Investigating
Freshwater
Akoranga Wai Maori

An inquiry resource
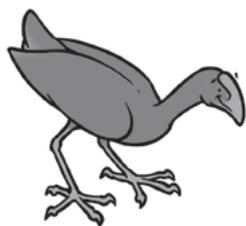
Introduction

Investigating Freshwater is a multi-curriculum, inquiry based learning resource for schools. The Investigating Freshwater inquiry framework offers opportunities for decision-making, community involvement, freshwater research and monitoring to give understanding and inspire and empower students into action.

Investigating Freshwater 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. Investigating Freshwater 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 (WBC) fresh water education programme was founded in 2002 under the charitable umbrella of the Northland based Mountains to Sea Conservation Trust. The Department of Conservation (DoC) and WBC formed a formal partnership in 2004 to assist both entities achieve their common goals - fresh water engagement, advocacy and conservation/preservation. DoC assisted in the national expansion of the WBC programme and it arrived in the Kaitaia area in 2006, becoming the catalyst for the WetFeet - investigating freshwater - teaching resource.

Wet Feet was developed in 2007 in the Far North by the Department of Conservation (DOC) Kaitaia Area Office (KAO) with Royal Society of New Zealand Teacher Fellow, Ross Lyons. WBC Northland and DOC KAO formed a partnership to launch and pilot the WetFeet resource. Following piloting and peer review, WBC worked collaboratively with DOC and education experts to draft a second edition of the resource in 2009, which incorporated a comprehensive inquiry framework, was based on the new curriculum and could be used to compliment the Whitebait Connection programme delivery. This formed the Whitebait Connection fresh water inquiry resource and was launched in 2010. The Whitebait Connection aim to keep the resource updated and 'fresh' and the latest version along with a comprehensive and evolving fresh water teaching and learning resource directory can be accessed online at www.whitebaitconnection.co.nz

The Department of Conservation continue to offer the WetFeet Investigating freshwater resource to New Zealand as a free educational resource that can be used by anyone hoping to find out more about fresh water.
Their Wet Feet resource can be found online at www.doc.govt.nz

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 Jones 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.
- The Department of Conservation for their vision and support

Vision

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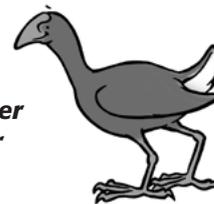
Goals

- 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

Resources

This teaching resource (Investigating Freshwater) includes:

• Units of work - a framework
• Links to worksheets which can be picked to suit your group and environment
• Links to standard forms and letter templates
• 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
• www.doc.govt.nz

Videos/DVD

• Whitebait Connection using the Investigating Freshwater 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.

Suggested Toolkit (coordinator can supply these)

• 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)

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How to use the Investigating Freshwater resource

The Investigating Freshwater 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.**

Planning your Investigating Freshwater programme

The Investigating Freshwater resource has been designed to be adapted for individual needs throughout New Zealand. While the Investigating Freshwater inquiry framework follows a stage by stage process this resource can 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 Investigating Freshwater resource and can be used as a guide when planning your Investigating Freshwater programme. For further examples

watch the Whitebait Connection from the Investigating Freshwater 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 Investigating Freshwater 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
- discuss possible assessment options
- 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 and techniques

Step 2. Programme delivery
Constant reflection is made by teachers and coordinators from the start to the end of a schools 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 programmes success.

Investigating Freshwater and Whitebait Connection Curriculum Overview

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

Vision
- **Confident**
- **Connected**
- **Actively involved**
- **Lifelong learners**

Students who will be:
- creative, energetic, and enterprising
- motivated and reliable
- able to relate to others
- connected to land and environment
- participants in a range of life contexts
- contributors to the well-being of NZ
- active seekers, users, and creators of knowledge
- informed decision makers

Principles
- **High expectations**
- **Treaty of Waitangi**
- **Cultural diversity**
- **Learning to learn**
- **Community engagement**
- **Coherence**
- **Future focus**

Students who:
- experience a curriculum that engages and challenges
- experience affirmations within NZ's unique identity
- develop beliefs around authentic learning opportunities
- make decisions

Values
- **Innovation, inquiry and curiosity**
- **Diversity**
- **Community and participation**
- **Ecological sustainability**
- **Integrity**

Students who will:
- have knowledge of important beliefs and values
- have opportunities to explore and express own values and those of others
- care for the environment with a range of actions to benefit all
- show responsibility

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

Students who will:
- use these competencies to live, learn, work and contribute as active members of society
- develop knowledge, attitudes and values that will lead to action
- be encouraged to adopt and adapt practices that are valued
- interact with people, places, ideas and things

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.

