

# wet-feet

## Investigating Fresh Water

*A Teaching Resource for Fresh Water,  
Wetlands, Dune Lakes, Streams & Rivers*





Introducing

# wet-feet

Investigating Fresh Water

## ***An innovative teaching resource for your school:***

- suitable for inquiry learning in all freshwater environments including dune lakes, gumlands, streams, wetlands and their native flora and fauna

## ***The comprehensive programme:***

- is designed to be used in all levels of the curriculum by teachers and environmental educators
- offers opportunities for decision-making, community involvement, freshwater research and monitoring to give understanding and inspire and empower students into action

## ***The teaching resource package offers:***

- a comprehensive inquiry framework with stages of learning and links to suggested teaching and learning experiences and resources
- a well researched resource list and reference guide



For further information see:  
[www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz)  
[www.doc.govt.nz](http://www.doc.govt.nz)



### **Introduction**

**Wet Feet – investigating fresh water** is a multi-curriculum, inquiry based learning resource for schools. The Wet Feet inquiry framework offers opportunities for decision-making, community involvement, freshwater research and monitoring to give understanding and inspire and empower students into action.

Wet Feet provides a comprehensive inquiry framework with stages of learning and links to suggested teaching and learning experiences which support inquiry into freshwater environments. The resource contains a well researched resource list and reference guide relating to freshwater environment inquiry. Wet feet is suitable for inquiry learning in all freshwater environments including dune lakes, gum lands, streams, wetlands and their native flora and fauna. It is designed to be used in all levels of the curriculum by teachers and environmental educators.

### **Background**

The Whitebait Connection Freshwater education programme started in Northland in 2002, and became the catalyst for the Wet Feet – investigating freshwater teacher resource. The first edition was developed in 2007 in the Far North by the Department of Conservation in Kaitaia with Royal Society of New Zealand Teacher Fellow, Ross Lyons. Following piloting and peer review the draft second edition has been developed incorporating the inquiry framework in 2009. This draft edition will continue to be reviewed and then finalised in late 2010.

### **Contributors**

- Ross Lyons: Royal Society of New Zealand Teacher Fellow, 2007; contributing author
- Julie Holt: Team Solutions, The University of Auckland; peer review and contributing author
- Kim Boyle and Nicki Wakefield: Whitebait Connection Coordinators, Northland; peer review and contributing authors
- Carolyn Smith and Doug Te Wake: Department of Conservation, Kaitaia Area Office; project leadership and funding support.



### **Acknowledgements**

The Royal Society of New Zealand for the teaching fellowship which provided an opportunity to research and write the resource material

The Northland Regional Council who provided professional support for monitoring the Far North dune lands and support resources

The teachers and pupils of Te Kao School, Te Kura Kaupapa Maori o Rangiawhia, and Oturu School in the Far North for taking part in trialling this resource

The Mountains to Sea Conservation Trust's Whitebait Connection programme coordinators for volunteering on this project.



## **Vision**

***Freshwater environment inquiry will inspire and empower students now and into the future to nurture and care for freshwater environments.***

## **Goals**

- To provide a freshwater environment inquiry framework and support resources to schools, communities and those learning about freshwater environments
- To support schools in learning in and about their local freshwater environments
- To inspire action for freshwater environments
- To provide a locally adaptable freshwater environments inquiry framework
- To provide opportunities for schools to involve environmental educators, community organisations, tangata whenua, the Department of Conservation and the school community in their freshwater environment inquiry.





## The aims of environmental education

### Environmental education is:

A multi-disciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment.

*Learning to Care for Our Environment: Me Ako ki te Tiaki Taiao:  
A National Strategy for Environmental Education*

The aims of environmental education are for students to develop:

- Aim 1: **awareness and sensitivity** to the environment and related issues
- Aim 2: **knowledge and understanding** of the environment and the impact of people on it
- Aim 3: **attitudes and values** that reflect feelings of concern for the environment
- Aim 4: **skills** involved in identifying, investigating, and problem solving associated with environmental issues
- Aim 5: a sense of responsibility through **participation and action** as individuals, or members of groups, whānau, or iwi, in addressing environmental issues

Environmental issues related to a sustainable future are often complex. Multi-disciplinary holistic teaching and learning approaches are therefore appropriate for meeting the aims of environmental education.

*Environmental Education Curriculum Guidelines, Ministry of Education*





## Benefits of environmental education

### **Benefits for students of the primary and intermediate schools:**

- Increase in awareness of environmental importance and pride in the environment
- Enhanced life skills
- Empowerment, ownership, and enjoyment
- Inclusion of all students
- Opportunity to learn life skills

### **Benefits for the school:**

- The school grounds become more attractive and aesthetically pleasing
- Promotional and public relations opportunities are created
- Relationships with the public are improved
- There is an increase in cooperation to enhance the school environment
- There are cost and energy savings

### **Benefits for teachers:**

- Improved workplace
- Increase in positive relationships
- Increase in student motivation
- Professional and personal development
- Decrease in work related stress
- Increase in job satisfaction

### **Benefits for the community:**

- Increase in environmental awareness and action
- Partnerships are created
- Increased pride in the school
- Increase in community value
- Increase in positive relationships
- Increase in awareness of environmental issues

### **Benefits for students of the secondary schools and the area school:**

- Increase in awareness and care for the environment
- Empowerment and ownership created
- Wide range of skills and values learnt
- Increase in respect for self and the environment

### **Benefits for the school:**

- Improved relations within the school
- Enhanced environment
- A more positive atmosphere created

### **Benefits for teachers:**

- Increase in job satisfaction
- Value, care, and pride for the environment created

