the water from this stream enter the sea? | | |

Shade the boxes on the bar charts below for each test so you can compare stream habitat, water quality and aquatic animals. (eg. If the answer is 'poor' shade this box, if the answer is 'excellent' shade all of the boxes)

## 1. Stream habitat

| Stream bed | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Algae | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Pool - riffle - run | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Stream shading | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Bank stability | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

**Stream habitat comparison:**

Explain what is the same and what is different about the two streams.

.....

.....

.....

.....

## 2. Water quality

| Water Temperature | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Water clarity | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

| Conductivity | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

**Water quality comparison:**

What is the same and what is different about the two streams?

.....

.....

.....

## 3. Aquatic animals

| Invertebrates | |
|---|---|
| Ex | Ex |
| Ok | Ok |
| Poor | Poor |
| Stream 1 | Stream 2 |

**Aquatic animals comparison:**

What is the same and what is different about the two streams?

.....

.....

.....

## 4. Human impacts

What is the main land cover in each of the catchments?

Stream 1 1. ..... 2. ..... 3. .....

Stream 2 1. ..... 2. ..... 3. .....

Highlight the human impact (s) you observed at each site.

| | | | | | |
|---|---|---|---|---|---|
| Stream 1 | Stormwater | Animals | Culverts | Straightened streams | Weirs or dams |
| Stream 2 | Stormwater | Animals | Culverts | Straightened streams | Weirs or dams |

**Human impacts comparison:**

What is the same and what is different about the two streams?

.....

.....

.....

## 5. Overall conclusion

Which stream is in the best condition? How do you know?

.....

.....

.....

.....