



Floating Wetlands

Te Kūkūwai Rewa

Education resource



BAY OF PLENTY
REGIONAL COUNCIL
TOI MOANA

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Introduction

Freshwater and the quality of it is a high priority for all of us. Rotorua lakes and the quality of the water is a key organisational priority for Bay of Plenty Regional Council.

The water quality of the Rotorua Te Arawa Lakes is declining due to various environmental influences. The main contributing factor has been the increase of nitrates and phosphates entering the lakes via streams and runoff.

The Regional Council has undertaken various initiatives to address this. One initiative has been to raise awareness of farmers, industry and the public on how to reduce nitrates entering waterways.

Another has been introducing communities to floating wetlands. This resource explains the history, structure and development of floating wetlands, and how schools can be involved in managing the water quality of our lakes through studying and launching their own floating wetland.

Kō te wai te ora o ngā mea katoa
Water is the life giver of all things



Floating wetland on Lake Rotoehu 2011

Why a floating wetland teacher resource?

Floating wetlands have only recently been considered a viable option to improve water quality in Rotorua lakes. This resource has been developed to assist schools interested in establishing and maintaining a floating wetland. It can also be used by other community groups.

For schools, the resource helps teachers:

- Increase student awareness and knowledge of floating wetlands.
- Increase student awareness of the role they can play improving water quality and ecosystems in Rotorua lakes.
- Facilitate positive changes to water quality in our lakes and waterways.

This resource is intended to provide more options and information about floating wetlands and the ecosystems that they support. The resource is a multi-curriculum, inquiry learning resource. It uses decision-making, community consultation and freshwater research as well as monitoring techniques to inspire students into action, and can be easily adapted to all levels.

Objectives of the kit

To investigate:

- The nature and uses of wetlands.
- The impact of humans on our lakes.
- The importance of floating wetlands.
- The community of plants and animals that exist in and around a floating wetland.

The resource also aims to develop:

- Awareness and sensitivity to the environment and diversity of a floating wetland environment.
- Knowledge and understanding of kaitiakitanga responsibilities for our environment, and what is affecting the lakes.
- Attitudes and values that recognise lakes and wetlands as a taonga and a responsibility for our environment and communities.
- Skills involved in identifying, investigating and problem-solving issues related to lakes and wetlands.
- A sense of responsibility through participation and action as individuals and as members of a group in addressing lakes issues and how floating wetlands help enhance the environment.

What's in the kit?

This resource kit provides:

- A suggested Unit plan.
- Background teacher information.
- Student activities designed to support the key dimensions of environmental education IN, ABOUT and FOR the environment.
- Relevant websites and resource links.

Also available are:

- Water monitoring kits, resources and how to book them.
- Samples of floating wetlands.

Bay of Plenty Regional Council online publications for teacher resources can be found on:

Rotorua lakes, teacher resource

<http://www.boprc.govt.nz/residents/teachers/teacher-resources/rotorua-lakes-teacher-resource/>

Waioira healthy water, teacher resource

<http://www.boprc.govt.nz/residents/teachers/teacher-resources/waioira-healthy-water/>

Where does it fit in to the curriculum?

The Floating Wetlands Resource has been designed by teachers to fit into a number of different areas of the curriculum, some major and some minor, including:

- **Major:** Science, English, Social Science, Environmental Education
- **Minor:** Arts, Physical Education and Health, Literacy and Numeracy

The resource has been developed in accordance with the Guidelines for Environmental Education in New Zealand Schools (1999, Learning Media).

Environmental education aims 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 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.

Suggested curriculum level

The activities contained in this kit can be used (or adapted for use) for levels 2 to 4 of the New Zealand school curriculum.

Field trips

There are a number of field-based activities requiring a visit to a floating wetland. Some of these activities can be combined into a single trip.

Making a Learning Journal and collating new words

There are 'Learning Journal entry pages' in many of the activities. These pages require students to write down their learning experiences in the form of a specific task, as explained within the Method or Reflection question section of an individual activity.

Also, each time a student encounters a new word, the word and its meaning can be entered onto the separate 'Glossary' template page.

There are print files of both the Learning Journal and the Glossary template in the Resource Section at the back of this Education Resource. Teachers may print and collate these separately if they wish to.



Unit planner – floating wetlands

Topic: Floating wetlands

'Considering the world we are a part of and how we can make decisions to manage and improve the quality of our local lake environments.'

Level: 2-4

Key Concepts:

Everything is connected: Inter-relatedness, whānaungatanga, whakapapa

There are limits to what the Earth can sustain and still provide for people and other living things.

We have a past and a future – our actions have consequences.

Kaitiakitanga – living together – we can design for harmony

Key dimensions of environmental education:

IN, ABOUT and FOR the environment

Learning experiences:

Experience, observe and investigate floating wetlands, the ecosystems they support and how they can assist in improving water quality in Rotorua Te Arawa Lakes

Key competencies:

Participating and contributing

Relating to others

Thinking

Managing self

Using language, text and symbols

Values:

Ecological sustainability

Inquiry and curiosity

Diversity

Community and participation

Integrity

Respect

Actions:

Carry out an inquiry study leading to an action project (installing a floating wetland) that contributes to the local environment (the Rotorua lakes).