### **Benefits for the community:**

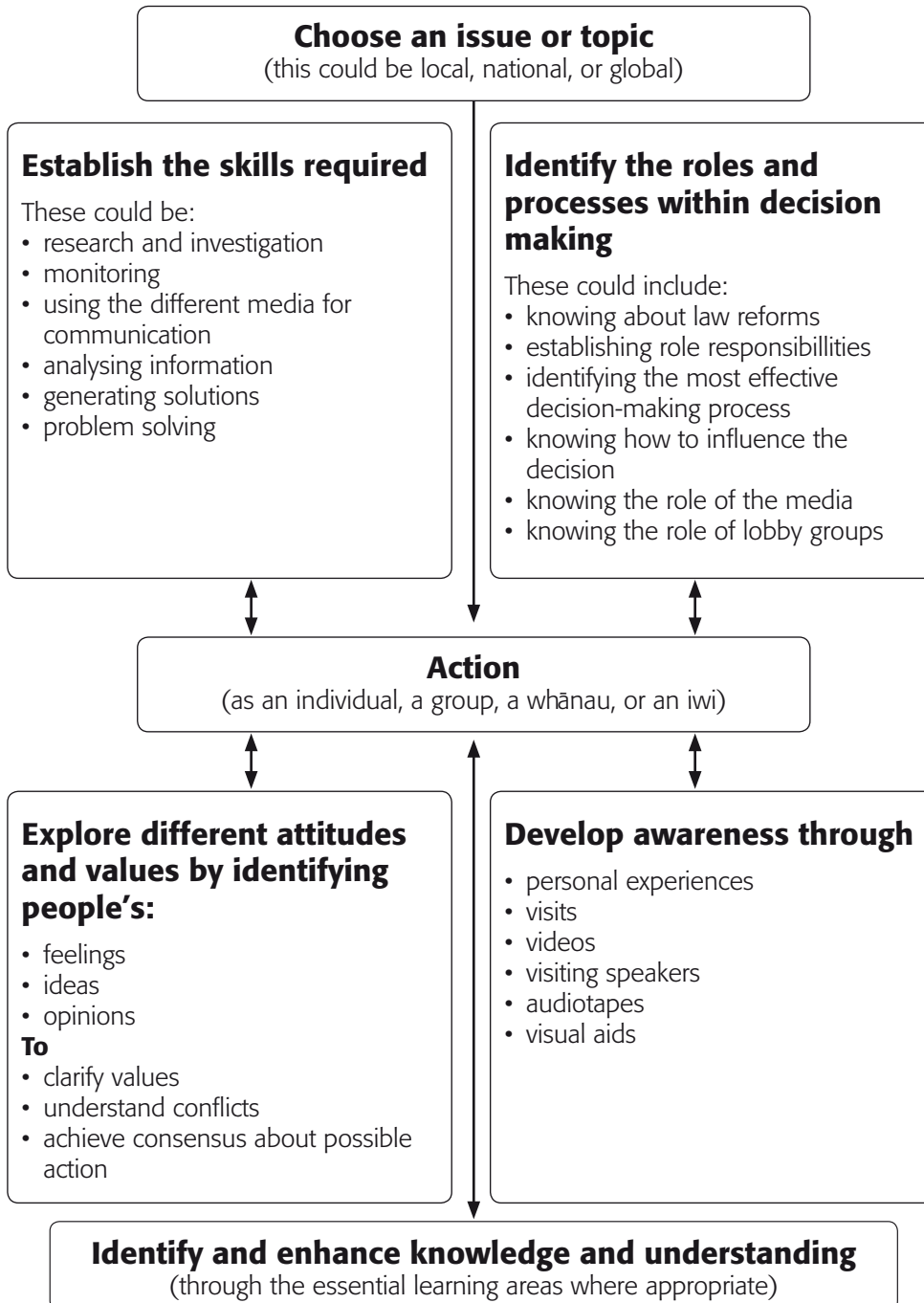
- Increase in community networking
- Environmental awareness and care created
- Increase in community integration

*Environmental Education Curriculum*  
Ministry of Education



## An action-oriented approach

The following diagram describes an action-oriented approach to environmental education.





## Resources

This teaching resource (Wet Feet - investigating fresh water) contains:

- Units of work
- Worksheets
- Standard forms and letters
- Lists of:
  - websites
  - teaching and learning experiences
  - school journal references
  - support resources

## Suggested resources

### Websites

- Whitebait Connection Website including images and teaching and learning resources to support freshwater environments inquiry [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz)
- [www.doc.govt.nz](http://www.doc.govt.nz)

### Videos/DVD

- Whitebait Connection using the Wet Feet Resource DVD
- Underwater under threat, New Zealand's native fish, (Ministry for the Environment)
- More whitebait, (Ministry for the Environment)
- Focus on bugs, (Waitakere City Council)
- Stream sense
- Guardians of the mauri, (Waitakere City Council)
- Forest/freshwater health, (DOC)

### Posters

- From the mountains to the sea - Wetlands at work for us, (DOC)
- Ngaro wai Ngaro ora - Planting by water keeps it healthy, (DOC)
- New Zealand's most unwanted fish, (Ministry for the Environment)
- New Zealand's freshwater fish, (Ministry for the Environment)
- New Zealand's freshwater invertebrates, (Ministry for the Environment)
- Far North wetland systems, (DOC Kaitaia)

### Photo packs

- The Pond Community, (Learning Media)
- The Stream Community, (Learning Media)

### Booklets

- For more information on your region's freshwater environments and how you can care for these see you Local and Regional Councils.

