

# Restoring our Native Flora and Fauna

## Teacher Notes/ Activity/Worksheets

### What can we offer

Here at Hamilton Zoo 'Restoring our Native Flora and Fauna' is an excellent context that can provide educational opportunities for students of all levels. Here students can see our Free-flight aviary of native bush which has been developed to what it is today. It provides a unique chance to see up close flora and fauna that exists in the Waikato region.

In addition we are lucky enough to have access to the Waiwhakareke Natural Heritage Park – a large scale restoration project opposite Hamilton Zoo. Here students can see what the community is doing to restore farmland back into different ecosystems i.e. ridgetop, hillslope, semi-swamp, lake margin/swamp, lake/aquatic and carry out a number of activities.

### Environmental education - Why?

We take a multi-disciplinary approach to learning in environmental education that develops the knowledge, awareness, attitudes, values, and skills that enables individuals and the community to contribute towards maintaining and improving the quality of the environment.

The aims of our environmental education programs are for students to develop:

- an awareness and sensitivity to the environment and related issues
- a knowledge and understanding of the correlation between the environment and people.
- attitudes and values that reflect feelings of concern for the environment.
- skills involved in identifying, investigating, and problem solving associated with environmental issues.
- sense of responsibility through participation and action as individuals, or members of groups, whānau, or iwi, in addressing environmental issues.

### Key Competencies

**Participating and Contributing** – *students are* given the opportunity to become actively involved in contributing to the quality and sustainability of our native bush eg. Arbor Day plantings

**Using Language, Symbols and Text** - *students will* explore the history of local restoration projects through visual, oral and written text and communicate findings in a variety of formats.

**Relating to others** – *students will* be able to listen actively, recognise different points of view and share ideas in relation to restoration of native bush.

**Thinking** – *students will* use creative and critical thinking to make sense of information and ideas, which will allow them to make decisions and shape their future actions with respect to our native flora and fauna.

**Managing Self** – *students will* be given facts which will allow them to follow their own interests in environmental sustainability and to gain further understanding of native flora and fauna restoration by being self-motivated, following instructions and completing tasks.

### Values

Ecological Sustainability

Inquiry and Curiosity

Participation in the wider community

Respect

## Possible Learning Areas / Achievement Objectives

(main focus Science/Social Science with links to other areas)

### Science

#### Level 1/2

##### **Living World - Ecology**

- Recognise that living things in our native bush are suited to their particular habitat.

##### **Living World - Planet Earth and Beyond - Interacting systems**

- Describe how our native flora and fauna areas have changed and what resources have been affected by human actions.

#### Level 3/4

##### **Living World - Ecology**

- Explain how living things in our native bush are suited to their particular habitat and how they respond to environmental changes both natural and human induced.

##### **Living World - Planet Earth and Beyond - Interacting systems**

- Investigate the water cycle and its effect on the native bush, climate, landforms and life.

#### Level 5

##### **Living World - Ecology**

- Investigate the interdependence of living things (including humans) in a native bush ecosystem.

##### **Living World – Life processes**

- Identify the key structural features and functions involved in the life processes of plants and animals that are found in a native bush environment.

#### Level 6

##### **Living World - Ecology**

- Investigate the impact of natural events and human actions on a New Zealand bush ecosystem.

##### **Living World – Life processes**

- Relate key structural features and functions to the life processes of plants, animals, and microorganisms and investigate environmental factors that affect these processes.

#### Level 7

##### **Living World - Ecology**

- Explore ecological distribution patterns and explain possible causes for these patterns.

#### Level 8

##### **Living World - Life Processes**

- Understand the relationship between organisms and their environment.

### Social Sciences

#### Level 1

- Understand how places in NZ are significant for individuals and groups.

#### Level 2

- Understand how places influence people and people influence places.
- Understand how the status of Māori as tangata whenua is significant for NZ communities.

#### Level 3

- Understand how people view and use places differently.
- Understand how people make decisions about access to and use of resources.
- Understand how cultural practices vary but reflect similar purposes.

#### Level 4

- Understand how exploration and innovation create opportunities and challenges for people, places and environments.
- Understand how formal and informal groups make decisions that impact on communities.
- Understand how people participate individually and collectively in response to community challenges.

