



He tāonga te wai – water is precious

He tāonga te wai — water is precious is an Integrated Studies (English and Social Studies) learning programme for Year 9 students about water issues on the Kāpiti Coast.

Introduction

On the Kāpiti Coast, everyone recognises water is a resource we must use wisely. We need to make sure we, and future generations, have a reliable, quality water supply, as well as healthy streams, rivers and lakes.

Since 2011, the Kāpiti Coast District Council has been working with iwi and educators to develop water education programmes for young people.

The Water Education Facilitator (WEF), who can be contacted at works with Early Child Education (ECE) teachers and teachers to develop and implement water education programmes for young people and to assist centres and schools to be efficient users of water. They can be contacted on wated@kapiticoast.govt.nz.

A series of learning programmes focusing on water use on the Kāpiti Coast has been developed for ECE to Year 9. Each learning programme is stand-alone and is intended to be adapted by ECE educators or teachers to meet the needs of their children or students. Collectively, the series of resources provide sequential learning for young people as they develop an understanding of water issues on the Coast and actions they and their families can take to use water wisely.

Using the learning programme

He tāonga te wai — water is precious was developed and trialled with teachers from Kāpiti College in 2011. It can be used as an end of term 4 unit or as a unit within any Integrated Studies topic rotation.

The Water Education Facilitator, from the Kāpiti Coast District Council, who can be contacted at wated@kapiticoast.govt.nz can provide a range of resources to support the delivery of this unit. The resources available are outlined in the Teachers' Notes that go with each section of the unit.

The unit has eight sections. In each section a range of activities for students are outlined. It is not expected students will complete all the activities but teachers will select amongst the provided material and build a learning programme suited to their students' interests. Section 1 (the introduction to the unit) includes some activities that establish student prior learning and interests.



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Curriculum links

Values highlighted in this unit	How students will be encouraged to develop the selected value or values during the unit
Respect Community Care Integrity	Students will be learning about the water issues on the Kāpiti Coast and what they can do to assist with water conservation. Students will be looking at personal, community and global responses to water issues and why water is so important.

Excellence – aiming high, persevering **Innovation**, enquiry and curiosity **Diversity** – culture, language, heritage **Respect** – for themselves and others **Equity** – fairness and social justice **Community** and participation for the common good **Care** for the environment **Integrity** – accountability, honesty, acting ethically

Key competencies highlighted in this unit	How students will be encouraged to develop the selected competency or competencies during the unit
Managing self Thinking Participating and Contributing Using Language, Symbols and texts	Students will look at the values and beliefs of others in the region to determine the significance of water to different groups of people. Students will consider possible solutions for reducing water use on the Kāpiti Coast. The students will take personal and possibly family or group action to reduce their water use.

Managing self – self-motivation, personal goals, appropriate behaviour, resourcefulness, sense of self and importance of heritage **Relating to others** – listen actively, recognise different points of view, negotiate, share ideas **Participating and contributing** – balancing rights, roles and responsibilities, and responding appropriately as a group member. **Thinking** – using creative, critical, metacognitive and reflective processes, drawing on personal knowledge and intuitions. **Using language, symbols, and texts** – interpreting language and symbols, using ICT, recognising how choices of language and symbol affect people's understanding.



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The learning programme

Conceptual understanding	Learning outcome, students will:	Teaching strategies/ learning activities	Resources
<p>Introduction</p> <p>Water is important in our lives.</p> <p>Water is a finite resource and only a limited amount of the water on the planet is available for our use.</p>	<ul style="list-style-type: none"> describe their present understanding of the importance of water in their lives. 	<ul style="list-style-type: none"> Introductory activities Class mime Teacher demonstration Individual worksheet is a formative assessment and can be used to shape the direction of the student's learning 	<p>Teachers' Notes</p> <p>Demonstration kit</p> <p><i>What do I know about water?</i> student worksheet with teacher answer sheet</p>
<p>The cultural and spiritual value of water</p> <p>Māori place spiritual value on water and have a role as kaitiaki or guardians of waterways.</p> <p>Many cultures value water.</p>	<ul style="list-style-type: none"> gain an understanding of the Māori view of the importance of water and the concept of Kaitiakitanga understand water has spiritual and cultural significance for people in many cultures. 	<ul style="list-style-type: none"> Presentation and discussion with a representative of the local iwi Consideration of the story of <i>Ranginui and Papatūānuku</i> Group work on place names of local waterways 	<p>Teachers' Notes</p> <p><i>Ranginui and Papatūānuku</i> student information sheet</p>
<p>The water cycle</p> <p>The water on the planet is constantly circled around in the water cycle.</p> <p>Activities of people affect the availability and quality of the water that is constantly cycled around the earth.</p>	<ul style="list-style-type: none"> understand water is a finite resource and is constantly circulated around the earth describe the water cycle using relevant technical terms explain how human activities impact on the water cycle. 	<ul style="list-style-type: none"> interpretation of visual and written material about the water cycle a range of suggested activities including: <ul style="list-style-type: none"> creation of poem, song dance, rap fiction writing (story, comic strip) factual writing with visual presentation (model making, poster, computer animation) Science experiment 	<p>Teachers' Notes</p> <p><i>The water cycle and Water in natural and urban catchments</i> A3 posters</p> <p><i>The water cycle</i> student information sheet</p> <p><i>Water in natural and urban catchments</i> student information sheet</p> <p><i>The water cycle</i> student worksheet</p>



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Conceptual understanding	Learning outcomes, students will:	Teaching strategies/ learning activities	Resources
<p>Safe drinking water</p> <p>Not all water is safe to drink, but water from our taps is safe to drink.</p> <p>On the Kāpiti Coast the water we drink comes from a number of different sources and is treated in a range of ways to make it safe to drink.</p>	<ul style="list-style-type: none"> explain how and why water is treated on the Kāpiti Coast. 	<p>Use of <i>Our Safe Drinking Water</i>, a DVD about water treatment on the Kāpiti Coast.</p>	<p>Teacher's Notes</p> <p>Demonstration kit</p> <p><i>Our Safe Drinking Water</i> DVD</p> <p>Possible visit to the Waikanae Water Treatment Plant</p> <p><i>Our safe drinking water</i> student worksheet with teacher answer sheet</p>
<p>Water issues on the Kāpiti Coast</p> <p>The Kāpiti Coast faces issues now and in the future about the supply and use of water.</p> <p>The Kāpiti Coast District Council and local residents are taking action to ensure there is enough quality water for our needs now and in the future.</p> <p>Not everybody on the Coast recognises the need for action to conserve water and there are a range of viewpoints on how to meet the area's water needs.</p>	<ul style="list-style-type: none"> describe the water supply and use issues facing residents on the Kāpiti Coast and explain a range of actions that can be taken to address the problem. recognise the viewpoints of groups of people on how to address Kāpiti's water supply issue describe their own viewpoint on options to address Kāpiti's water supply issue. 	<p>Presentation by the Water Use Adviser from the Kāpiti Coast District Council that outlines water supply issues supported by background information.</p> <p>Research by students</p> <p>Interviews and discussion with local residents and/ or representatives of local community groups.</p>	<p>Teachers' Notes</p> <p>Presentation by the Water Use Adviser from the Kāpiti Coast District Council</p> <p><i>Kāpiti water supply issues</i> student information sheet</p> <p>Kāpiti Coast District Council website, publications and planning documents</p> <p>Local community group representatives</p> <p>Submissions to the Council on water supply issues</p>