### Toolkit

- SHMAK kit/book (NIWA)
- fish traps
- scoop nets
- white rectangular plastic bins
- ID charts of invertebrates and fish
- The Reed Field Guide To New Zealand Freshwater Fishes, (Bob McDowall)
- Native animals of New Zealand, (A. W. B. Powell)

# wet-feet

Investigating Fresh Water



*How to use the Wet Feet Resource*



## How to use the Wet Feet resource

The Wet Feet resource has been developed incorporating the following:

- an inquiry framework
- global, national and local contexts for learning
- the Whitebait Connection (WBC) freshwater education programme delivery structure
- key learning concepts used in the WBC programme:
  - » values of freshwater
  - » interdependence, interconnections and cycles of the environment from the mountains to the sea
  - » ecology and biodiversity
  - » threats to the freshwater environment
  - » introducing personal and social responsibility - kaitiakitanga
- teaching and learning resources which support freshwater environment inquiry

Important consideration has been made to the following documents

- the New Zealand Curriculum (Ministry of Education, 2007)
- Guidelines for Environmental Education in New Zealand Schools (Ministry of Education, 1999)

While developed for use in schools, this resource is suitable for use by anyone wishing to learn about freshwater environments.

Please note: This resource is being constantly updated. A full and up to date version including links to more resources that fit within this inquiry framework can be found at [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz).

### Planning your Wet Feet programme

The Wet Feet resource has been designed to be adapted for individual needs throughout New Zealand. While the Wet Feet inquiry framework follows a stage by stage process this resource can be used in many different ways, in any part of New Zealand, over any timeframe, and involve many different people.

The following is an example of how the Whitebait Connection programme uses the Wet Feet resource and can be used as a guide when planning your Wet Feet programme. For further examples watch the Whitebait Connection from the Wet Feet Resource DVD.

### Step 1. Teacher and coordinator planning meeting. In this meeting the teachers and coordinator plan the following:

- key learning concepts and student outcomes
- goals and foci for the programme, eg. increasing awareness of a local issue; cultural values of freshwater; engaging students and community with local restoration project
- community and other organisations involvement. Coordinators and teachers can start identifying those community and organisation resources that will support the programme such as local freshwater restoration groups, the Department of Conservation, regional councils, tangata whenua and storytellers
- who will provide the key teaching and learning experiences to the students and setting dates. Use the Wet Feet and Whitebait Connection Curriculum and Inquiry Framework planning documents in this resource
- compilation of resources that will be needed throughout the programme such as posters, DVD's and freshwater investigation equipment
- anticipation of student action. Ideas and plans for action in stage 7 can start to be planned
- possible establishment of a webpage for the school's programme on the Whitebait Connection website
- discuss wbc evaluation framework
- discuss possible assessment options

### Step 2. Programme delivery

Constant reflection is made by teachers and coordinators from the start to the end of a school's freshwater inquiry to ensure goals and key learning concepts are being met, and support for the students' actions is provided.

### Step 3. End of programme

Celebration of students learning and achievements through presentations, certificates, media releases and leadership prizes is carried out. Acknowledgements and thank you's are made to those that contributed to the programme. Student, teacher and coordinator evaluations provide useful information for reflecting on the programme's success.

### Wet Feet and Whitebait Connection Curriculum Overview

**New Zealand Curriculum:** providing a context for developing teaching and learning programmes for education for sustainability.

<p><b>Vision</b></p> <ul style="list-style-type: none"> <li>• <b>Confident</b></li> <li>• <b>Connected</b></li> <li>• <b>Actively involved</b></li> <li>• <b>Lifelong learners</b></li> </ul> <p>Students who will be:</p> <ul style="list-style-type: none"> <li>- creative, energetic, and enterprising</li> <li>- motivated and reliable</li> <li>- able to relate to others</li> <li>- connected to land and environment</li> <li>- participants in a range of life contexts</li> <li>- contributors to the well-being of NZ</li> <li>- active seekers, users, and creators of knowledge</li> <li>- informed decision makers</li> </ul>	<p><b>Principles</b></p> <ul style="list-style-type: none"> <li>• <b>High expectations</b></li> <li>• <b>Treaty of Waitangi</b></li> <li>• <b>Cultural diversity</b></li> <li>• <b>Learning to learn</b></li> <li>• <b>Community engagement</b></li> <li>• <b>Coherence</b></li> <li>• <b>Future focus</b></li> </ul> <p>Students who:</p> <ul style="list-style-type: none"> <li>- experience a curriculum that engages and challenges</li> <li>- experience affirmations within NZ's unique identity</li> <li>- develop beliefs around authentic learning opportunities</li> <li>- make decisions</li> </ul>	<p><b>Values</b></p> <ul style="list-style-type: none"> <li>• <b>Innovation, inquiry and curiosity</b></li> <li>• <b>Diversity</b></li> <li>• <b>Community and participation</b></li> <li>• <b>Ecological sustainability</b></li> <li>• <b>Integrity</b></li> </ul> <p>Students who will:</p> <ul style="list-style-type: none"> <li>- have knowledge of important beliefs and values</li> <li>- have opportunities to explore and express own values and those of others</li> <li>- care for the environment with a range of actions to benefit all</li> <li>- show responsibility</li> </ul>	<p><b>Key competencies</b></p> <ul style="list-style-type: none"> <li>• <b>Thinking</b></li> <li>• <b>Using language, symbols and texts</b></li> <li>• <b>Managing self</b></li> <li>• <b>Relating to others</b></li> <li>• <b>Participating and contributing</b></li> </ul> <p>Students who will:</p> <ul style="list-style-type: none"> <li>- use these competencies to live, learn, work and contribute as active members of society</li> <li>- develop knowledge, attitudes and values that will lead to action</li> <li>- be encouraged to adopt and adapt practices that are valued</li> <li>- interact with people, places, ideas and things</li> </ul>
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### Whitebait Connection Mission Statement

To foster understanding of life sustaining capacities of aquatic eco-systems, by engaging school children, teachers, parents and the wider community, in an ecological and largely outdoor practical inquiry about streams and catchments and to encourage and facilitate any restorative actions that may result from that enquiry.