#### Level 5

- Understand how people's management of resources impacts on environmental and social sustainability.
- Understand how the ideas and actions of people in the past have had a significant impact on people's lives.

#### Level 6- Geography

- Understand that natural and cultural environments have particular characteristics and how environments are shaped by processes that create spatial patterns.
- Understand how people interact with natural and cultural environments and that this interaction has consequences.

#### Level 7 - Geography

- Understand how people's perceptions of and interactions with natural and cultural environments differ and have changed over time.

#### Level 8 - Geography

- Understand how people's diverse values and perceptions influence the environmental, social, and economic decisions and responses that they make.



<b><u>English</u></b>	Listening, Reading and Viewing Speaking, Writing and Presenting
<b><u>Mathematics</u></b>	Statistics, Number, Measurement, Geometry
<b><u>The Arts</u></b>	Drama/Dance, Music, Visual Arts, Photography
<b><u>Health and Physical Education</u></b>	Healthy Communities and Environment – Community Resources
<b><u>Technology</u></b>	Technological Practice - Planning for practice
<b><u>Learning Languages</u></b>	Language and Cultural knowledge

### Learning Intentions

- Respect self, others and the environment
- Communicate effectively
- Solve problems efficiently

### Possible Learning Experiences

- Study the ecosystem of one particular tree.
- Learn to identify trees in your community by using a tree key or have students create a tree key in class.
- Study the structure of a tree, how it functions and the benefits it provides.
- Learn about the history of restoration projects in your community.
- Learn how to measure a tree's height, crown spread, diameter and age of a tree.
- Look for patterns in nature and replicate these in art work e.g. bark rubbings, leaf prints, sketching.
- Design advertising to educate others about the importance of Arbor Day and restoration projects.
- How do different cultures use trees/plants e.g. for Maori medicinal purposes, spices.
- Write descriptions of trees/plants.
- Produce a play recreating the history of Arbor Day or local restoration projects.
- Investigate relationships between plants and animals.

### Vocabulary

wetland, native, exotic, species, biodiversity, threatened, endangered, ecosystem, ecology, swamps, native, habitat, flora, fauna, arbour, food chain, sustainability, watershed, erosion, biome, conifer, canopy, deciduous, epiphyte, indigenous, pests

### National Standards

This is an ideal unit that can be linked to Reading, Writing and Numeracy National Standards. Choose which way best suits you to include this into your unit.

**Reading** – expose students to a variety of text (historical, newspaper, non-fiction) see list below of reading material suited for this topic.

**Writing** – choose a writing focus to be included in this unit (for example arguments, reports, responses to literature, articles, explaining, recounts)

**Numeracy** – Statistics, Measurement, Number, Grouping, Geometry

### Key Concepts / Big Picture

- Everything is connected – people, habitats, plants and creatures.
- Everything has a place on earth and we have the role in protecting habitats and species: biodiversity, ecosystems and kaitiakitanga.
- There is a correlation between us and the environment. Our actions can contribute to the environment in which we live and the environment can contribute to actions we take.

### Possible Assessment / Success Criteria

- Describe the process of a local native bush restoration project and the purpose of it.
- Write a recount of being involved in Arbor Day activities.
- Identify several native trees/plants.
- Understand the connection between plants and animals.
- Identify actions they can take to have a positive impact on local restoration projects.
- Produce an educational brochure about a local restoration project.
- Construct a play telling the story of the local area.
- Design a flora/fauna board game giving educational information.
- Identify different ecosystems and their interrelationship.

### Pre-visit Learning Outcomes

- Discuss what you know about native plants and why it is important to protect them.
- Discuss what living things you would expect to find in the Hamilton Zoo Free-flight aviary and Waiwhakareke Natural Heritage Park.
- Discuss reasons for participating in Arbor Day activities.
- Identify native restoration projects in our local area.

### Post-visit Learning Outcomes

- Explain the importance of native flora and fauna and how human impacts can affect them.
- Explain the role of Kaitiaki<sup>1</sup> and what personal actions we can take to protect our native flora and fauna.
- Carry out a class inquiry to come up with ways that they can help in the preservation of Waikato flora and fauna.

<sup>1</sup> **Kaitiaki** is a New Zealand term used for the Māori concept of guardianship, for the sky, the sea, and the land.