Julie Holt - Team Solutions, University of Auckland, Tai Tokerau

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Investigating Freshwater and Whitebait Connection Programme - Inquiry framework

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

Stage name and summary	School Teaching and Learning Experiences	Whitebait Connection Teaching and learning	Resources
1. Making connections Introduce and engage with the topic, outline and share existing knowledge and understanding, form connections with the topic, begin wondering, introducing inquiry process	- bus stop activity - freshwater environments topic reveal - resource building - document early wonderings - prompting questions - Know, What, Learn (KWL) - introduce inquiry stages, names and topic name	Teacher communicates students knowledge and understanding and early wonderings about the topic to coordinators who use it to plan the next stage	- Investigating Freshwater DVD images - bus stop items
2. Strengthening connections introducing 'big picture' key concepts, cementing connections with local freshwater environment, establishing global, national and local context for learning, introducing programme coordinators.	- introduce the local catchment walkabout - key concept map - revisit powerpoint - community freshwater values survey - water cycle lesson - Know, Want, Learnt (KWL) - catchment lesson - resource building - form a cultural map - watch the Whitebait Connection using the Investigating Freshwater Resource DVD	- WBC Mountains to Sea / Connecting with the Whitebait Connection powerpoint presentation - How much is fresh? activity - Whitebait Run! game - connections within a catchment display - introduce the local catchment walkabout - Who dirtied the water? activity	- Investigating Freshwater DVD - WBC using the Investigating Freshwater Resource DVD - Guardians of the Mauri DVD - WBC Connecting with the Whitebait Connection ppt - catchment parts cards
3. Dive in developing and forming 'the big' inquiry questions – focus & support questions	- inquiry stage revision - prompting questions to help form the big questions	Teacher communicates students big questions to coordinators who use it to plan the next stage	- example inquiry plans

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
4. Diving deeper constructing and planning methods to continue inquiry	- constructing a learning plan - working out a timeline - resource building - discussing learning opportunities - identifying and developing skills of research - identifying people and agency resources - work out inquiry checklist - scientific method lesson - KWL	- in-class field trip methods planning session - assisting with student inquiry planning - identifying people and agency resources Teacher communicates inquiry plans to coordinator	- WBC using the Investigating Freshwater Resource DVD - Focus on Bugs DVD - example inquiry plans - inquiry skills and methods list - recording/ documenting methods list
5. Explore & discover carrying out investigations, researching to answer big questions and recording/ documenting progress using methods identified in stage 4	- carrying out inquiry according to methods outlined in stage 4 - resource building - inquiry stage revision	- coordinate field trips - in-class field trip follow ups	- resources identified in stage 4
6. Finding the treasure summarising knowledge gained, sharing the knowledge gained and reflection on the inquiry	- using skills for presenting information - inquiry stage revision - comparing inquiry plan and timeline with inquiry results - evaluation and reflection of inquiry methods - networks list activity - letters of thanks for those that assisted in the inquiry - reporting and presenting the knowledge to school community - celebrating the knowledge!	- assisting students to interpret information - in-class visit: celebrate students findings and view presentations	- example presentations - processing and interpreting activities and skills list - reporting activities and skills list
7. It's all about action students carry out actions for the freshwater environments based on knowledge gained in earlier stages.	- 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	- assisting students determine and carry out action plans - identifying people, agency and support for student action plans	- WBC using the Investigating Freshwater Resource DVD - Tiakina o Tatou Awa DVD - example action projects - action planning document

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Stage 1 – Making Connections

Start of enquiry evaluation, making connections by sharing existing knowledge 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.

Opinions and ideas about the topic can be determined and 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

To describe what we know about freshwater environments

Suggested success criteria

Students are able to:

- form connections
- form opinions and ideas around freshwater environments
- use KWL

Potential curriculum links

English
- Forming inquiry questions

The Arts
- Making a wall chart

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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** 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

- To describe some aspects of the key concepts.

Suggested success criteria

Students will:
- be able to outline some values of freshwater
- be able to describe interdependence in the environment
- be able to name and describe connections and cycles from the mountains to the sea e.g. water cycle, whitebait life cycle
- be able to outline ecology and biology in freshwater
- be able to name some threats to freshwater environments
- explore the concept of Kaitiakitanga and cultural values of water for Maori

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
• Living world
Social Sciences
• Peoples customs, traditions and values
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**

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 Investigating Freshwater photo packs.

3. Form a 'cultural map' of the local catchment where students show on a map significant points of interest that they know about or have visited before. This map may be added to in the follow 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
   • location of the school

4. Watch the Whitebait Connection using the Investigating Freshwater Resource DVD and see how others have carried out inquiry into freshwater environments.