### Learning Areas: Science Social Sciences Literacy

- Aims**
- **Awareness and sensitivity**
  - **Knowledge and understanding**
  - **Attitudes and values**
  - **Skills**
  - **Participations and action**
- Students will be involved in teaching and learning approaches that contribute towards their own personal growth while maintaining and improving the quality of the environment.

- Concepts**
- **Interdependence**
  - **Sustainability**
  - **Biodiversity**
  - **Personal and social responsibility for action**
- Students will:
- explore the relationships between all living things and the physical environment
  - develop knowledge and understanding of sustainable resource management
  - know and understand the interrelatedness of all living things and the impact on them by people
  - experience the opportunities to become kaitiaki

- Dimensions**
- **In**
  - **About**
  - **For**
- Students will:
- experience learning as an integration of these dimensions
  - gain firsthand knowledge of natural environments
  - develop skills of observation, data collection, practical inquiry and investigation
  - develop awareness and knowledge about influences on the environment
  - seek ways to minimise impact on the environment
  - create practical opportunities to maintain and improve the quality of the environment

### ENVIRONMENTAL EDUCATION GUIDELINES

*Education for Sustainability is a new focus for education. It is a way of helping individuals and societies to resolve fundamental issues relating to the current and future use of the world's resources. However, simply raising awareness of these issues is insufficient to bring about change. Environmental education must strongly promote the need for personal initiatives and social participation to achieve sustainability.*



## **Wet Feet and Whitebait Connection Programme - Inquiry framework**

*An outline of the Wet Feet inquiry framework. Teacher and learner experiences are outlined in more detail in section 3 of this resource.*

<b>Stage name and summary</b>	<b>School Teaching and Learning Experiences</b>	<b>Whitebait Connection Teaching and learning</b>	<b>Resources</b>
<p><b>1. Making connections</b> Introduce and engage with the topic, outline and share existing knowledge and understanding, form connections with the topic, begin wondering, introducing inquiry process</p>	<ul style="list-style-type: none"> <li>- bus stop activity</li> <li>- freshwater environments topic reveal</li> <li>- resource building</li> <li>- document early wonderings</li> <li>- prompting questions</li> <li>- Know, What, Learn (KWL)</li> <li>- introduce inquiry stages, names and topic name</li> </ul>	<p>Teacher communicates students knowledge and understanding and early wonderings about the topic to coordinators who use it to plan the next stage</p>	<ul style="list-style-type: none"> <li>- Wet Feet DVD images</li> <li>- bus stop items</li> </ul>
<p><b>2. Strengthening connections</b> introducing 'big picture' key concepts, cementing connections with local freshwater environment, establishing global, national and local context for learning, introducing programme coordinators.</p>	<ul style="list-style-type: none"> <li>- introduce the local catchment walkabout</li> <li>- key concept map</li> <li>- revisit powerpoint</li> <li>- community freshwater values survey</li> <li>- water cycle lesson</li> <li>- Know, Want, Learnt (KWL)</li> <li>- catchment lesson</li> <li>- resource building</li> <li>- form a cultural map</li> <li>- watch the Whitebait Connection using the Wet Feet Resource DVD</li> </ul>	<ul style="list-style-type: none"> <li>- WBC Mountains to Sea / Connecting with the Whitebait Connection powerpoint presentation</li> <li>- How much is fresh? activity</li> <li>- Whitebait Run! game</li> <li>- connections within a catchment display</li> <li>- introduce the local catchment walkabout</li> <li>- Who dirtied the water? activity</li> </ul>	<ul style="list-style-type: none"> <li>- Wet Feet DVD</li> <li>- WBC using the Wet Feet Resource DVD</li> <li>- Guardians of the Mauri DVD</li> <li>- WBC Connecting with the Whitebait Connection ppt</li> <li>- catchment parts cards</li> </ul>
<p><b>3. Dive in</b> developing and forming 'the big' inquiry questions – focus &amp; support questions</p>	<ul style="list-style-type: none"> <li>- inquiry stage revision</li> <li>- prompting questions to help form the big questions</li> </ul>	<p>Teacher communicates students big questions to coordinators who use it to plan the next stage</p>	<ul style="list-style-type: none"> <li>- example inquiry plans</li> </ul>
<p><b>4. Diving deeper</b> constructing and planning methods to continue inquiry</p>	<ul style="list-style-type: none"> <li>- constructing a learning plan</li> <li>- working out a timeline</li> <li>- resource building</li> <li>- discussing learning opportunities</li> <li>- identifying and developing skills of research</li> <li>- identifying people and agency resources</li> <li>- work out inquiry checklist</li> <li>- scientific method lesson</li> <li>- KWL</li> </ul>	<ul style="list-style-type: none"> <li>- in-class field trip methods planning session</li> <li>- assisting with student inquiry planning</li> <li>- identifying people and agency resources</li> </ul> <p>Teacher communicates inquiry plans to coordinator</p>	<ul style="list-style-type: none"> <li>- WBC using the Wet Feet Resource DVD</li> <li>- Focus on Bugs DVD</li> <li>- example inquiry plans</li> <li>- inquiry skills and methods list</li> <li>- recording/ documenting methods list</li> </ul>