### Suggested Field Trip to Hamilton Zoo / Waiwhakareke

- Identify native plants at the Hamilton Zoo or Waiwhakareke and back in the classroom find out why they are important to this local area and how they have been used in the past. Native plants are labelled in the Hamilton Zoo Free-flight Aviary.
- Have a zoo education session and discuss how zoos have changed over time. Look at the development of the Hamilton Zoo - in particular look at photos showing the development of the Free-flight aviary and identify the purpose of this.
- Observe how native birds interact in a natural environment. Look at their food chains and special features.
- Discover and name invertebrates that live at Waiwhakareke and understand the importance they have in the food chain.
- Understand how farming has had an impact on water quality - a perfect example of this can be seen at Waiwhakareke where part of the park is still being farmed along a waterway and the other half has been restored with planting.





# ARBOR DAY

## What is Arbor Day?

Arbor Day falls every year on June 5<sup>th</sup>, although activities for Arbor Day may be celebrated on a different date in your area. It is much more than the start of the tree-planting season. It is a celebration of everything that depends on trees and the importance of them in our everyday lives.

## History of Arbor Day

The celebration of Arbor Day had its beginnings in an area not associated with trees or forests but the Great Plains of USA. J. Sterling Morton, moved to Nebraska, USA in 1854 with his wife Caroline. Nebraska, a Great Plains state, was a newly formed territory at that time.

Lacking trees, J. Sterling endeavored to encourage tree planting in order to attract people to the state. He did that first as Editor of Nebraska City News, and then as President of the Agricultural Board. In 1872, he proposed that the state declare April 10 as Arbor Day, and his proposal was accepted. On that day in 1872, it is said that Nebraskans planted one million trees.

In 1885, Nebraska declared J. Sterling Morton's birthday, April 22, as Arbor Day and made it a legal holiday. Today Arbor Day is celebrated by many countries around the world although the day in which it is celebrated will vary depending on the best time of year to plant trees.

## NZ History of Arbor Day

New Zealand's first Arbor Day planting was in Greytown in the Wairarapa on 3 July 1890. The first official celebration took place in Wellington in August 1892, with the planting of pohutukawa and norfolk pines along Thorndon Esplanade.

Born in 1855, Dr Leonard Cockayne (generally recognised as the greatest botanist who has lived, worked, and died in New Zealand) worked extensively on native plants throughout New Zealand and wrote many notable botanical texts. Even as early as the 1920s he held a vision for school students of New Zealand to be involved in planting native trees and plants in their school grounds.

This vision was adapted by many schools in New Zealand and have been planting native trees on **Arbor Day**.

Since 1977 New Zealand has celebrated Arbor Day on June 5, which is also World Environment Day. Prior to then Arbor Day, in New Zealand, was celebrated on August 4 - which was rather late in the year for tree planting in New Zealand hence the date change.

## How is Arbor Day Celebrated around New Zealand?

Many Arbor Day activities focus on ecological restoration projects using native plants to restore habitats that have been damaged or destroyed by humans or invasive pests and weeds. There are great restoration projects underway around New Zealand and many organisations including community groups, landowners, conservation organisations, iwi, volunteers, schools, local businesses, nurseries and councils are involved in them. These projects are part of a vision to protect and restore the indigenous biodiversity and create healthy habitats where native animals can live.

Over the years Hamilton has celebrated Arbor Day with plantings in numerous areas around the city. Since 2011 the focus on the Arbor Day plantings has been at Waiwhakareke Natural Heritage Park, New Zealand's largest inland restoration project. Waiwhakareke is recreating the rare and endangered wetland once widespread in our region. It is bringing back the rare plants and wildlife that make it home and creating a rich environmental, educational and recreational experience for the city. Local schools and corporate groups are encouraged to join in on the day to help make this project come to life.

## How can you get involved in Arbor Day Celebrations

- Join local community groups in plantings – check your local area for plantings that your school can get involved in.
- Take your class on a tree identification hike around your school or within your community.
- Have a tree activities day in your classroom.
- Dedicate library time for students to read books about trees and forests.
- Plant trees on the school grounds and learn how to maintain them.

# HAMILTON ZOO FREE-FLIGHT SANCTUARY DEVELOPMENT

## Hamilton Zoo Free-flight Aviary History

The Free-flight Aviary, which took over 2 years to design and build, features a unique self-sustaining 'Forgotten Forest' of New Zealand native bush, specially planted to reflect the pre-human environment of New Zealand.