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Conceptual understanding	Learning outcomes, students will:	Teaching strategies/ learning activities	Resources
<p>Conserving water - what we can do to use water wisely</p> <p>On the Kāpiti Coast we need to conserve or save water, especially in the summer months.</p> <p>There are a range of actions individuals, families and communities can take to reduce their water use.</p> <p>We all need to take action to use water wisely.</p>	<ul style="list-style-type: none"> explain the need to save water recognise a number of ways to save water take personal or family and/ or school action to save water. 	<p>Students undertake investigations or audits to see how they currently use water at home and at school.</p> <p>Students complete action planning and take action to save water at home and at school.</p> <p>Students monitor and evaluate the effectiveness of their actions to save water.</p>	<p>Teachers' Notes</p> <p>Home water use audit sheets</p> <p>School water use audit and research task</p> <p><i>Ways to save water</i> information sheet</p>
<p>Safe water for all - a global perspective</p> <p>Many people in the world live in areas of the world are short of water and the shortage of water determines how these people live.</p> <p>Increasing world population will require communities and nations to find and use a range of options to provide safe water for all.</p>	<ul style="list-style-type: none"> explain the impact of living in an area where there is a shortage of clean, safe water describe how identified water shortage and water quality issues are being addressed in one community or country compare local water issues with issues faced in a country where quality water is not available to all people. 	<p>Students view the DVD <i>Safe water for all</i> and complete an investigation of the impact of water shortages on a village in Niger.</p> <p>Students complete two outdoor experiential activities in the school grounds.</p> <p>Students view the DVD <i>Waterways</i> and can use internet research to investigate how technology, as well as changes in water use are being used to solve water supply and use issues in an identified community or country.</p>	<p>Teachers' Notes</p> <p>Classroom poster <i>Everyone, everywhere needs water</i></p> <p>Equipment for outdoor activities</p> <p>DVDs <i>Safe water for all</i> and <i>Waterways</i></p> <p>Internet case studies</p>



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Conceptual understanding	Learning outcomes, Students will:	Teaching strategies/ learning activities	Resources
<p>He tāonga te wai — unit conclusion</p> <p>We all have a view or perspective on water and the need to respect it and use it wisely.</p>	<ul style="list-style-type: none">• recognise and respect the views of a range of people living on the Kāpiti Coast.• describe (in words and/ or visually) their views on why water is a tāonga or treasure.	<p>Students attend a panel presentation with six people from the community who explain why water is important for them and present their future vision for water use on the Kāpiti Coast.</p> <p>People represented will include:</p> <ul style="list-style-type: none">• a water conscious gardener• a local industry representative• a local farmer• a representative from a conservation group• a representative from a commercial river recreation company• a fly fisher. <p>Students</p> <ul style="list-style-type: none">◇ review their initial ideas about water (first lesson formative assessment)◇ discuss what they have learnt as they have◇ completed the unit◇ develop a personal◇ response on how they value water <p>This serves as a final assessment for the unit.</p>	<p>Teachers' Note</p> <p>Panel discussion</p> <p>Art and computer resources for students to complete their personal reflection on how they value water.</p>



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Background information for teachers

Provision of water services

The Kāpiti Coast District Council is responsible for providing:

- ◇ a supply of safe drinking water
- ◇ stormwater systems remove water after heavy rain
- ◇ wastewater removal and treatment systems.

Kāpiti Coast residents pay for these services when they pay their rates. Different water services are provided in different areas on the Coast.



The Waikanae Water Treatment Plant

Water issues on the Kāpiti Coast

Teachers are invited to read Water Issues on the Kāpiti Coast page 24 as background before they teach the *Water is precious* learning programme.

Partnership with local iwi

The Council is proud of its relationship with the tāngata whenua. A Memorandum of Partnership between the three iwi (Ngāti Raukawa, Āti Awa ki Whakarongotai and Ngāti Toa) and the Council has been in place since 1994. The Memorandum guides the relationship between Council and tāngata whenua. The goal of the Memorandum is to forge a relationship of mutual benefit between the Council and tāngata whenua and create an effective and meaningful partnership.

Background information for teachers and students

The Kāpiti Coast District Council website www.kapiticoast.govt.nz contains useful information for teachers and students.

If teachers have specific questions, requests for loan resources or want to discuss their *Water is precious* learning programme they can contact the Water Education Facilitator at wated@kapiticoast.govt.nz

Acknowledgements.

The Kāpiti Coast District Council would like to thank everyone who has been involved in the development of the *Water is precious* learning programmes.

This learning programme was written by Anne Brunt. Photographs were provided by Anne Brunt, Nicola Easthope, Liz Stretton, Billie Taylor, The Greater Wellington Regional Council and Raumati South School.

A number of territorial authorities in New Zealand and Australia have developed educational programmes about water. Over time a number of activities have been created and modified for use and it is no longer possible to acknowledge authorship of specific activities. The Kāpiti Coast District Council would like to acknowledge the co-operation of local and regional Councils that has allowed the free exchange and use of material so we can all create quality educational programmes suited to our local areas. Thanks to World Vision New Zealand for use of their resources.



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Teachers' notes: Unit introduction

Introduction and resources

These activities can be used to assess student prior knowledge and provide information that will allow you to shape the unit to meet your students' interest in water issues on the Kāpiti Coast. The student worksheet *What do I know about water?* can be used as a formative assessment. A teachers' answer sheet is provided.

A rapid fire class mime game

Give each student five seconds to think of and create a mime about how they use or value water. Students can reflect on the mimes and work out some broad categories about how we use and value water e.g. to drink, to clean ourselves and our possessions, to cook things, to manufacture things, for recreation (in, on or under the water), as part of our cultural practices and to appreciate.

What do I know about water?

Have your students complete the worksheet *What do I know about water?* and answer the questions below. The demonstration provides a visual representation of the small amount of freshwater on the planet is available for our use.

Ask the students

- if they are aware of water use issues on the Kāpiti Coast
- how they are aware of the issues
- what they think the issues are
- what they would like to find out about these issues
- what they think they and their family can do to address the issues.



A demonstration of the earth's water resources

A demonstration kit is available from the Water Use Adviser.

- Gather a 20 litre water container filled with water, three mugs, a plastic cup, a salt water label and a teaspoon.
- Show the students the 20 litre container and have them imagine it represents all the water in the world.
- Pour two mugs of water from the 20 litre container. The water left in the 20 litre container represents how much of the world's water is ocean and is salty water. Put label on container saying 'salt water'.
- The two mugs of water represent the world's fresh water.
- Pour half a mug of water into a third mug. Three quarters of the water (one and a half mugs) represents the water is locked up in the Arctic and in Antarctica.
- From a half filled mug take out three teaspoons of water and put it in a plastic cup.
- The water left in the mug represents the fresh water is underground and can't be reached.
- The water in the plastic cup represents the less than one percent of the world's water is fresh and can be easily reached in lakes, rivers and the soil by humans, plants and animals.



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Teachers' notes: Unit introduction

1. What is water conservation?

Water conservation means individuals or groups taking action to reduce their water use.

3. Where do you think the water you drink comes from?

In New Zealand potable water, or water we can drink, must be treated. On the Kāpiti Coast our drinking water is treated at a treatment plant.

We need to boil or chemically treat stream water or risk getting diseases like Giardia.

The Health Department state we must boil or chemically treat tank or rain water to make sure it is safe to drink.



The Waikanae Water Treatment Plant

4. What percentage of the planet do you think is made up of water? What percentage of this water do you think is drinkable?

There's a lot of water on Earth! Roughly 1,260,000,000,000,000,000 litres (1,260 million trillion litres) can be found on our planet.

Ninety-eight percent of the water on the planet is in the oceans, and therefore is currently mostly unusable for drinking because of the salt.

About 2 percent of the planet's water is fresh, but 1.6 percent of the planet's water is locked up in the polar ice caps and glaciers or underground in aquifers and wells.

Less than half a per cent of the planet's total water supply is found in lakes and rivers and is available for all of us to use.

The rest of the water on the planet is either floating in the air as clouds and water vapor, or is locked up in plants and animals. There's also all the soft drinks, milk and orange juice you see at the store and in your refrigerator.

6. What percentage of your body is water? Can we live without water?

Up to 70% of the human body is water. The brain is composed of 70% water, and the lungs are nearly 90% water. Lean muscle tissue contains about 75% water by weight, body fat contains 10% water and bone has 22% water. About 83% of our blood is water, which helps digest our food, transport waste and control body temperature.

Each day humans must replace 2.4 litres of water, some through drinking and the rest taken in from the food we eat (You could use three one litre bottles to demonstrate this).

If you lose 1% of your body water, you will feel thirsty. If you lose 10% or more you risk death. Humans can only survive three days without water.