## Overview of units for wetlands and stream investigation using inquiry learning

Stage name and summary	School Teaching and Learning Experiences	Whitebait Connection Teaching and learning	Resources
<p><b>5. Explore &amp; discover</b> carrying out investigations, researching to answer big questions and recording/ documenting progress using methods identified in stage 4</p>	<ul style="list-style-type: none"> <li>- carrying out inquiry according to methods outlined in stage 4</li> <li>- resource building</li> <li>- inquiry stage revision</li> </ul>	<ul style="list-style-type: none"> <li>- coordinate field trips</li> <li>- in-class field trip follow ups</li> </ul>	<ul style="list-style-type: none"> <li>- resources identified in stage 4</li> </ul>
<p><b>6. Finding the treasure</b> summarising knowledge gained, sharing the knowledge gained and reflection on the inquiry</p>	<ul style="list-style-type: none"> <li>- using skills for presenting information</li> <li>- inquiry stage revision</li> <li>- comparing inquiry plan and timeline with inquiry results</li> <li>- evaluation and reflection of inquiry methods</li> <li>- networks list activity</li> <li>- letters of thanks for those that assisted in the inquiry</li> <li>- reporting and presenting the knowledge to school community</li> <li>- celebrating the knowledge!</li> </ul>	<ul style="list-style-type: none"> <li>- assisting students to interpret information</li> <li>- in-class visit: celebrate students findings and view presentations</li> </ul>	<ul style="list-style-type: none"> <li>- example presentations</li> <li>- processing and interpreting activities and skills list</li> <li>- reporting activities and skills list</li> </ul>
<p><b>7. It's all about knowledge</b> its all about the ACTION</p>	<ul style="list-style-type: none"> <li>- use skills gained to identify, plan, construct, set up a timeline, carry out, summarise, evaluate and reflect, report and celebrate their action FOR the environment</li> </ul>	<ul style="list-style-type: none"> <li>- assisting students determine and carry out action plans</li> <li>- identifying people, agency and support for student action plans</li> </ul>	<ul style="list-style-type: none"> <li>- WBC using the Wet Feet Resource DVD</li> <li>- Tiakina o Tatou Awa DVD</li> <li>- example action projects</li> <li>- action planning document</li> </ul>

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Investigating Fresh Water



**Work Stages**



## Stage 1 – Making Connections

*Pre inquiry evaluation, making connections and starting to think about what we want to find out.*

In this stage, participants will be engaged into the freshwater environments topic.

Existing knowledge and understanding of the freshwater environment will be outlined, then connections between the students' existing knowledge and the key concepts will be formed.

Pre inquiry opinions and ideas about the topic can be determined and 'lower level' questions or early wonderings about the inquiry will be developed.

Information gathered at this stage can be used in planning the following stages and in progress evaluations. This information will also be important for coordinators.

### Links to key competencies

- Thinking
- Using language, symbols and texts
- Participating and contributing

### Suggested learning intentions

- Form connections
- Form opinions and ideas around freshwater environments
- Form Know, Want, Learnt (KWL's) about freshwater

### Suggested success criteria

We will know we have succeeded when?

- We are able to describe what we know about freshwater environments.

### Potential curriculum links

English

- Forming inquiry questions

The Arts

- Making a wall chart

*continued over >>>*





## Stage 1 – Making Connections

*Pre inquiry evaluation, making connections and starting to think about what we want to find out.*

### Suggested teaching and learning experiences & resources

1. Introduce the topic of freshwater environments. As a group or individually establish existing broad understanding of the topic. Suggested prompting questions:
  - what is water?
  - where does water come from?
  - how do you use water?
  - why is water important?
  - who does freshwater affect?
  - who depends on freshwater?
  - what lives in freshwater?
  - how do people care for freshwater environments?
  - who cares for freshwater environments?
  - what are the different types of freshwater environments?
2. 'Bus Stop' to form connections between existing knowledge and key concepts. Use images and/or objects familiar to the participants and relating to the key concepts. On a large sheet of paper at each bus stop ask participants to write down what they think each image/object is and what it is about.
3. What do we want to learn more about? On a large sheet of paper gather early wonderings about the topic.
4. Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.



## Stage 2 – Strengthening Connections

*Introducing the 'big picture' key concepts of the freshwater topic*

In this stage, students will be introduced to the big picture key concepts of the inquiry in an engaging and/or experiential way. The key concepts are:

- values of freshwater
- interdependence, interconnections and cycles from the mountains to the sea
- ecology and biodiversity
- threats to the freshwater environment introducing personal and social responsibility - Kaitiakitanga.

Information gathered in stage one can be used to tailor this stage around the existing knowledge and understanding.

### Links to key competencies

- Thinking
- Using language, symbols and texts
- Participating and contributing

### Suggested learning intentions

- Know some values of freshwater
- Know about interdependence
- Know about connections and cycles from the mountains to the sea e.g. Water cycle, whitebait life cycle.
- Know about ecology and biology in freshwater
- Know about some threats to freshwater environments
- Understand the concept Kaitiakitanga and cultural values of water for Maori

### Suggested success criteria

We will know we have succeeded when?

- We are able to describe some aspects of the key concepts.

*continued over >>>*





## Stage 2 – Strengthening Connections

*Introducing the 'big picture' key concepts of the freshwater topic*

### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing

Health and Physical Education

Science

- Understanding about science

Social Sciences

- Social studies

Mathematics

- Location and grid interpretation

Information Technology

- Collating required information from appropriate sources

Maori

- Place names

### Suggested teaching and learning experiences & resources

1. Facilitator visit or use the powerpoint on the Whitebait Connection website [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz)
2. 'Introduce the local catchment' walkabout - take a field trip to identify key features and freshwater environments of the local catchment. Make a worksheet containing possible things to do on a local catchment walkabout or virtual tour, always linking to the key concepts. After a local catchment walkabout participants can select habitat types from the Wet Feet photo packs.
3. Form a 'cultural map' of the local catchment - students show on a map significant points of interest that they know about or have visited before which relate to? This map may be added to in the following stages also. Suggested points to include are:
  - habitat types discovered on a local catchment walkabout
  - places visited before
  - local legends or waiata
  - possible sources of water pollution in the local area
  - history of the area

4. Watch the Whitebait Connection using the Wet Feet Resource DVD and see how others have carried out inquiry into freshwater environments.
5. Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.



## Stage 3 – Dive In

### *Forming the inquiry questions*

Following stage 2, students can now develop inquiry questions that are based on a wide foundation of knowledge that is relevant to the freshwater environments topic.