This massive project officially opened to the public in 1996 and covers over 3800 square metres and is up to 17 metres in height. This making it the largest walk-through aviary in Australasia at this time at a cost of over three-quarter of a million dollars. Poles support a chain and mesh structure, which encloses a whole gully. This mesh is designed to exclude small vermin like sparrows and mice as well as dangerous feral animals such as cats and stoats making it a pest free environment. Visitor entrances have a two door system which requires only one door to be open at a time, to reduce the risk of birds escaping or unwanted animals entering.

Features within the enclosure include a large pond, a waterfall and small high pond of which the water is reticulated through to the top pond. Natural rocks, fallen trees and logs are used as well as naturalistic plantings. It has a wooden raised walkway in which not only puts visitors higher into the tree tops but also allows for the ground to become a natural environment.

It has only native birds and native plants. Care has to be taken to select only compatible animals and non-poisonous plants. The birds can interact with all other birds in a natural way. It has also been noted that the birds within the aviary are attracting birds into the environment outside the enclosure. The plants are chosen because they are suitable for shelter, food sources or habitat recreation.

Three main habitats are recreated; forest, wetlands and sub-alpine. Birds are free to fly anywhere within the sanctuary and may choose to have contact with visitors or hide away.

Several feeding stations are spread throughout the sanctuary. These are covered shelters where food and nectar water are placed daily. Food that is given in the feeding stations supplement food that the birds collect themselves from the plants and environment in which they live.

## Birds in Hamilton Zoo Free-flight Sanctuary

Birds within the Free Flight Sanctuary are part of a carefully managed conservation program. Many are rare or endangered.

Bird species within the aviary may change. We currently have the following birds within our aviary - Antipodes Island Parakeet, Banded Rail, Blue Duck, Brown Teal, New Zealand Shoveler, Grey Teal, Grey Duck, Bellbird, New Zealand Pigeon, New Zealand Scaup, North Island Kaka, Paradise Shelduck, Red-crowned Parakeet, Sacred Kingfisher, Tui, White-faced Heron.

Some of these species are part of a breeding programme. These may be either in the aviary or in other enclosures.

## Plants in Hamilton Zoo Free-flight Sanctuary

The plants in the Free-flight aviary are all native and have been chosen for their contribution to the ecosystem and a food sources for the birds that live within the free-flight. Once these plants had established themselves they have been able to self-seed developing a very natural ecosystem.

There are a number of native plants within the free-flight however all are not labelled. Those that are labelled with information signs are the following – Puriri, Cabbage Tree, Five Finger, Lacebark, NZ Honey Suckle, Wineberry, Tree Fern, Lemonwood, Korokio, Brown Pine, Marble Leaf, Pigeonwood, Tawa, Black Pine, Karamu, Rimu, North Island Kowhai, Hals Totara, Poroporo, Nikau Palm, Peppertree, Titoki, White Pine, Black Matipo, NZ Passionfruit, Black Tree Fern.

# WAIWHAKAREKE NATURAL HERITAGE PARK DEVELOPMENT

## History of Waiwhakareke

The name Waiwhakareke translates as (wai) water (whakareke) to plunge a pole.

Waiwhakareke has a rich history. In pre-European times the land was a popular transport corridor for Maori seeking stone or taking their goods to trade across the Tasman Sea. Ngati Koura, Ngati Ruru and Ngati Ngamurikaitaua all have links to the area, some dating back more than 800 years.

The forests and wetland at Waiwhakareke provided a place for food and resource gathering for Maori. Totara, matai, kauri, flax and raupo were collected for use as building materials, textiles and rope, while plants such as hinau, kahikatea, miro and raupo were collected for food (berries and pollen). Birds which fed on the trees were also snared and trapped by Maori, while fish, eel and duck were caught from the lake.

From the 1820s European settlers began arriving in the area paving the way for the land clearances of the 1860s. Maori activity continued in the area, particularly gum digging and the removal of Kauri from the swamps for use as waka (canoes). Over the next 40-50 years – particularly following European confiscation of Maori land after the Land Wars of the 1860s - drainage of the peat wetland increased. The draining of the wetlands allowed pastoral farming to establish on the land.