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What do I know about water?

We cannot live without water. If we did not have access to clean and safe water our lives would be very different.

Answer these questions to find out what you know about water and water conservation.



1. What do you think the term “conserving water” means?

2. Do you think conserving water is something you and your family need to do? Why/why not?

3. Where do you think the water you drink comes from?

4. What percentage of the planet do you think is made up of water? What percentage of this water do you think is drinkable?

5. How important is water to you and your family? On the back of this sheet complete a mind map showing the importance of water in your lives.

Think about:

- all the things you do with water in your life
- the things you could not do if you did not have access to water
- what you value about water
- what we take for granted about water in New Zealand .

6. What percentage of your body is water? Can we live without water?



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Teachers' notes: The cultural and spiritual value of water

Introduction and resources

In this section students gain an understanding of the Māori view of the importance of water and the concept of Kaitiakitanga, and understand water has spiritual and cultural significance for people in many cultures.

The Water Adviser can organise a representative from your local iwi to come and discuss the importance of water and our local waterways and the iwi's role as Kaitiaki or guardians of our waterways.

The iwi representative will be able to discuss the naming of key waterways in your area and the historical and current significance of the waterway for the iwi. They can discuss their iwi's partnership with the Kāpiti Coast District Council in the governance of local waterways.

You could extend your investigation of a specific local waterway (stream, or river) by investigating:

- who uses it and what they use it for
- how the waterway was used in the past
- who cares for the waterway
- how people show they value the waterway
- what is happening or has happened to the waterway that is damaging it in any way and how the issue is being / was addressed
- how the waterway is being managed and cared for to ensure it is healthy.

Ranginui and Papatūānuku

In a Māori world view, life began with the separation of Ranginui (sky father) and Papatūānuku (earth mother). From them emerged the various atua (gods).

Aspects of the water cycle are represented in the story of Ranginui and Papatūānuku. Rain (precipitation) is represented as tears while mist (water vapour) is explained as the sighs of Papatūānuku. The waterways are created by the tears of Ranginui and Papatūānuku.

In a Māori world view, the Earth is a living entity. Papatūānuku is both our ancestor and our provider. People are descended from her through the atua (Māori 'gods'). The atua are the environment and as descendants of the atua, people are part of the environment. Water being part of that environment, we are water and water is us. This is also true in a scientific world view where humans are 70% water.

Tangaroa is one of the descendants of Papatūānuku and Ranginui. He is one of the atua. Tangaroa is the atua of the sea, rivers, lakes and all life within them. As part of this living system, water has its own mauri, energy, or life-force.

Students can read, or be read, the story of Ranginui and Papatūānuku and explain how, in the Maori world view, the water on earth was created and water is valued.



He tāonga te wai — water is precious

He tāonga te wai — water is a treasure to be valued and cared for

A tāonga is a heartfelt treasure of immense value. There are times when a tāonga can be an item, for example, something handed down through generations (tāonga tuku iho), but a tāonga can also be an idea or sometimes a person. A tāonga is viewed and valued by others in a special way.

If we respect and value water, and feel our connection with it as a part of the environment, then we must be responsible to care for it. We need to look after earth's resources in a sustainable way to ensure her gifts remain for future generations. We need to think of water (and earth's other gifts) as tāonga.

Local Maori are kaitiaki or guardians of our waterways and work in partnership with the Kāpiti Coast District Council to manage our waterways and ensure we are using them sustainably and preserving them for future generations.

Respecting water

People from many different cultures value, respect and treasure water. There are many cultural practices that involve water and demonstrate just how important water is to our lives.

Have your students work in pairs or groups and discuss:

- why water is important to people in many cultures
- any cultural uses of water they can think of
- how we use water for our wellbeing or hauora
- examples where people on the Kāpiti Coast are not treasuring or valuing water
- examples where people on the Kāpiti Coast demonstrate they are valuing, treasuring or caring for water.

Cultural uses of water could include:

- use of water in religious ceremonies e.g. baptism
- use of water at cemeteries or urupa
- competitions such as waka ama or dragon boating
- festivals that feature water like Diwali
- actions that show respect before gathering food from water
- delivering prayers or karakia before going on or into water
- respecting water sources as you complete activities in or on the water e.g. not putting rubbish in the water, not using the water as a toilet or not destroying plants or harming animals.





He tāonga te wai — water is precious

Ranginui and Papatūānuku

In a Māori world view, life began with the separation of Ranginui (the sky father) and Papatūānuku (the earth mother). Here is their story.

In the beginning there was Te Korekore, the nothingness. All was dark and still. There was no light, no life, but there was potential for life. Slowly the darkness gave way to light and the first parents, Ranginui and Papatūānuku emerged.

Ranginui and Papatūānuku clung to each other in a strong, loving embrace. They created many children, the atua, who lived in the cramped, dimly lit space between them. The children were unhappy living in the dark and decided to separate their parents so they could live in light. They tried to separate their parents several times but their embrace was too strong. Tānemahuta had an idea. He lay down with his back against his mother Papatūānuku and pushed his feet up against his father Ranginui. With great strength he pushed against his parents until finally their embrace was broken.

The separation of Ranginui and Papatūānuku created the universe. Papatūānuku became our earth with its rugged mountains, deep valleys and flat plains. Ranginui became the sky, allowing Papatūānuku's body to be enveloped in light, warmth and air.

Ranginui and Papatūānuku were heartbroken about their separation and often cried as they looked at each other. Their tears covered much of the land and formed the sea. The children were concerned the crying would flood the earth so they turned Papatūānuku on her side, making it difficult for the grieving parents to look at each other.

The children thrived in the new light filled world. Their mauri, their life force, developed and they brought new life into the world. Tānemahuta became atua of the forests and created the plants, birds and insects, while Tangaroa became atua of the water and created the fish and other animals that dwell there. Life flourished on Papatūānuku.

However, Tāwhirimātea, who disagreed with the separation of his parents, went to live with his father and became atua of wind and storms. To this day he is still angry with his brothers and shakes the forests of Tānemahuta with fierce storms, breaking branches and crashing trees to the ground. He whips up the seas with gales and casts some of Tangaroa's children on to the shore.

While the agony of the initial separation has eased, Papatūānuku and Ranginui still long for each other and often weep. Papatūānuku's tears bubble up from the earth in the form of fresh water springs and her sighs for Ranginui are seen as the soft mist lingers over her valleys. Ranginui's tears fall as rain and they merge with the tears of Papatūānuku creating streams and rivers that flow to the sea. Where the mountain peaks seem to touch the sky, the separated parents are closest to each other. Being so close to his beloved, Ranginui sometimes cries and his tears create a veil of mist over the mountain peaks.

So it was, water was created by the grief of the separated parents. Aotearoa became a land filled with fresh, clean waters that flowed from the rugged mountains to the sea. The streams, rivers and lakes contain their own mauri, their own life giving energy, essential for sustaining life on Papatūānuku.



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Teachers' Notes: The water cycle

Introduction and resources

The water cycle can be studied in Social Studies and English or in Science. If your Integrated Studies includes Science you may want to adapt the Science unit H2O on the go at www.sciencelearn.org.nz/sciencelearn/Contexts/H2O-On-the-Go/NZ-Research/H2O-On-the-Go

A *Water Cycle Information Sheet* is provided for use by students and a range of student activities are suggested. Some of these activities can meet objectives in the Arts curriculum.

The Water Adviser can provide A3 posters of *The Water Cycle* and *Water in natural and urban catchments* for display in your classroom.

YouTube provides many graphic interpretations of the water cycle that will interest your students.

Understanding the water cycle

Work through the water cycle information sheet with your students and then have them complete some water cycle activities to reinforce their understanding of the water cycle.

