

Waikato Wetlands

**A primary science/social science resource
for use at school and Hamilton Zoo**

**There's a lot more
to learn at**

 **Hamilton Zoo**
THE ZOO WITH PERSONALITY

Waikato Wetlands

What we can offer

At Hamilton Zoo the **Waikato Wetlands** area is an excellent context that can provide educational opportunities for students of all levels. Our education programme promotes awareness of issues relating to wetland management. The Waikato Wetlands area provides a unique chance to see fauna and flora that exists in the Waikato region and students can learn about wetland functions.

We also have the Waiwhakareke restoration project across the road from the zoo. Students can see the process of restoration of farmland back into different ecosystems i.e. ridgetop, hillslope, semi-swamp, lake margin/swamp, lake/aquatic.

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 programmes are for students to develop:

- awareness and sensitivity to the environment and related issues
- 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

CURRICULUM LINKS

Key Competencies

Participating and Contributing – *students are* given the opportunity to become actively involved in contributing to the quality and sustainability of wetlands.

Using Language, Symbols and Text - *students will* explore the history of wetlands 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 sharing ideas in relation to wetlands.

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 wetland.

Managing Self – *students will* be given facts which will allow them to follow their own interests in environmental sustainability to gain further understanding of wetlands 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 a wetland are suited to their particular habitat.

Planet Earth and Beyond - Interacting systems

- Describe how wetlands have changed and resources affected by human actions.

Level 3/4

Living World - Ecology

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

Planet Earth and Beyond - Interacting systems

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

Level 5

Living World - Ecology

- Investigate the interdependence of living things (including humans) in a wetlands 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 wetland environment.

Level 6

Living World - Ecology

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

Possible Learning Areas / Achievement Objectives

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

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.

Possible Learning Areas / Achievement Objectives

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

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

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 a wetlands unit.

Reading - expose students to a variety of text e.g. historical, newspaper, and non-fiction. See page 8 for 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

Learning Intentions

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

Possible Learning Experiences

- Investigate the connectedness of native flora and fauna in wetlands.
- Recognise some ways in which humans and animals impact on the mauri / special nature of the water.
- Develop skills in water quality monitoring to assess the health of waterways.
- Record and display growth rates of plants or flora/fauna in a grid survey.
- Construct a drama/dance display on the correlation between humans and the environment in the Waikato area.
- Sketch flora/fauna and identify.

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.

Vocabulary

wetland, native, exotic, species, biodiversity, threatened, endangered, ecosystem, ecology, swamps, native, habitat, flora, fauna

Possible Assessment / Success Criteria

- Describe what Waikato wetlands were like in the past and how these have changed.
- Explain why wetlands are valued and give reasons for their protection.
- Name several creatures and plants that live in a wetland and why they live in this habitat.
- Describe the relationships between plants and animals, and the implications for people living in and around wetland.
- Identify actions they can take to have a positive impact on their local wetland reserve.
- Write a letter to the council taking affirmative action.
- Construct a play telling the story of the local area.
- Design a flora/fauna matching game.

Pre-visit Learning Outcomes

- Discuss what we know about wetlands /kūkūwai and why it is important to protect them
- Discuss what living things you would expect to find there and what human impacts you might observe
- Discuss what actions you can take to be a great and safe visitor
- Identify areas of wetlands in our local area

Post-visit Learning Outcomes

- Explain the importance of wetlands and how human impacts can affect their health
- Explain the role of Kaitiaki¹ and what personal actions we can take to protect our wetlands
- Carry out a class inquiry to come up with ways that they can help in the preservation of Waikato wetlands

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

Suggested Wetlands Field Trip to Hamilton Zoo / Waiwhakareke

- Go pond-dipping to find what lives in the water, identifying the water invertebrates through a hand on approach using information given in the classroom.
- Observe birds in the wetland area and aviary and note how they use the environment around them (e.g. the wetlands).
- 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.



Brown Teal

The New Zealand brown teal (pateke) is a unique endemic dabbling duck that was once widespread through New Zealand wetland habitats, with an estimated population of several million prior to European settlement in 1840.

Brown teal are now one of the world's most endangered waterfowl species and by far the rarest NZ mainland duck species with fewer than 1000 brown teal living in the wild!

Sadly wetland drainage, forest clearance and the introduction of predators have caused their decline.

Hamilton Zoo is actively involved in a breed and release programme for the brown teal. This involves working closely with the Department of Conservation (DOC), the Brown Teal Recovery Group and a number of other organisations.