Up until Hamilton City Council purchased the area in 1975, the lake was not fenced off. A direct result of the lack of fencing around the lake was pollution of the water through cattle effluent. Cattle were able to access the lake directly and could graze the edges, with the resulting contamination degrading water quality.

## History of Waiwhakareke Natural Heritage Park

It all started in 1975 when Hamilton City Council purchased the land surrounding Waiwhakareke lake with restoration in mind. Starting in 2004 with an aim to reconstruct the natural forest, wetland and lake ecosystems present in pre-European times. Intensive predator control will allow

vulnerable species to flourish in an urban environment and spill over to other parts of the city.

The 60-hectare park will serve as a focus for Hamilton's wider biodiversity restoration, including lakes and lakeshores, the Waikato River, its banks and unique gullies, and other parks with current or potential natural values (estimated to be 750 hectares). It will bring our natural and cultural heritage to within easy reach of New Zealand's largest inland city, and reconnect current and future generations with their environment through enhanced education, outreach and engagement opportunities.

## Ecosystem at Waiwhakareke Natural Heritage Park

When restoring an ecosystem back to what it would have been once takes a lot of planning. Waiwhakareke has had the knowledge of many..... to help develop the overall plan.

In order to recreate the most successful restoration, thought in the types of plants is important. Each eco-sourced plant is carefully selected to suit the environment in which they are planted. These plants are going to produce fruit, pollen, shelter and a home for the many things that will eventually live here. Kkauri, titoki, wineberry, putaputaweta, coprosma, karamu, cabbage tree, koromiko, lancebark, rewarewa, kanuka, manuka, kawakawa, harakeke, totara, kowhai, lancewood are some of the plants being planted at Waiwhakareke.

Within these trees invertebrates live. These become important as a food source for the birds, amphibians and reptiles and also help in the pollination of plants. Wetlands can have hundreds of normally unseen insect species.

Waiwhakareke is known to be home to 'Fred the thread'. Fred the Thread is a caterpillar that grows into a small moth. The caterpillar was the basis of a detective hunt by the scientists at Landcare Research. Find out more at the science learning hub. <https://www.sciencelearn.org.nz/resources/1434-fred-the-thread>

## Birds at Waiwhakareke Natural Heritage Park

With the growth of plants over the last 12 years we are now seeing more bird life. With the restoration of this habitat has seen more berries and insects – being the main food source for birds?

Recently we have seen an increase in native birds. Fantail, tui, kaka, kingfisher and white-face herons have been seen in the park. We hope to see many more sightings of native birds as the park grows and the habitat develops further.

## What lives in the Lake

Waiwhakareke is known as a wetland peak lake. Many of New Zealand's native freshwater fish live in wetlands for some or all of their lives – such as short and long-finned eels, inanga, giant kokopu and banded kokopu. These fish also journey to and from the sea using a corridor of rivers, streams and drains. This watery pathway must be kept intact if they are to complete their lifecycles successfully. In contrast, the endangered brown mudfish spends all its life in wetlands or in drains or weed-filled creek beds. During dry spells it has an extraordinary ability to burrow deep into mud or under logs and hibernate for months at a time. This means it can occupy seasonal wetlands not accessible to other fish.

The juveniles of five of our native fish – banded, giant and short-jawed kokopu, inanga and koaro – are collectively known as 'whitebait'. Their eggs hatch in autumn and the larvae are washed out to sea. Six months later they make the hazardous return journey as juveniles. Most of the whitebait fishery catch is inanga. Juvenile kokopu and koaro may migrate over 100km upstream, even climbing damp rocks beside steep waterfalls, until they reach sheltered streams and wetland habitats.

Although birds are the most visible component of wetlands, other animals like invertebrates (such as insects), amphibians and reptiles (lizards, etc) also live there. Typical wetlands can have hundreds of normally unseen insect species. The ecosystem of Waiwhakareke was destroyed when the area was turned into farmland. As the restoration of this park continues we are seeing more and more of this natural ecosystem return. There are prime examples of the difference about the quality of water before and after restoration within the park.