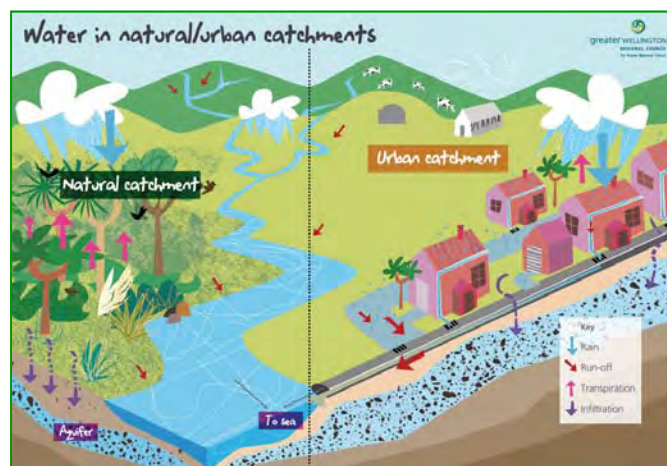
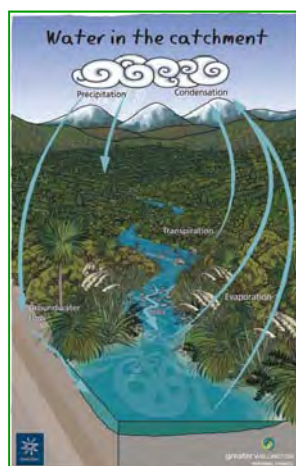
Creative journeys around the water cycle

You could initiate some quick story rounds about the journey of a rain drop as it passes through the water cycle, for example the raindrop falls from the sky and lands on a dog, is shaken onto the ground, then drunk by a cow, passed out as urine and evaporated back into the clouds. Have one student create the first step in the story with other students adding a step until the water is returned to the clouds as water vapour.

The water cycle in urban catchments

Use the *Water in natural and urban catchments* information sheet as the basis for a discussion on what happens with the water cycle in an urban environment. If you require more information about the water cycle in urban environments visit www.gw.govt.nz/assets/Our-Environment/Water-Supply/PDFs/Turning-on-the-tap page 39.

If you want to investigate the impact of human activities on the water cycle use Take Action for Water at www.gw.govt.nz/take-action-for-water





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The water cycle

Complete one or more of these activities as directed by your teacher.

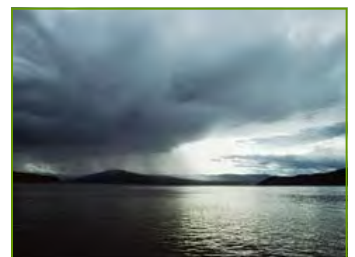
- Make a three dimensional model of the water cycle.
- Create this experiment in your classroom and explain how it demonstrates the water cycle in action.
- Imagine you are a water drop and write an illustrated story or comic strip describing your journey through the water cycle. Think small or think over millions of years!
- Explain with words and / or artwork how aspects of the water cycle are represented in the story of Ranginui and Papatūānuki.
- Make a drama, dance, song, rap, mime or play about the water cycle.
- Investigate YouTube interpretations of the water cycle and create something better.
- Think of your own activity to show the water cycle. Discuss this with your teacher before you begin.



Water droplets on a leaf — condensation in action



Snowfall in the Tararua ranges



Precipitation



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The water cycle

The water cycle is a visual way to look at how water travels. Here are some key facts about the water cycle.

There is no more water in the world now than many centuries ago. Water is not created, it is cycled around.

Water falls from the clouds as rain, hail and snow. This is described as precipitation.

A catchment is an area that catches the rain. Rain drops fall onto hills and then collect together to form small streams. Water in streams continues a journey downhill with the force of gravity. Streams become larger and can form into rivers. The rivers flow into an estuary and out to sea.

When the sun heats up water in river, lakes and the sea, the water can turn into water vapour or steam and return to the atmosphere. This process is called evaporation.

When water is absorbed by plants through their roots then evaporated into the atmosphere from their leaves. This process is called transpiration.

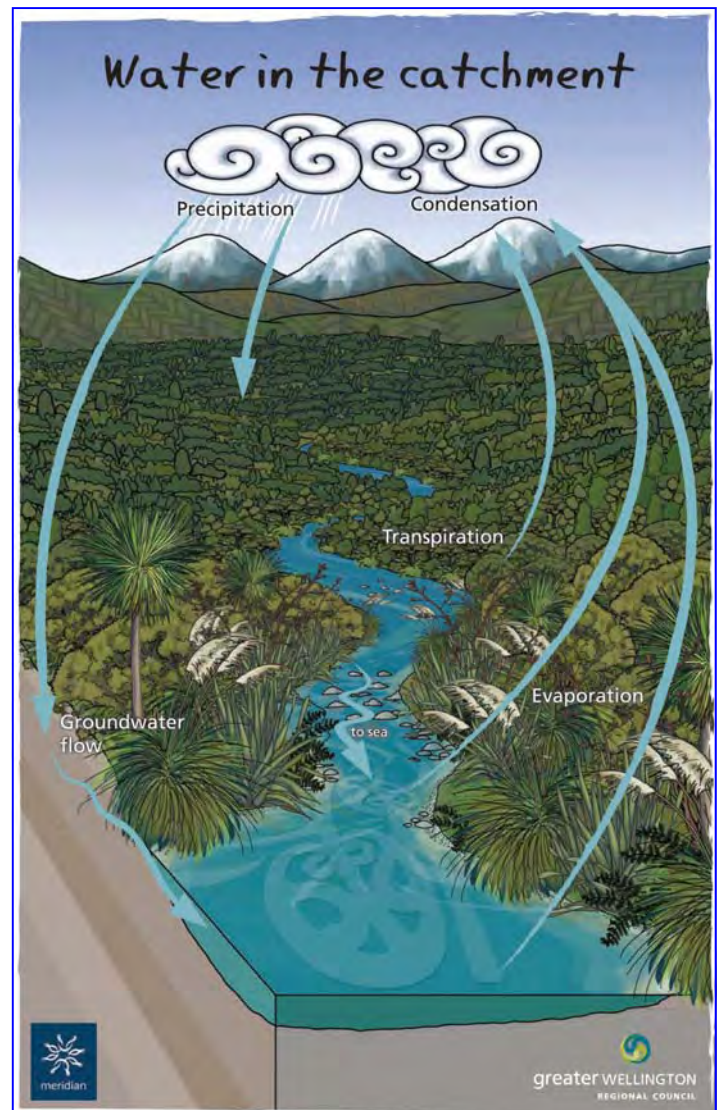
Evaporated water gathers in the air as clouds.

When the water vapour in the air cools it changes from gas to liquid (rain) or solid (snow or hail). This process is called condensation.

When it rains, hails or snows water falls from the clouds and the cycle begins again.

Some water enters underground water systems when rain water falls on the ground and from under rivers and streams.

Ground water flows underground and can flow into lakes and seas.



Some of the water circulating in your body may have been drunk by dinosaurs or sailed on by Māori or Polynesian explorers.



He tāonga te wai — water is precious

Water in natural and urban catchments



Sometimes too much water can fall on urban catchments. Tilley Road during the Paekakariki flood of October 2003



He tāonga te wai — water is precious

Teachers' notes: Safe drinking water

Introduction and resources

This section is based on students watching the DVD *Our safe drinking water*, a DVD about the Waikanae Water Treatment Plant, or visiting the Treatment plant. The Water Education Facilitator can arrange class visits to the Treatment Plant and will provide each college with a copy of the DVD *Our safe drinking water*.

Is our water safe to drink?

Equipment:

- o salt
- o soil
- o detergent
- o oil
- o paint
- o a substance to mimic faecal matter

Begin this section by pouring a glass of tap water and asking if it is safe to drink.

Add these substances to the glass of water and discuss how the substance is likely to get into a water supply like a river, other waterways (stream, lake, or sea) or a supply of rainwater in a tank or barrel.



Indicate the DVD or visit will explain how the water supplied to our house is treated to make it safe to drink and have your students answer the worksheet *Our safe drinking water*.

Answers to the questions in the worksheet are provided here.

1. How do we know our water is safe to drink?

The water is treated and made safe to drink at a treatment plant.

- Checks are made at the treatment plant to make sure the correct amount of chemicals are used.
- The treated water is analysed regularly by the Health Department.
- Random checks are made on the quality of the water at tap outlets in the community, including our college.