5. Check out **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

Students will:

- review prior knowledge to make further connections with the topic
- form enquiry questions based on existing knowledge and exploring early wonderings

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** 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.

In this section students will identify what methods are needed to answer inquiry questions. Students will gain skills in developing an execution plan and timeline including how they will record, interpret and present the results.

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

- To plan a field trip which supports the inquiry questions
- To identify suitable methods and skills for the inquiry

Suggested success criteria

The students will:
- Identify suitable skills for use in the inquiry
- Identify suitable resources for use in the inquiry
- Construct a timeline

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

On the Farm

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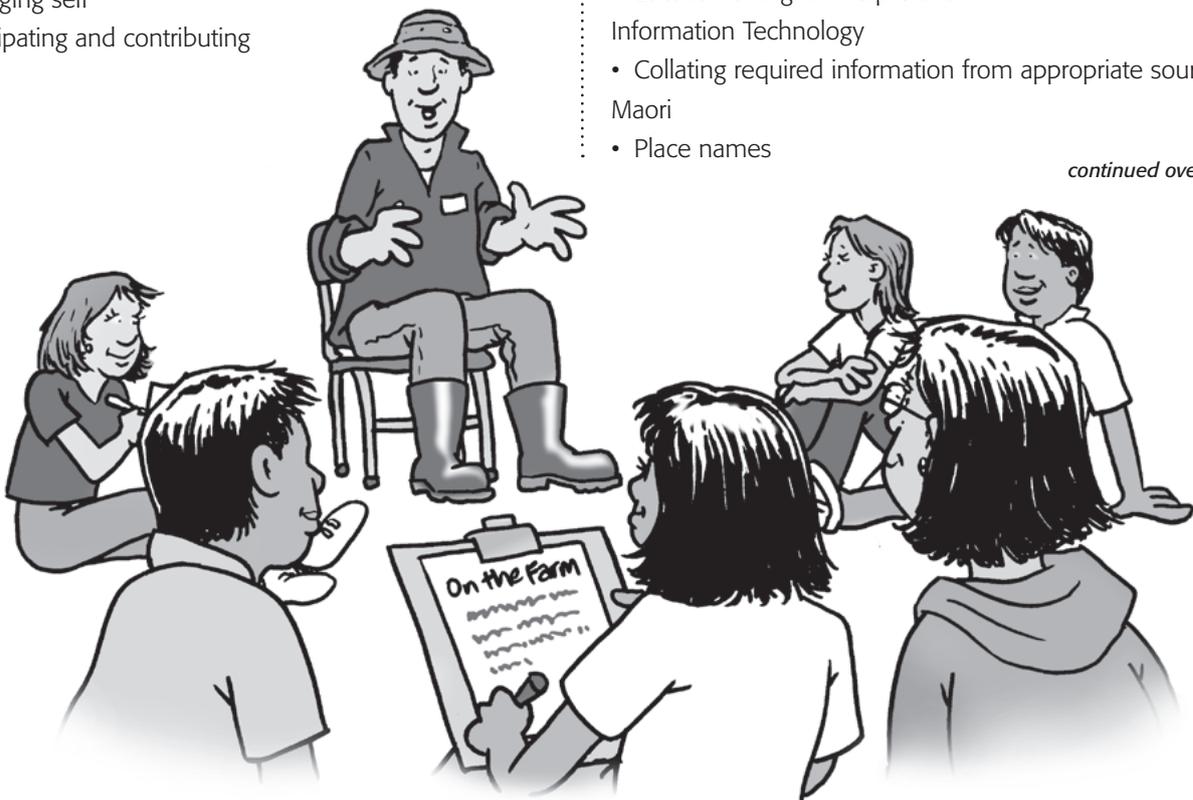
Stage 4 – Diving Deeper
Planning and constructing the inquiry methods

Suggested teaching and learning experiences & resources

1. Provide a list of potential 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 to chose from.

3. Students prepare RAMS for field trips.

4. Field investigation methods – this may require a coordinator or local expert assistance to plan the field methodology based on local knowledge.

5. Develop a workplan for the inquiry including a timeline and inquiry plan checklist.

6. Deliver a lesson on scientific information gathering.

7. Check out **www.whitebaitconnection.co.nz** for a full list of resources and links relating to this stage.

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Stage 5 – Explore and Discover
Carrying out the inquiry plan

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

- To carry out a field trip that we have planned to answer our inquiry questions
- To use the identified methods from stage 4

Suggested success criteria

The students will:
- Implement plans
- Record discoveries
- Take part in a field trip or explore other possible learning activities

Potential curriculum links

English
- Listening, reading, viewing, speaking and writing.