## Suggested Forest and Fauna Activities

Focus	Objectives	Activities/links
Watersheds / Water cycle	What is a watershed? How does water move through the environment? Why is water quality important? How does planting trees protect and enhance water quality?	<a href="http://www.talkabouttrees.org/docs/lesson8.pdf">http://www.talkabouttrees.org/docs/lesson8.pdf</a> (although a California resource it is full of ideas for activities and lessons)
Ecosystems	What is an ecosystem? How do ecosystems work?	<a href="http://www.talkabouttrees.org/docs/lesson1.pdf">http://www.talkabouttrees.org/docs/lesson1.pdf</a> (although a California resource it is full of ideas for activities and lessons)
Parts of Trees	What are the different parts of a tree? What purpose does each part serve? What is the relationship between the function and parts of a tree and those of humans?	<a href="http://www.talkabouttrees.org/docs/lesson2.pdf">http://www.talkabouttrees.org/docs/lesson2.pdf</a> (although a California resource it is full of ideas for activities and lessons)
Invertebrate	What invertebrate am I? Where do I live? Am I an insect or a spider?	<a href="https://www.sciencelearn.org.nz/topics/invertebrates">https://www.sciencelearn.org.nz/topics/invertebrates</a> <b>Land Invertebrates</b> <a href="http://www.landcareresearch.co.nz/resources/identification/animals/bug-id/what-is-this-bug">http://www.landcareresearch.co.nz/resources/identification/animals/bug-id/what-is-this-bug</a> <b>Water Invertebrates</b> <a href="https://www.waicare.org.nz/Home.aspx">https://www.waicare.org.nz/Home.aspx</a> (under resources - Waicare invertebrate field guide for water invertebrate) <a href="http://www.landcareresearch.co.nz/resources/identification/animals/freshwater-invertebrates/guide">http://www.landcareresearch.co.nz/resources/identification/animals/freshwater-invertebrates/guide</a> <a href="https://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/macrobenthos-id-guides">https://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/macrobenthos-id-guides</a>
Fred the Thread	What am I? Why am I so important to Waiwhakareke?	<a href="http://sciencelearn.org.nz/Contexts/Hidden-Taonga/NZ-Research/Fred-the-Thread">http://sciencelearn.org.nz/Contexts/Hidden-Taonga/NZ-Research/Fred-the-Thread</a>
Wetlands	What lives in our lakes/streams/rivers? Saving our Streams	<a href="https://www.niwa.co.nz/freshwater-and-estuaries/our-services/aquaticplants/outreach/education#protect">https://www.niwa.co.nz/freshwater-and-estuaries/our-services/aquaticplants/outreach/education#protect</a> Hamilton Zoo Resource – Wetlands <a href="http://hamiltonzoo.co.nz/education/resources/worksheets-and-units/">http://hamiltonzoo.co.nz/education/resources/worksheets-and-units/</a>
Native Birds	What natural habitat do I live in? What do I eat?	Hamilton Zoo resources – Native Birds <a href="http://hamiltonzoo.co.nz/education/resources/worksheets-and-units/">http://hamiltonzoo.co.nz/education/resources/worksheets-and-units/</a>

## References and Resources - Websites

### **Waiwhakareke project** - [www.waiwhakareke.co.nz](http://www.waiwhakareke.co.nz)

*This website gives you the history of the land in which Waiwhakareke now stands. This area has been developed back into wetlands since 2004. It gives you Maori History, European Settlement and Farming Times. Waiwhakareke is in Hamilton opposite the Hamilton Zoo.*

### **Department of Conservation** - [www.doc.govt.nz](http://www.doc.govt.nz)

*This website holds information about Waikato Wetlands. It covers a range of teaching resources and information on wetland areas in NZ. Includes Waikato wetland areas: Lakes Kaituna, Ngaroto, Ruatuna and Whangamarino. Also has information on freshwater invertebrate.*

### **Environment Waikato** – [www.ew.govt.nz](http://www.ew.govt.nz)

*This website has teaching resources and resources for students on What are wetlands? Why wetlands are important, What's happening with wetlands and Looking after our wetlands with further links from its information. Teaching Resources – Rivers and Us is a water focused unit for years 4-8 which looks at the impact of humans on our waterways and the many diverse ways that we use water; Stream Sense is a water quality catchment monitoring programme for years 9-13 which encourages schools to become involved in ongoing monitoring of their local waterway.*