2. What is the purpose of the Resource Consent on the Waikanae River and what does it allow the Kāpiti Coast District Council to do?

The Resource Consent limits the amount of water the Council can take out of the river so that there is always sufficient water flowing in the river to meet the needs of other river users. The Resource Consent allows the Council to take a limited amount of water out of the river every day. (23 million litres a day or 266 litres per second).

3. What other river users or living things could be affected if the river level was allowed to fall too low?

- trout fishers and whitebaiters
- farmers
- recreational users like swimmers and kayakers
- people who enjoy and value the river.
- people who walk their dogs
- plants and animals that live in the river
- wetland or river estuary birds and animals
- local iwi who value the river e.g. for historical and spiritual significance, whakapapa/ancestral identity, fishing, white baiting



He tāonga te wai — water is precious

Teachers' Notes: Safe drinking water continued

4. Why are chemicals added at the beginning of the water treatment and then later removed?

Chemicals are added to get the dirt out of the water. The flocculent aid and coagulant get the dirt to flock or clump together so it can be removed.

Algae in the river can produce toxins that can cause health problems for people and animals. When powdered activated carbon is added to the water the toxins attach to the carbon and are later removed..

5. Why is UV light passed through the water?

The UV light makes any bacteria and viruses in the water harmless to people by stopping all bacteria and viruses from reproducing. The water itself is not changed by the UV light.

6. What other chemicals are added to the water and why are they added?

The gas chlorine is added so the water stays disinfected all the way to your house.

The Kāpiti Coast District Council and the residents in the area have decided to add fluoride to the water at a level that strengthens teeth.

Lime is added to the water to get the water to a pH between 7.8 to 8.00. Acid or alkaline water could reduce the life of pipes.

7. What can happen in the summer if the river level falls and the Council cannot take enough water out of the river?

Water from six bores that reach an aquifer or underground river by the Waikanae River is pumped up, treated and added to the treated river water.

8. The water we drink is different in different areas of the Kāpiti Coast. On another piece of paper make a flow chart or sequence diagram to show:

- where the water you drink comes from
- how it is treated and
- how it reaches the taps in your house.

If you live in Paraparumu, Waikanae, Raumati and Raumati South you drink water from the Waikanae River that is treated at the Waikanae Treatment Plant. The water may be supplemented with bore water from the Waikanae River in the summer.

If you live in Paekākāriki you drink bore water. There is a shallow bore beside the Wainui stream. The water is filtered to remove particles of a certain size then the water is UV treated to make bacteria and viruses in the water harmless. The water is chlorine disinfected before it is stored and then piped to homes and businesses in Paekākāriki.

If you live in Ōtaki you drink bore water. There are three bores, two in Tasman Road and one in Rangiru Street. The water from these bores is UV treated, it has its pH corrected and has chlorine added before it is stored and then piped to homes and businesses in Ōtaki.



He tāonga te wai — water is precious

Our safe drinking water

Complete this worksheet as you watch the DVD
Our safe drinking water.



1. How do we know our water is safe to drink?

2. What is the purpose of the Resource Consent on the Waikanae River and what does it allow the Kāpiti Coast District Council to do?

3. What other river users or living things could be affected if the river level was allowed to fall too low?

4. Why are chemicals added at the beginning of the water treatment and then later removed?

5. Why is UV light passed through the water?

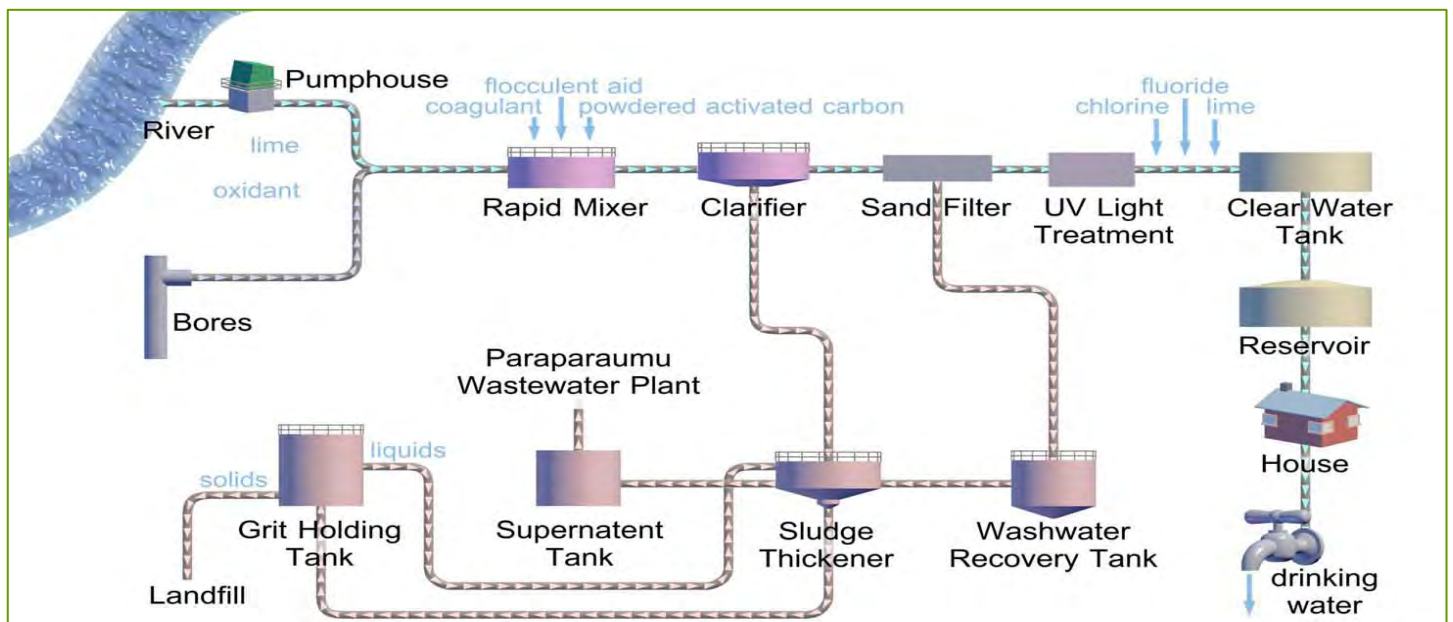


6. What other chemicals are added to the water and why are they added?

7. What can happen in the summer if the river level falls and the Council cannot take enough water out of the river?

- where the water you drink comes from
- how it is treated and
- how it reaches the taps in your house.

9. Use this diagram to discuss with a partner how water is treated at the Waikanae Treatment Plant.





He tāonga te wai — water is precious

Teachers' notes: Water issues on the Kāpiti Coast

Introduction and resources

In this section students investigate water issues on the Kāpiti Coast. The Water Use Adviser has a fifty minute presentation that relates directly to the information sheets on the next pages and outlines the water issues on the Coast, and the reasons for these issues.

Students carry out research to investigate current and proposed solutions to identified issues.

Most people on the Kāpiti Coast are aware of water supply issues but people hold a range of views on how these issues should be dealt with now and in the future. There is an opportunity for students to develop an in depth investigation of any one identified water supply issue and current or proposed solutions to the issue.

What are water issues on the Kāpiti Coast and what can the Council and residents do to address the issues?

After your students have listened to the presentation by the Water Use Adviser and worked through the related information sheets have your students work in groups and:

- write a description of the water supply issues on the Coast
- select one Council -led approach to address the water supply solution and conduct some research about that approach.

After completing the research students could :

- explain what the approach or solution involves
- describe what the Council will do to achieve the solution and what residents are required or encouraged to do to achieve this solution (or will do in the future)
- conduct interviews with residents or resident interest groups and/ or reading material presented by residents and resident interest groups
- present information about the range of views on the solution held by local residents and the basis of their viewpoints
- express a group viewpoint, based on the research they have carried out, on the advantages and possible disadvantages of the solution.

Information sources for the research are primarily the Kāpiti Coast District Council Website, including *Water Updates* an information sheet about water for residents provided on the website. The Water Education Facilitator can provide more detailed information if required.