Suggested Wetlands Inquiry Unit

Inquiry Questions	Activity	Teachable moments
What do we know about wetlands?	Get students to brainstorm what they already know about wetlands. What is the function of wetlands? What might we find at a wetland area? Can we identify any wetland areas in our region? Record what students know.	<ul style="list-style-type: none"> - How do we brainstorm? - Working collaboratively – we can learn a lot from what others know.
What would we like to find out?	Get students to come up with a list of questions they would like to find out about wetland areas. This could be done as a class, in groups or individually. Group these questions into categories. E.g. about plants, animals, insects, water, how have they changed etc.	<ul style="list-style-type: none"> - How do we ask a good question? – Open /closed questions.
What is a wetland?	Explain what a wetland is to students. This may be in the form of diagrams, worksheets or photos. Look at the different animal and plant species that live in wetlands. Now that they know a little more about wetlands are there any more questions that they could add to their questions list? Have any of their questions been answered. Come up with a class definition of what a wetland is. E.g. A wetland is.....	<ul style="list-style-type: none"> - Looking at different resources to gather information. E.g. books, internet, people, libraries, council etc - How do we sum up all the information we now know.
History of the local wetland area.	Introduce students to their local wetland area. Share the history of this area and give information on how this has changed. Some students may have already done some research and have more to offer. This could be the zoo's wetland, Waiwhakareke or a wetland close to the school.	<ul style="list-style-type: none"> - Reading maps - Understanding how their region has changed by looking at pictures.
What cultural perspectives do Maori hold towards local wetlands?	Investigate the Maori words for wetland plants and animals. Why are some plants and animals especially important to Maori? (Food, medicine, resources, spiritual etc) Give students a wetland animal or plant species. Get students to research this plant or animal and find out why it is so important to Maori.	<ul style="list-style-type: none"> - Research skills - Maori language - Identification of native plants/animals
How are local wetlands being damaged?	Look at what is damaging local wetlands. What is storm water and how is this contributing to the damaged? Farming – what part of farming is damaging? Development – Do they consider the damage to local wetlands?	<ul style="list-style-type: none"> - Water cycle - Pollution (different types)
What have others done to preserve wetland areas?	Visit your local wetlands area, Hamilton Zoo and Waiwhakareke and look at what others have been doing to preserve or re-establish wetland areas. What is the purpose in these types of projects? What positive and negative differences have been noted? Are they making a difference? Who is involved with these projects? What are they doing to make a difference?	<ul style="list-style-type: none"> - Field trip
Have we answered all our questions?	Look at our question bank and see if we can now answer our questions. Do we need to do some more research?	

Suggested Wetlands Inquiry Unit

Inquiry Questions	Activity	Teachable moments
What can we do in our local area to help restore native wetland plants and animals?	Look at what projects already exist? Is there a project that we could start up ourselves or a way we could contribute to a project that is already established? Get students to come up with ideas. This could be an area within the school that needs redeveloping and by planting native plants will bring in bird and insect life to their area. It could be that they adopt a local farm that needs a waterway planted out. Growing of their own plants to donate to a project. Planting or cleaning up at an area that is already being re-established. Advertising what is happening in the local area and the positive outcome of the project. Fundraising to donate to a local project.	<ul style="list-style-type: none"> - Community Inquiry
What ideas do we have?	Get students to work in groups to come up with ideas on how the class/school can be involved in restoring a native wetland. Get students to have information to present to the rest of the class so that a decision can be made. They need to be able to answer questions such as? Who else will need to be involved? What will we need? What are our goals and how does our idea meet this?	<ul style="list-style-type: none"> - Presenting ideas – PowerPoint, poster, speech etc
TAKE ACTION	After a project has been decided on, action needs to be taken. As a teacher you could make this as big or as small as you would like by setting a time frame for the project to be completed in. By adopting a long-term project students will develop long term goals and feel like they have a stronger connection with their local environment.	<ul style="list-style-type: none"> - Propagating native plants - Advertising - Environmental Education - Being involved in a community project - Design and Development
Reflection - Evaluation	What have we achieved? What would we have done differently? Remember that some projects will be long term however by meeting regularly you can discuss the progress that is being made and if changes need to be made to original plan.	<ul style="list-style-type: none"> - Reflection - Evaluation



Discovery of the world's thinnest caterpillar in the Waikato!

Nicknamed Fred the Thread, Fred is the caterpillar of a native moth (*Houdinia flexilissima*) and is quite possibly the world's thinnest caterpillar. Fred was found following studies conducted by Landcare Research investigating the natural ecosystem of peat bogs in the Waikato. Peat bogs are mined for use in horticulture but also constitute a unique ecosystem. The plants Fred eats and calls home are currently under threat through mining of peat and as bogs are drained for use as pasture.

References and Resources - Websites

Waiwhakareke project - 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

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

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

This website is great to identify, plants and invertebrate.

Science Learning Hub – www.sciencelearn.org.nz

The Science Learning Hub provides resources for teachers for school years 5-10. The resources explore the latest research in science and technology in New Zealand and are closely linked to the science curriculum.

Learnz – 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

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 – ww.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.