### **Landcare Research** – [www.landcareresearch.co.nz](http://www.landcareresearch.co.nz)

*This website is great to identify, plants and invertebrate.*

### **Learnz** – [www.learnz.org.nz](http://www.learnz.org.nz)

*Learnz takes you on virtual field trips covering a wide range of topics to do with sustainability. One of these being Northern Wetlands. A digital resource which is engaging and gives students the opportunity to interact with inaccessible places and people.*

### **Digistore** – [www.digistore.tki.org.nz](http://www.digistore.tki.org.nz)

*Digistore is a storehouse of digital content to support learning across the curriculum. On this website you will find interactive multimedia resources. There is a variety of wetland resources.*

### **Kiwi Conservation Club** – [www.kcc.org.nz](http://www.kcc.org.nz)

*The KCC is a child friendly site that looks at different types of plants found in the wetlands and threats and impacts on our native forest and birds.*

## References and Resources - Books

### **Wonderful Water** – Philippa Werry

[Connected 3, 2004 – Ministry of Education]

*Fictional story about a class field trip to a country stream. The class is comparing a city stream to a country stream. The class carries a variety of observations to come up with their conclusion.*

### **The Bittern** – Diana Noonan

[School Journal – Pt 03 No.1 2009 – 9.5-10.5yrs - Story]

*Grandad is commemorated for saving wetland from development and thereby helping the bittern.*

### **Raupo** – Jill MacGregor

[School Journal – Pt 01 No.5 2008 – 8.5-9.5yrs - Article]

*Find out more about this fascinating plant, including how early Maori used raupo.*

### **The Bush Supermarket** – Judy Stoud

[School Journal – Pt 03 No.2 1995 – 10-12yrs - Article]

*By having different equipment - eyes, wings, tail, beak, and feet - and by choosing different living areas, the birds share out the food available at different levels in the bush.*

### **Is This an Animal?** – Introducing the Animal Kingdom

[Building Science Concepts – Ministry of Education]

### **The Bush** – Classifying Forest Plants

[Building Science Concepts – Ministry of Education]

### **Waterways** – How Rivers and Streams Work

[Building Science Concepts – Ministry of Education]

### **The Land Changes** – Keeping Earth's Systems in Balance to Sustain Life

[Building Science Concepts – Ministry of Education]

### **Environmental Education in New Zealand Schools**

[Ministry of Education]

*National Library of NZ and Local Libraries will have books to help with this topic.*

# What do I eat?

Looking at the beak of each bird what do you think they might eat?

Use the bird signs in the aviary or pages on our website to help you.

**Australasian Bittern**



berries nectar insects  
fish seeds larvae flowers

**Antipodes Island  
Parakeet**



berries nectar insects  
fish seeds larvae flowers

**Kaka**



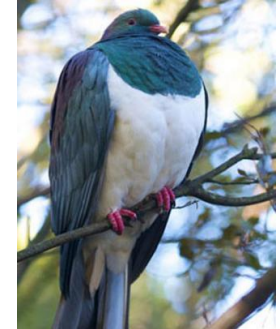
berries nectar insects  
fish seeds larvae flowers

**Sacred Kingfisher**



berries nectar insects  
fish seeds larvae flowers

**NZ Pigeon**



berries nectar insects  
fish seeds larvae flowers

**White-faced Heron**



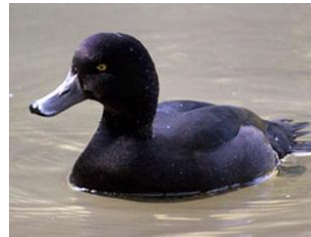
berries nectar insects  
fish seeds larvae flowers

**Bellbird**



berries nectar insects  
fish seeds larvae flowers

**NZ Scaup**



berries nectar insects  
fish seeds larvae flowers

**Banded Rail**



berries nectar insects  
fish seeds larvae flowers

**Blue Duck**



berries nectar insects  
fish seeds larvae flowers



# What plant am I?

Take a look in our free-flight aviary. Find the Maori and English name of the plants below.

Use the plant signs in the aviary to help you.



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name



Māori Name

Common Name





# What plant am I? (answers)

Take a look in our free-flight aviary. Find the Maori and English name of the plants below.

Use the plant signs in the aviary to help you.