He tāonga te wai — water is precious

Water issues on the Kāpiti Coast

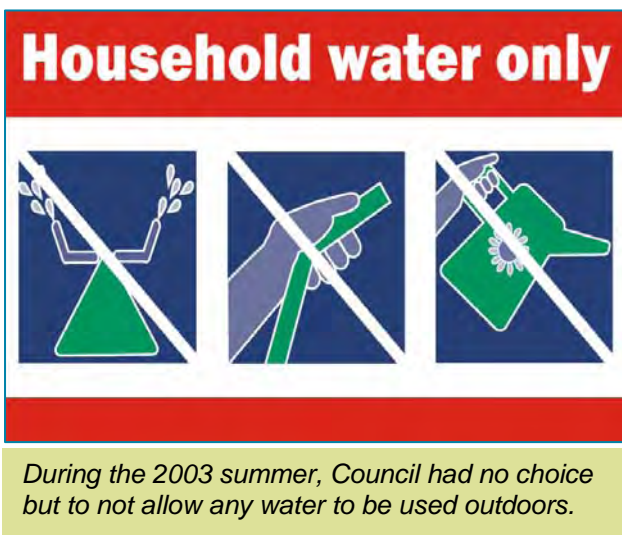
Having enough water now and into the future

Historical issues

There is a limit of how much water Council can take for our water supplies because there must be enough water left for the wildlife to survive. When the levels fall past the environmental limit, no more water can be taken.

The summer in 2003 highlighted the challenges of Kapiti Coast water supplies.

The hot dry summer meant little rain was topping up the rivers. As the river levels fell, the amount of water available for the water supplies fell too. This was right at the time people were using water the most, to wash cars and to keep their lawns and gardens green.



Tough water restrictions were put in place that meant people could only use water in their homes and not on their gardens or to wash their cars. However as the river level continued to fall, there was not enough water available in the rivers.

Council had to make a choice between taking more water than they were allowed to or risk not having enough water for people to keep clean, drink or flush their toilets.

It was a tough time for everyone and when the rains returned and replenished the rivers, people wanted something to be done.

There were obvious reasons why the shortages occurred:

- ◇ the water supplies were dependent on rivers and were vulnerable in hot summers with low rainfall
- ◇ high summer demand from people watering gardens put a lot of pressure on water supplies
- ◇ many gardens were dependent on town water supply to stay alive. People became frustrated when they couldn't water their gardens and their plants died. Those who had their own rainwater or bore supply could maintain their gardens
- ◇ the water supply networks and pipes leading into homes were aging and water that could have been used was being lost to leaks
- ◇ the towns of Raumati, Paraparaumu and Waikanae were growing quickly and more houses were built every year, putting more pressure on the water supplies
- ◇ when the river is low, algae will grow and will affect taste.



He tāonga te wai — water is precious

Having enough water now and into the future continued

Changing approach

In 2003 Council after talking with the public, local iwi and experts, released a 50 year water supply strategy to ensure all towns had access to a safe, cost effective and reliable water supply.

Key elements of the strategy were:

- ◇ recognition that there is a limit to how much water we can take from the natural water system
- ◇ develop water supplies that can provide water in summer months
- ◇ strengthen the tangata whenua partner role in governance (ranagatiritanga) and stewardship(kaitiakitanga) of waterways
- ◇ ensure our water supplies protect natural systems so wildlife can flourish
- ◇ people and businesses use water efficiently
- ◇ reduce the amount of leaks in Council supply and in people's homes and in businesses
- ◇ people fund water in a manner that is fair to what they use
- ◇ use rainwater and greywater to reduce the amount of water used each day and during summer.



Testing water at the Waikanae River water intake

Since 2003

Water supply

Council began improving water supply to protect them against dry summers and improving the water quality of each supply.

Water Conservation

We all have a role to play in reducing the amount of water we use. This means changing our habits, fixing leaks, making our homes more water efficient (e.g. installing dual flush toilets or a rainwater tank) and gardening to the local conditions.



Council looked at ways to assist people make these changes and the following measures were put in place:

- ◇ free professional advice for residents to save water in the home and garden, as well as what to do if they found a leak
- ◇ promote rainwater and greywater for watering gardens
- ◇ continue with water restrictions and require properties to fix leaks when they are found;
- ◇ run events to promote water saving ideas, such as mulching your garden
- ◇ require new homes to install greywater and (or) rainwater for toilet flushing and watering gardens
- ◇ Council increased funding to find and repair leaks in the water supply network;
- ◇ offer assistance to households who want to install rainwater or greywater systems.



He tāonga te wai — water is precious

Having enough water now and into the future continued



Water meters

Currently all homeowners pay for the water they use through a yearly charge. It doesn't matter if they use a lot or little, all households pay the same amount. This means there is little reason to save water as you pay the same.

Now with meters, people will be more careful about how they use water. For example rather than turning on the sprinkler and forgetting about it, paying for water will encourage you to only provide the water the garden needs, as well as add mulch, compost and choose a more efficient irrigation system.

The big savings are likely to be when people garden. Remember it is during the summer when demand for water is the highest. By being more careful in how you water in the summer, you can still have good looking gardens but save water and ensure our supply lasts for much longer.

Also without meters, it is hard to find leaks on private property. For example, as meters have been installed, one property was found to have a leak of over 30 000 litres a day! This is enough water for more than 25 households! With meters any property with a leak will quickly know and fix the leak.

For more information on why Council is implementing water meters, responsibilities of Council and the property owner, as well as how to read a water meter, you can download the document *Important information about your Water Meters* from Council website.





He tāonga te wai — water is precious

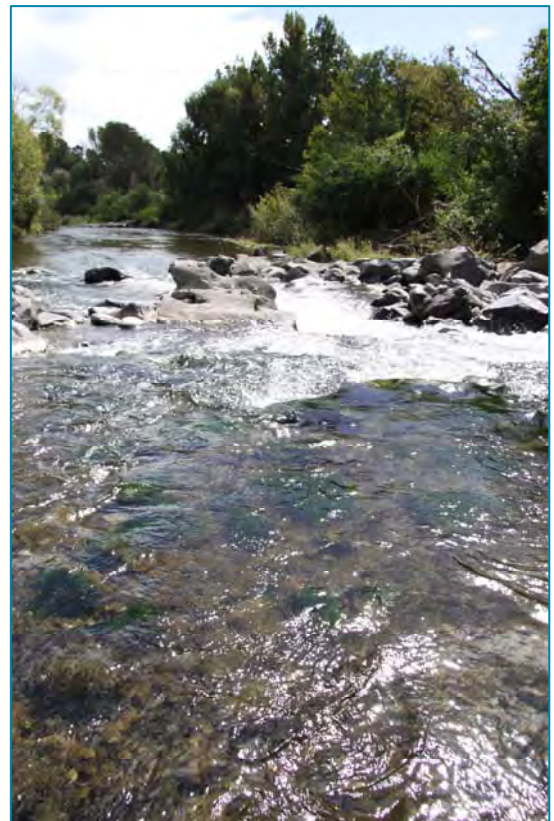
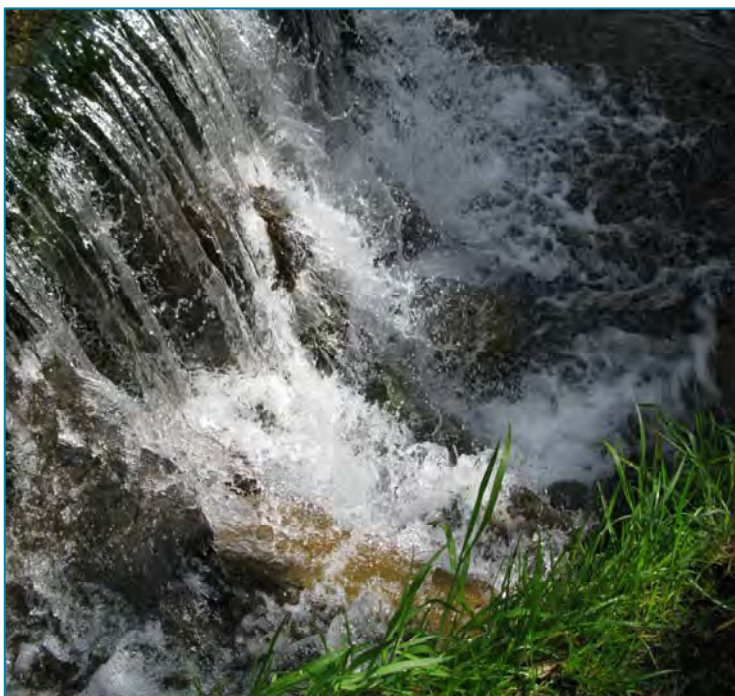
Having enough water now and into the future continued

Summary

Our rivers are an important part of the Kapiti Coast lifestyle and its important that we ensure that there is enough left for the wildlife to flourish and for us to enjoy in summer.