#### Links to key competencies

- Thinking
- Using language, symbols and texts
- Relating to others
- Managing self
- Participating and contributing

#### Suggested learning intentions

- Know how to form inquiry questions based on a knowledge base
- Forming open ended questions

#### Suggested success criteria

We will know we have succeeded when?

- We are able to as a class, in groups or as individuals: finalise the inquiry questions based around the key concepts and state them clearly.

#### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing.

#### Suggested teaching and learning experiences & resources

1. As a class, in groups or as individuals, finalise the inquiry questions based around the key concepts. State them clearly and display them somewhere in the class. Suggested inquiry questions:
  - how healthy are our local freshwater environments?
  - are there any threats to the local freshwater environments?
  - what lives in our local freshwater environments?
  - how do local people use the freshwater environment?
  - how do local people care for the freshwater environments?
  - how are we affecting the local freshwater environments?
  - have the local freshwater environments changed?
2. Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.



## Stage 4 – Diving Deeper

### *Planning and constructing the inquiry methods*

Using the inquiry questions formed in the last stage students can now plan their inquiry.

Students will:

- identify what methods they need to use to carry out the inquiry
- develop an execution plan
- set a timeline
- ensure the methods are ethical and safe
- determine the methods they will use to interpret and present the results e.g video, graphs, maps.

#### Links to key competencies

- Thinking
- Using language, symbols and texts
- Relating to others
- Managing self
- Participating and contributing

#### Suggested learning intentions

- We are learning to?
- Plan a field trip.

#### Suggested success criteria

We will know we have succeeded when?

- We have a detailed, safe and ethical field trip plan that will help us to answer our inquiry questions.

#### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing

Science

- Understanding about science

Social Sciences

- Social studies

Mathematics

- Location and grid interpretation

Information Technology

- Collating required information from appropriate sources

Maori

- Place names

*continued over >>>*





## Stage 4 – Diving Deeper

### *Planning and constructing the inquiry methods*

#### Suggested teaching and learning experiences & resources

1. Provide a list of available methods to carry out an inquiry to students and they can identify which will be useful to their inquiry. eg. survey, interviewing experts, field investigation, MCI stream health indicators, getting information from maps, books, people. Use an example inquiry plan if needed.
2. Plan how students will record the inquiry. Provide a list of recording/documenting methods eg. video, photos, data sheets, sound recordings of interviews, inquiry journal/log.
3. Safety and logistical planning exercises eg. for field trips. Ensuring inquiry plan is do-able.
4. Field investigation methods – this may require a coordinator or local expert assistance to plan the field methodology based on local knowledge. Carry out an Environmental Risk Analysis and Management System (RAMS) activity with the students for any field trips
5. Develop a workplan for the inquiry including a timeline, checklist.
6. Deliver a lesson on scientific information gathering.
7. Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.



## Stage 5 – Explore and Discover

### *Carrying out the inquiry*

In this stage, students carry out their inquiry according to the methods identified in the previous stage.

#### Links to key competencies

- Thinking
- Using language, symbols and texts
- Relating to others
- Managing self
- Participating and contributing

#### Suggested learning intentions

We are learning to?

- Carry out a field trip that we have planned to answer our inquiry questions.

#### Suggested success criteria

We will know we have succeeded when?

- We complete the field trip.

#### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing.

Science

- Understanding about science

Social Sciences

- Social studies

Maori

- Place names

Health and Physical Education

#### Suggested teaching and learning experiences & resources

- Teaching and learning experiences will be defined in the stage 5 e.g. compare an unprotected freshwater environment with a protected freshwater environment
- Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.





## Stage 6 – Finding the treasure

### Summarising, sharing results and reflecting

By this stage students will have researched, investigated and gathered the information needed to answer their inquiry questions. In this stage the outcomes of the previous will be processed and results presented.

#### Links to key competencies

- Thinking
- Using language, symbols and texts
- Relating to others
- Managing self
- Participating and contributing

#### Suggested learning intentions

We are learning to?

- Interpret data acquired in the field to answer our inquiry questions about freshwater.

#### Suggested success criteria

We will know we have succeeded when?

- We can answer our inquiry questions.

#### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing

Science

- Understanding about science and communicating in science. Living world

Social Sciences

- Social studies

Information Technology

- Interpreting data - graphs, spreadsheets, presentations.

#### Suggested teaching and learning experiences & resources

- Introduce processing and interpreting activities and skills list
- Introduce reporting activities and skills list
- Compare the inquiry plan with the actual inquiry, comparing timeline
- Reflection – was the inquiry question answered? If not, what is needed to answer the question? Were the questions and methods suitable?
- Networks list activity - who has been a part of our inquiry? Make a list of all those involved. Write letters of thanks and share what you learnt with them
- Celebrate and share the learning! This could be by holding a community hui. (Please note: celebrating and sharing the learning may also be a part of stage 7)
- Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage.





## Stage 7 – It's all about the action

### Planning and carrying out action

In this stage, students use the knowledge, skills, networks and experiences gained throughout the inquiry and put it into ACTION!

#### Links to key competencies

- Thinking
- Using language, symbols and texts
- Relating to others
- Managing self
- Participating and contributing

#### Suggested learning intentions

We are learning to?

- Formulate and carry out an action plan that does something for the freshwater environment, based on the knowledge we gained during our inquiry.

#### Suggested success criteria

We will know we have succeeded when?

We have carried out our action plan and have made a commitment to a long-term action or values that we can carry on through our lives.

#### Potential curriculum links

English

- Listening, reading, viewing, speaking and writing.

Science

- Understanding about science, communicating in science. Living World.