**Māori Name**

Titoki

**Common Name**

New Zealand Ash



**Māori Name**

Kowhai

**Common Name**

North Island Kowhai



**Māori Name**

Kohia

**Common Name**

New Zealand Passionfruit



**Māori Name**

Tarata

**Common Name**

Lemonwood



**Māori Name**

Rimu

**Common Name**

Rimu



**Māori Name**

Tawa

**Common Name**

Tawa



**Māori Name**

Kohuhu

**Common Name**

Black Matipo



**Māori Name**

Matai

**Common Name**

Black Pine



**Māori Name**

Ti Kouka

**Common Name**

Cabbage Tree



**Māori Name**

Putaputaweta

**Common Name**

Marble Leaf

# What do I look like?

Take a closer look at each of the plants below and sketch a leaf. Think about the shape of each leaf, the veins and how they are placed on the stem.

Use the plant signs in the aviary to help you.

<b>Māori Name</b>
Nikau
<b>Common Name</b>
Nikau Palm

<b>Māori Name</b>
Kahikatea
<b>Common Name</b>
White Pine

<b>Māori Name</b>
Kohia
<b>Common Name</b>
New Zealand Passionfruit

<b>Māori Name</b>
Putaputaweta
<b>Common Name</b>
Marble Leaf

<b>Māori Name</b>
Puriri
<b>Common Name</b>
Puriri

<b>Māori Name</b>
Wheki
<b>Common Name</b>
Tree Fern

<b>Māori Name</b>
Titoki
<b>Common Name</b>
New Zealand Ash

<b>Māori Name</b>
Rimu
<b>Common Name</b>
Rimu

<b>Māori Name</b>
Makomako
<b>Common Name</b>
Wineberry

<b>Māori Name</b>
Kowhai
<b>Common Name</b>
North Island Kowhai

# What lives in NZ fresh waterways?

There are many things that live in our lakes, streams and rivers. Some of these are native and others are invasive. Take a look at the pictures below and circle if they are native or invasive.

**Eels / tuna**



Native or Invasive

**Hornwort**



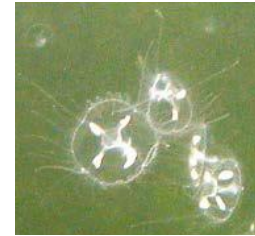
Native or Invasive

**Common Bully**



Native or Invasive

**Freshwater jellyfish**



Native or Invasive

**Inanga**



Native or Invasive

**Freshwater mussel**



Native or Invasive

**Koi Carp**



Native or Invasive

**Oxygen Weed**



Native or Invasive

**Freshwater crayfish /koura**



Native or Invasive

**Catfish**



Native or Invasive

**Hydatella**



Native or Invasive

**Golden Bell Frog**



Native or Invasive

**Rudd**



Native or Invasive

**Boatman**



Native or Invasive

**Freshwater sponge**



Native or Invasive



# What lives in NZ fresh waterways? (answers)

There are many things that live in our lakes, streams and rivers. Some of these are native and others are invasive. Take a look at the pictures below and circle if they are native or invasive.

**Eels / tuna**



Native or Invasive

**Hornwort**



Native or Invasive

**Common Bulli**



Native or Invasive

**Freshwater jellyfish**



Native or Invasive

**Inanga**



Native or Invasive

**Freshwater mussel**



Native or Invasive

**Koi Carp**



Native or Invasive

**Oxygen Weed**



Native or Invasive

**Freshwater crayfish /koura**



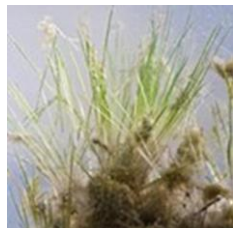
Native or Invasive

**Catfish**



Native or Invasive

**Hydatella**



Native or Invasive

**Golden Bell Frog**



Native or Invasive

**Rudd**



Native or Invasive

**Boatman**



Native or Invasive

**Freshwater sponge**



Native or Invasive



# Invertebrate Search

Softy shake some branches into a tray, look around the base of trees. What can you find?

Look closely through a magnifying glass. Look at features and identify using books.

Draw a picture	How many legs?	Does it have wings?	What colour is it?	Where was it found? (Top/middle of tree, on the ground or in the water)	My invertebrate is a.....