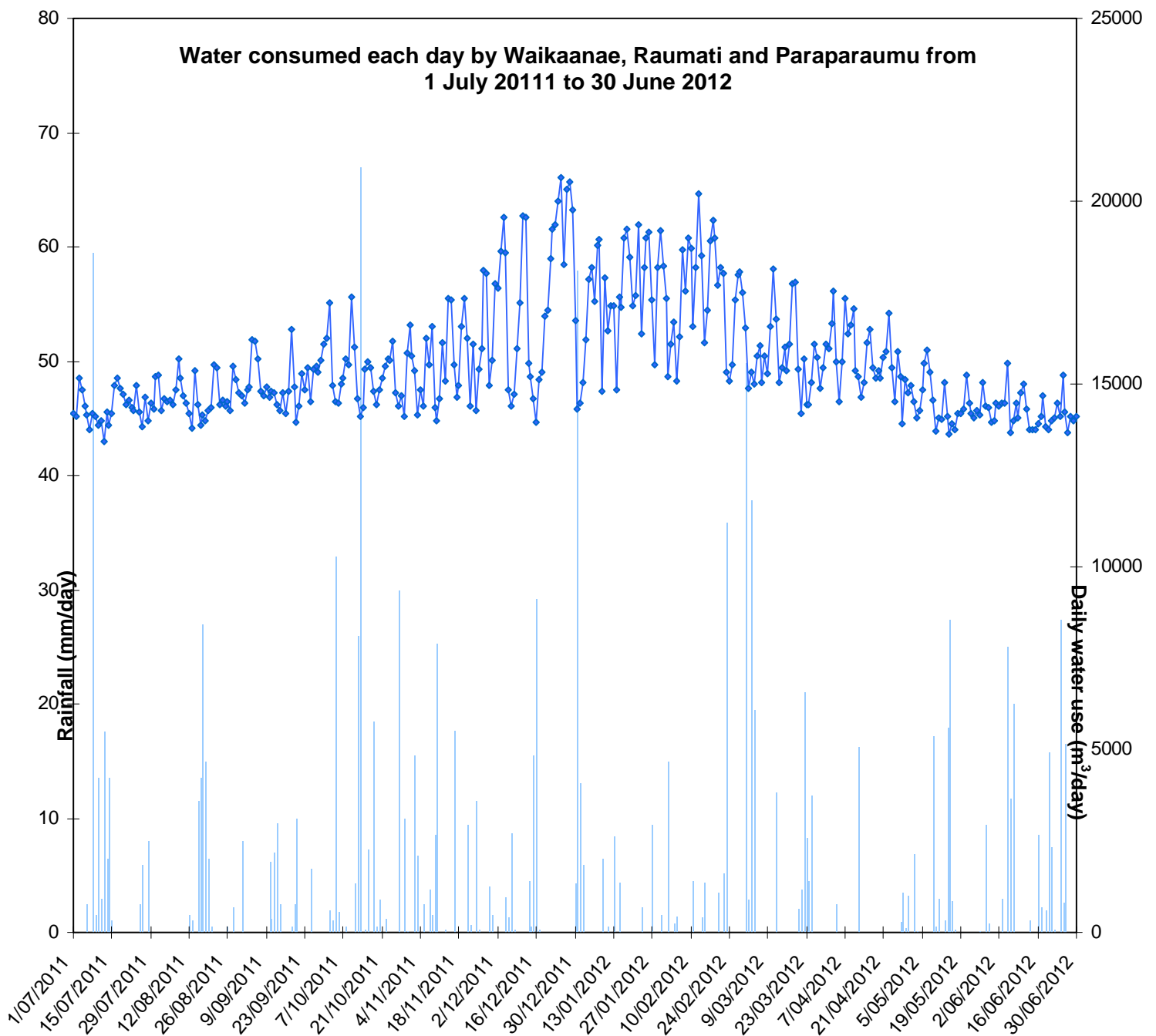
Our towns could not exist without a reliable water supply. There would be no water to keep us clean, or flush our toilets or keep our clothes smelling fresh.

To keep our water supplies reliable we all need to play a part in how we use water. What can you do to do use water without wasting it?





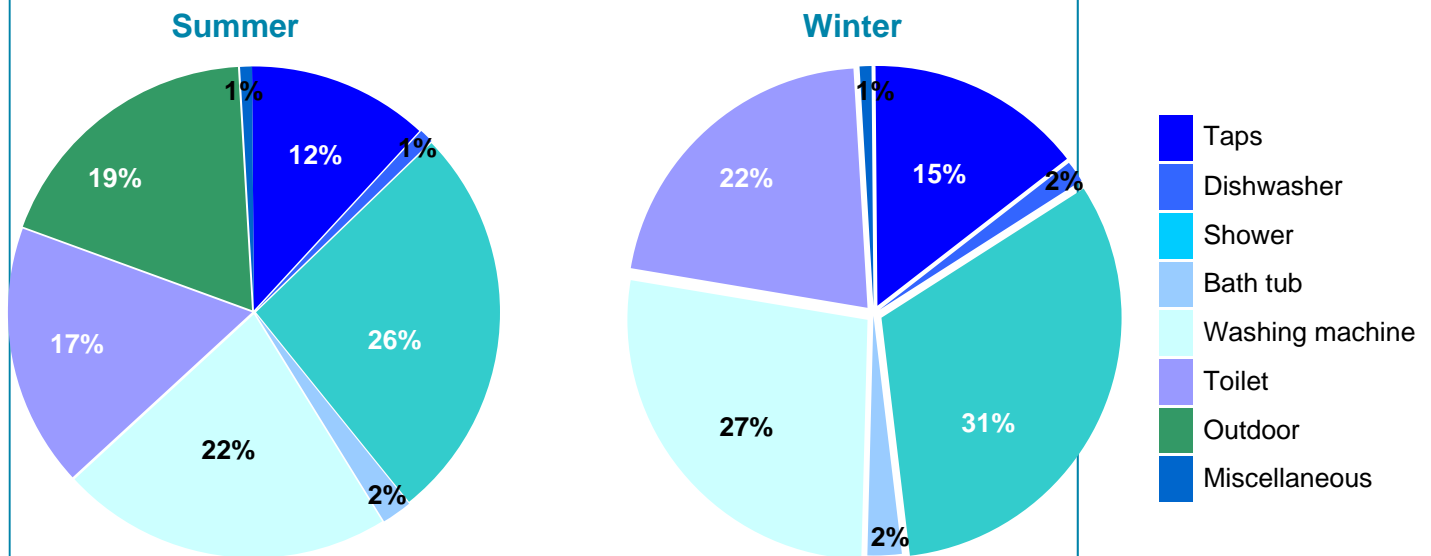
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He tāonga te wai — water is precious

Water use on the Kāpiti Coast



DAILY WATER USE SURVEY = 10 litres

In 2007, BRANZ conducted a survey on water use in Kapiti homes. This table shows where the 12 surveyed households used their water. It breaks down how many litres on average, **each person** in these households used per day. The graphics below illustrate this in buckets. One bucket contains approx 10 litres of water.