Social Sciences

- Social studies

Information Technology

- Interpreting data – graphs, spreadsheets, presentations

Health and Physical Education

- Interpersonal skills

The Arts

- Communicating and interpreting

#### Suggested teaching and learning experiences & resources

1. Watch the Whitebait Connection programme using the Wet Feet Resource DVD and Tiakina o Tatou Awa for examples of actions.
2. Implement an action planning exercise using action planning document and action examples and skills document.
3. Develop an action plan including timelines, key tasks etc to carry out the action.
4. Check out [www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz) for a full list of resources and links relating to this stage, including examples of other students action.







## List of websites for freshwater waterways in New Zealand

### Wetlands and waterway information

<http://www.doc.govt.nz/upload/documents/science-and-technical/SfC181.pdf>

Protecting habitats on private land.

<http://www.waterinfo.org.nz/>

Information on freshwater in New Zealand - rainfall, levels, flows, etc.

<http://www.nrc.govt.nz/Environment/>

Northland Regional Council.

[http://www.landcareresearch.co.nz/research/research\\_details.asp?Research\\_Content\\_ID=7](http://www.landcareresearch.co.nz/research/research_details.asp?Research_Content_ID=7)

Maintaining and Restoring Wetlands Project.

<http://ramsar.org/>

The Ramsar Convention on Wetlands.

<http://www.wetlandtrust.org.nz/>

National Wetland Trust areas of New Zealand.

<http://www.niwascience.co.nz/rc/freshwater/>

National Institute of Water & Atmospheric Research freshwater page.

<http://www.nzwwa.org.nz/>

New Zealand water and waste sustainable management.

<http://environment.org.nz/>

Christchurch Environment Centre.

<http://www.biodiv.org/>

The Convention on Biological Diversity.

<http://www.doc.govt.nz/templates/summary.aspx?id=33685>

Conservation and wetlands.

<http://www.ew.govt.nz/enviroinfo/indicators/inlandwater/lakes/index.htm>

Environmental indicators in lakes.

<http://www.ew.govt.nz/enviroinfo/indicators/inlandwater/riversandstreams/index.htm>

Environmental indicators in streams.

<http://www.ew.govt.nz/enviroinfo/indicators/inlandwater/wetlands/index.htm>

Environmental indicators in wetlands.

<http://www.ew.govt.nz/enviroinfo/profile/maoriperspective.htm>

Māori perspective on the environment.

<http://www.mfe.govt.nz/publications/ser/metadata/env-class/page22.html>

New Zealand wetland classifications.

<http://www.mfe.govt.nz/publications/water/cultural-health-index-for-streams-and-waterways-feb06/index.html>

Cultural Health Index—a tool to assess the health of streams and waterways.

<http://www.landcare.org.nz/shmak/>

SHMAK monitoring kit info.

<http://www.nzetc.org/tm/scholarly/tei-Bio14Tuat01-t1-body-d3.html>

Information about inanga (whitebait) by R. M. McDowall.

<http://www.nzs.com/science/environment/>

Listing of environmental services on the Web for New Zealand.

**<http://www.niwa.cri.nz/services/free/nzffd>**

National Institute of Water & Atmospheric Research freshwater fish database.

**<http://www.niwa.cri.nz/rc/freshwater/fishatlas/fishfinder>**

Identification of freshwater fish.

**<http://www.doc.govt.nz/upload/documents/science-and-technical/WONI-Pamphlets.pdf>**

Freshwater biodiversity.

**<http://www.e4s.org.nz/efs/>**

Education for Sustainability.

**[http://www.nzpcn.org.nz/vascular\\_plants/advanced\\_search.asp](http://www.nzpcn.org.nz/vascular_plants/advanced_search.asp)**

New Zealand Plant information.

### Education resources

**<http://nwp.rsnz.org/>**

National Waterways Project.

**<http://www.nrc.govt.nz/For-Schools/>**

Northland Regional Council resources for schools.

**<http://www.ew.govt.nz/enviroinfo/water/index.htm>**

Environment Waikato waterways, school resources.

**<http://www.emap.rsnz.org/>**

Environmental Monitoring and Action Project.

**<http://www.waicare.org.nz/site/main/data.aspx>**

Water quality monitoring, education and action programme.

**<http://www.es.govt.nz/Departments/Environmental%20Education/resources/index.aspx>**

Environment Southland stream connection resources for a variety of levels.

**<http://www.lernz.co.nz/>**

Lake Ecosystem Restoration New Zealand.

**<http://www.teara.govt.nz/EarthSeaAndSky/en>**

Te Ara: The Encyclopedia of New Zealand, information for students.

**<http://www.ccc.govt.nz/Education/LearningThroughAction/PrimaryProgrammes/WaterwaysAndWetlands/>**

Christchurch City Council's education programmes and guided walks in wetlands.

**<http://www.hbrc.govt.nz/Education/EnvironmentalEducationinSchools/ResourcesforSchools/tabid/189/Default.aspx>**

Hawke's Bay Regional Council's resources for schools.

**<http://www.fishandgame.org.nz/Site/Environment/environmentwetlands.aspx>**

Wetlands resources for fishing and hunting.

**[http://www.tki.org.nz/r/eotc/resources/safety\\_e.php](http://www.tki.org.nz/r/eotc/resources/safety_e.php)**

Water safety guidelines for schools.

**<http://www.waitakere.govt.nz/AbtCit/ei/EcoWtr/FrshWtrFsh/frshwater-fish.asp>**

Identification of freshwater fish.

**<http://www.learningmedia.co.nz/>**

Useful resources for wetlands.

**<http://www.nzfreshwater.org>**

New Zealand native freshwater life.

**<http://nwp.rsnz.org/content/index.htm>**

Royal Society of New Zealand resources.

## Interactive student freshwater activities

<http://www.biodiversity.govt.nz/kids/>

Up the Creek—a bilingual interactive game for kids.

<http://www.ecokids.co.nz/>

Auckland Regional Council interactive site for kids.