Science
- Living world

Social Sciences
- Social studies

Maori
- Place names

Health and Physical Education

Information Technology
- Interpreting data: graphs, spreadsheets, presentations

Health and physical education
- Heathy communities and environments

Suggested teaching and learning experiences & resources

- Teaching and learning experiences will be defined in the plan developed in stage 4.
- See the example inquiry plans for examples of experiences suitable for different focus questions.
- Check out **www.whitebaitconnection.co.nz** for a full list of resources and links relating to this stage.

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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

- To interpret information gathered to answer our inquiry questions about freshwater

Suggested success criteria

Students will:

- Be able to answer the inquiry questions
- Be able to communicate knowledge gained from their inquiry

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.
- Introduce reporting activities and skills list
- Compare the inquiry plan with the actual inquiry, including the timeline.
- Reflection – was the inquiry question(s) 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** 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

- To formulate an action plan that does something for the freshwater environment based on the knowledge we gained during our inquiry.
- To carry out the action plan developed

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 Investigating Freshwater Resource DVD and Tiakina o Tatou Awa for examples of actions

2. Identifying suitable and do-able action for the freshwater environment using action planning documents.

3. Develop and carry out an action plan including timelines and outlining recording and presentation methods using skills gained in the previous sections.

4. Celebrate achievements and actions. This can be done in many ways through involving others such as the wider community and media.

5. Check out **www.whitebaitconnection.co.nz** for a full list of resources and links relating to this stage, including examples of other students action.

PLANTING TO HELP PREVENT SOIL EROSION

FENCING TO KEEP LIVESTOCK OUT OF THE WATERWAYS
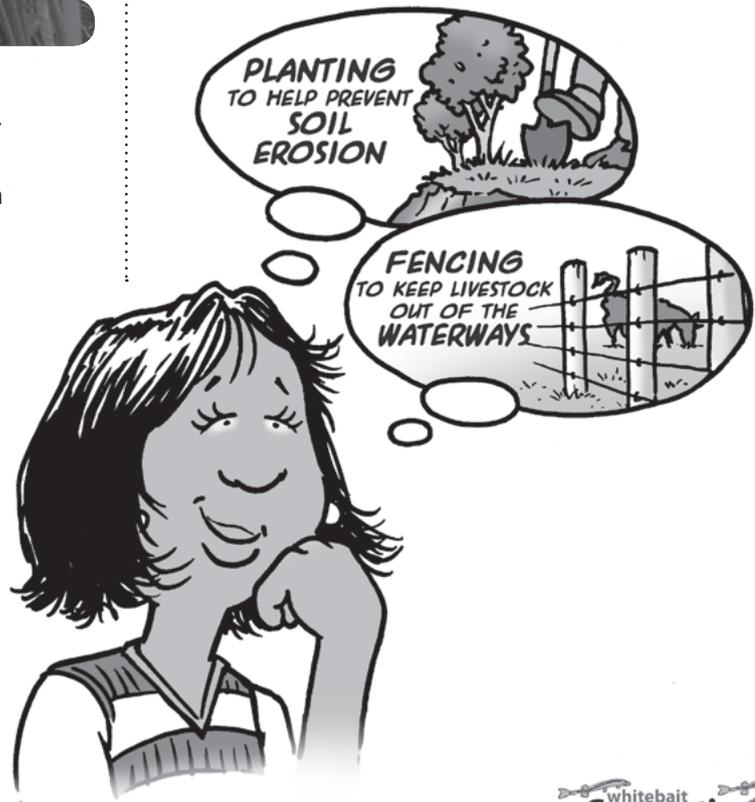
List of websites for freshwater waterways in New Zealand

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
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
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
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

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/
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.

whitebait
Connection
Xstream about freshwater life
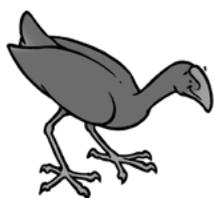
Watery resources - School journals

TOPIC	YEAR	PART	TYPE
RIVERS			
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

TOPIC	YEAR	PART	TYPE
WATER AND USE			
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

TOPIC	YEAR	PART	TYPE
WATER POLLUTION AND CONSERVATION			
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
RELATED TOPICS			
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

TOPIC	YEAR	PART	TYPE
FISHY TALES			
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

Books / Stories
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'.

Investigating Freshwater
Akoranga Wai Maori

whitebait Connection
Xstream about freshwater life

www.whitebaitconnection.co.nz

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

Mountains › To ‹ Sea
Conservation Trust
Nga Maunga ki te Moana

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