Resources:

Rotorua Lakes Education Resource

Maps of Rotorua lakes

DVDs – Stop the Spread; Birth of a Floating Wetland; Rural Delivery

Learning Areas:

English

Achievement objectives: Listening, reading and viewing. Speaking, writing and presenting.

Science

A/Os: Physical world, Living world; Material world.

Observe, describe, compare physical and chemical properties.

Health and Physical Education

A/Os: Community resources; Relationships

Social Sciences

A/Os: Place and environment

Social responsibilities; understanding that events have causes and effects; and how people view and use places differently.

Mathematics and Statistics

A/Os: Statistics

Conduct investigation using the statistical inquiry cycle;

Probability

Technology

A/Os: Knowledge; Technological practice

Learning Languages

A/Os: Language knowledge; Cultural knowledge

Vocabulary:

Aerobic, algae, biodiversity, ecosystem, eutrophication, food web/chain; habitat, matrix, microbes, nutrients, PET, phosphates, pollutants

Learning Outcomes:

Students will:

Build knowledge and understanding of floating wetlands and how they can improve water quality in lakes.

Recognise some ways in which humans affect the mauri of water.

Investigate the interconnectedness of flora and fauna associated with floating wetlands.

Develop skills in monitoring water quality and ecosystems.

Learning stages and activities within this teaching resource

The table below illustrates the activities associated with each learning stage covered in this resource, and highlights the curriculum area that each learning stage falls within.

Learning stage	Activities	Page	Curriculum area
1. Floating wetlands – what do we know?	1a Bus stopping brainstorm – what do we know now?	37	ENG, SCI, SS
	1b Know your lakes	63	ENG, SCI, SS
2. Floating wetlands – what can we learn?	2a Water cycle	73	SCI
	2b Wetlands vs floating wetlands – what are the differences?	89	SCI
	2c Floating wetlands – why Rotorua?	93	SCI, ENV ED
	2d Where are the floating wetlands now and where can they go?	117	SCI, SOC SCI, ENV ED
	2e Construction of a floating wetland. Video voice-over – become a reporter	133	SCI, ENV ED
	2f Construction of a floating wetland – investigate the situation	127	SCI, ENV ED
	2g YouTube: 'Fight to clean up Rotorua lakes'	135	SCI, SOC SCI, ENV ED
	2h Understanding biodiversity	137	SCI, ENV ED
	2i What invertebrates live in our lakes?	153	SCI
	2j Invertebrates in our lakes – the koura	157	SCI
	2k Invertebrates in our lakes – more facts about freshwater invertebrates	161	SCI
	2l Vertebrates in our lakes – facts about freshwater vertebrates	163	SCI
	2m Food chains and food webs	167	SCI, ENG, ENV ED
	2n Who eats what/whom?	171	SCI, ENV ED
	2o Join (or create) a floating wetlands Facebook page	175	TECH, ENG, ENV ED, SCI
	2p Review	177	ENG, SCI, ENV ED
	3. Exploring a floating wetland hands-on! Field trips	3a Pre-field trip preparation	181
3b Plan for action		183	ENV ED
3c Field trip #1 – what is living on the floating wetland?		185	SCI, ENV ED
3d Field trip #2 – what is living under the floating wetland?		197	SCI, ENV ED
3e Evaluating the field trips		207	SCI, ENV ED, ART
3f What did we learn? Comic strip		209	SCI, ENV ED, ENG / MĀORI
3g Building a prototype floating wetland		215	TECH, SCI, ENV ED
3h What else is affecting the quality of our lakes? (Extension)		221	SCI, SOC SCI, ENV ED
4. Take Action – making our own floating wetland	4a Action Plan	227	SCI, SOC SCI
	4b Application process – what's involved?	231	SOC SCI
	4c Application process – who's involved?	235	SOC SCI
	4d Application process – data gathering	241	SOC SCI
5. Reflect – monitoring and reporting progress	5a Tracking progress	245	SOC SCI, MAS, SCI, ENV ED
	5b Successes and future recommendations	247	SOC SCI, SCI
	5c Reporting progress and knowledge – celebrating successes!	249	SCI, SOC SCI, ENV ED

ENG = English	TECH = Technology	SS = Social Studies	ENV ED = Environmental Education	SOC SCI = Social Sciences
SCI = Science	ENG / MĀORI = English / Te reo Māori	ART = The Arts	MAS = Mathematics and Statistics	PE = Physical Education

Curriculum planner – floating wetlands

<p>Topic: Floating wetlands Levels 2-4</p>	<p>Science</p>	<p>English</p>
<p>Learning Outcomes:</p>		

Action learning cycle

The EnviroSchools action learning cycle can be used to plan any topic, issue or project (see EnviroSchools Handbook pg 43-47).