<http://www.waterlink.org.nz/>

Interactive freshwater game for kids. The adventures of Pakura and friends.

[http://www.tki.org.nz/r/wick\\_ed/themes/freshwater.php](http://www.tki.org.nz/r/wick_ed/themes/freshwater.php)

## Stream and waterways planting guides

<http://www.ccc.govt.nz/parks/theenvironment/streamside.asp>

Christchurch City Council's streamside planting guide.

<http://www.bushmansfriend.co.nz/>

Plant identification and information.

## Environmental funding for projects

[http://www.wwf.org.nz/index.php/new\\_zealand\\_conservation/education/resources/](http://www.wwf.org.nz/index.php/new_zealand_conservation/education/resources/)

World Wildlife Fund teacher resources.

<http://www.mfe.govt.nz/withyou/funding/index.html>

Funding for projects.

<http://www.recycleglass.co.nz/fund.htm>

Funding for projects.

<http://www.nzwwa.org.nz/wherethereswater.html>

Funding for projects.

<http://www.nrc.govt.nz/For-Schools/>

Funding for environmental projects in Northland.

## Global environmental websites

<http://www.globe.gov/fsl/html/templ.cgi?about>

Environmental projects and resources.

<http://eelink.net/ee-linkintroduction.html>

North American Association for Environmental Education.

<https://www.streamwatch.org.au/streamwatch/connect/Streamwatch>

Australian environmental freshwater monitoring, teacher resources.

<http://www.earthforce.org/>

Teacher resources and monitoring programmes in the USA.



## Watery resources - School journals

TOPIC	YEAR	PART	TYPE
<b>RIVERS</b>			
Big Grey	1991	4.1	Poem
Gunboats on the Waikato	1983	4.2	Article 1-13
River Story (Waipa)	1983	4.2	Poem
Waikato Canoe Chant	1983	4.2	Poem
Highway on the Whanganui	1983	4.2	Article 9-10
After the Storm	1992	2.2	Story 9-10
Friday of No Mercy	1986	3.1	Article 8-9
Gisborne Floods	1990	YPW	Poem
The River Crossing	1995	4.1	Story 11-13
Rain in the Hills	1990	1.1	Article

<b>WATER AND USE</b>			
Waiere	1987	4.2	Poem
Power Crisis - Where to Now?	1993	4.2	Article 10-11
Turning on the Power	1981	4.3	Article 9-10
White Knuckle Territory	1996	SJ	Story Library
Make a Water Wheel	1989	1.2	Article 9-10
The Old Water Wheel	1989	1.2	Article 9-10
Shapes of Water	1995	1.4	Article 10-12
Drought	2002	3.3	Poem
Water Supply	1978	4.3	Article
Don't Waste the Water!	1999	3.3	Article
Easy as Child's Play	2002	Connected No.2	Article
Laying the Drains	1981	3.3	Article 9.5-10.5
The Water Cycle	2002	Connected No.2	Article

<b>WATER POLLUTION AND CONSERVATION</b>			
Rain in the Hills	1990	1.1	Article 8-9
Blue Fish on the Footpath	1992	2.2	Article 8-9
Pollution – What Happens?	1988	3.1	Article 10-12
Testing the North River	1996	2.3	Article 9.5-10.5
Turid Reid: Field Studies Scientist	1979	4.1	Article 12-14
Water Supply	1978	4.3	Article 12-14
Don't Waste the Water!	1999	3.3	Article 8.5-9.5
Using Water	1979	4.1	Article 10-12

TOPIC	YEAR	PART	TYPE
<b>RELATED TOPICS</b>			
Landscapes by the Foot	1989	2.1	Article 9-10
Diane Oud - Nursery Worker	1979	1.2	Article 9-10
How we came to have Town Belts	1983	3.1	Article 9-10
Building a House in India	1993	2.1	Article 9.5-10.5
The Water we Breathe	1978	3.2	Article 10-12
Windows made of Water	1982	1.2	Article 8.5-9.5
Salt from the Sea	1982	1.4	Article 8.5-9.5
Branches	1988	1.1	Article 7-8
An Interview with a Glass of Water	2002	Connected No.2	Story
Making Puddles	2000	Connected No.1	Article
It's All Happening	1996	2.3	Story
Pollution - What Happens	1988	YPW	Article

<b>FISHY TALES</b>			
A Fishy Question	1985	3.3	Article 12-14
Eels Have feelings Too!	1978	1.6	Story
Eel	1989	3.3	Poem
Eeling	1988	YPW	Story
The Eel Business	1980	4.1	Story
Hinaki	2000	SL	Story
Hopu Koura	1981	2.4	Article
Nanny's Whitebait	1981	2.3	Story
Our Tame Eels	1997	YPW	Article
Queen of the River	1999	1.1	Story
Whitebaiting	1981	2.3	Article
Bait	1998	4.2	Story
The Whitebait Game	1996	2.3	Story
Catching the Big Ones	1994	4.3	Article

<b>Books / Stories</b>
Kiwi Adventures Trout Fishing by Gillian and Darryl Torckler Reed Publishing
Native Animals of New Zealand A.W.B. Powell

This list is based on <http://www.taieri.net.nz/files/Screen%20version.pdf> P 82 and updated by 2003 Teacher Fellow Grant Irvine when he wrote 'Nelson Waterways Education Kit – an integrated approach'.

# wet-feet

Investigating Fresh Water

*The Whitebait Connection is a programme of the  
Mountains to Sea Conservation Trust*



For more information or feedback please visit  
[www.whitebaitconnection.co.nz](http://www.whitebaitconnection.co.nz)  
or email [info@whitebaitconnection.co.nz](mailto:info@whitebaitconnection.co.nz)



Department of Conservation  
*Te Papa Atawhai*

[www.doc.govt.nz](http://www.doc.govt.nz)