RUNNING A TAP



Households used their taps around 12 times a day, for 27 seconds at a time

= 7.5 litres a day



HAVING A SHOWER



People showered 0.7 times a day for 6.9 minutes at a time

= 54.3 litres a day



FLUSHING THE TOILET



People used the toilet 5.1 times a day and each flush used 6.2 litres of water on average

= 31.2 litres a day



WASHING THE CLOTHES



Households washed clothes 0.8 times a day.

= 41 litres a day



WATERING THE LAWN



Households watered their lawns on average 4hrs/week.

= 204 litres a day



He tāonga te wai — water is precious

Teachers' notes: Conserving water – what we can do to use water wisely

Introduction and resources

In this section students investigate how much water we use at home and school and what we can do to reduce the amount of water that we use.

The students use worksheets to:

- carry out an audit of their family's water use
- investigate ways to save water at home
- promote a water saving idea to other people on the Kāpiti Coast
- develop an action plan and take personal or family action to save water.

A set of pamphlets of ideas to save water can be provided by the Water Education Facilitator and ideas to save water, especially in the summer months, are on the Council website www.kapiticoast.govt.nz.

An activity is provided for students to do an audit of water use at your college and to take action to reduce the College's water use, especially in terms 1 and 4. Go to *Turning on the Tap* at www.gw.govt.nz/turning-on-the-tap for a school audit model.

Using water at home

The *Using water at home* worksheets lead students through a process of guessing how much water their family uses and then conducting more accurate estimates of their home water use.

Students then investigate and rank water saving ideas and select an idea to promote to Kāpiti residents. It may be useful for you to discuss how best to promote water saving practices to people by asking questions such as:

- Does the same marketing or promotion campaign work for everybody?
- If you were going to promote your water saving practice to a specific target audience who would this be and why (e.g. young people, families, older residents, gardeners)?
- What sort of promotion will appeal to this target audience?
- How can we determine if our proposed promotional approach will be successful? For example test it with a member/ members of the target audience?

The *Taking personal action to save water* worksheets lead students through a process of planning and carrying out a water saving action. Ideally, students would review their action at the end of summer to see how successful they have been at adopting a life-long water saving practice.

Taking action to save water at our college

An activity is provided for students to audit water use at your college and students are encouraged to take action to save water. This may involve members of the school community changing the way they use water or it may involve approaching the Principal and Board of Trustees with proposals about making infrastructure e.g. installing dual flushing toilets, changing taps or replacing appliances with water-saving models.



He tāonga te wai — water is precious

Using water at home

In this activity you will explore where and how you use water at home.

Water can be measured in litres or in cubic metres. A cubic metre of water contains 1,000 litres.

How long do you think it would take your family to use 1,000 litres of water?

Work in a group and make estimates to fill in this chart

	How many people live in the family	Estimate of how long it will take them to use 1,000 litres of water.
Me		
Classmate Two		
Classmate Three		
Classmate Four		
Classmate Five		

You are now going to do some research to test your predictions and find out how much water you and your family actually used in the last 24 hours.

Personal water use

Column A How you use water	Column B Doing this once will use an average of ...	Column C How many times you use water in this way each day	Column D How much water is used (Columns B x C = D)
Flushing the toilet	10 litres		
Having a bath	100 litres		
Having a shower	12 litres each minute	(x minutes you spend in the shower)	
Washing hands	5 litres		
Washing face	5 litres		
Brushing teeth	2 litres		
Any other use?			

Total (Column D)

—— litres used

How do we rate?

Circle the answer that best fits your family .

Our family:

1. conserves a significant amount of water
2. uses an average amount of water
3. uses a lot of water

Give a reason for your answer.



He tāonga te wai — water is precious

Using water at home continued

Family water use

Column A How you use water	Column B Doing this once will use an average of ...	Column C How many times you use water in this way each day	Column D How much water is used? (Columns B x C = D)
Dishwasher	65 litres		
Washing dishes in the sink	15 litres		
Insinkerator (garbage disposal)	28 litres	(x minutes you spend in the shower)	
Washing machine Full load	150 litres		
Washing Machine Half Load	90 litres		
Hose use (washing car, watering garden etc.)	14 litres per minute		
Preparing a meal	15 litres		
Housework / cleaning	15 litres		
Any other use?			

Total (Column D)

—— litres used

To calculate an estimate of how many litres of water your family used in 24 hours

Multiply your personal usage by the number of people in your family

My personal use of —— litres x the number of people in my family is —— litres

Add your family water use total to this

Our family's water use for 24 hours is estimated to be —— litres.

Seasonal and special water use

How do you think your family's water use would change in the summer compared with the winter?

Are there some things that you family does sometimes that use a lot of water?

Compare your results with two classmates and discuss the similarities and differences in your estimates.

Look through your family's current water use patterns and see if you can work out how your family could take action and use less water.

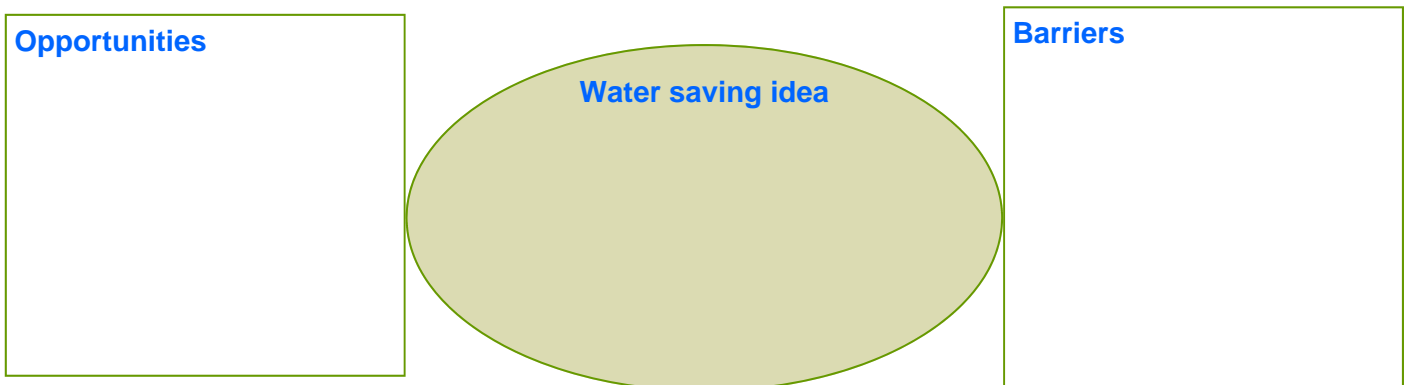


He tāonga te wai — water is precious

Taking action to save water at home

We need to save water on the Kāpiti Coast, particularly in the summer months.

- Work in a group and brainstorm some ways to save water under these headings:
 - ◇ In the bathroom
 - ◇ In the kitchen
 - ◇ In the laundry
 - ◇ In the garden
 - ◇ Outside, not the garden
- Check your ways to save water with a provided pamphlet about saving water and add any important ideas you may have missed.
- Rank your top five ideas considering these factors:
 - ◇ amount of water they would save
 - ◇ importance on the Kāpiti Coast (summer water use)
 - ◇ cost of doing something to save the water
 - ◇ your perception of how willing people will be to carry out the action.
- Choose one of the ideas that you think is the most important thing people could do to save water.
- Use this graphic organiser to identify what might encourage individuals or a target group like families.



- Develop a creative way to encourage people to adopt your selected water saving idea. You could create a radio or TV advertisement (If no recorders are available ask if you can record using a Smartphone). You could make a billboard, or a sign for display on a bus or an attention grabbing poster.

For this activity you could use images or photographs from the internet, but remember to check if the image is free to use, i.e. the level of copyright the image has.

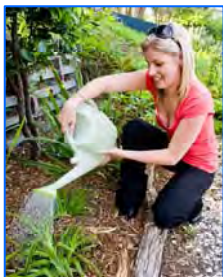
- Check out <http://bestdesignoptions.com/?p=11638> or gardeners to adopt the water saving practice and what might be a barrier to adopting the practice.



He tāonga te wai — water is precious

Using water in the home

Water use area



How much does the average home use?

Garden hose hand held up to 900 litres per hour.

Garden hose sprinkler up to 1,300 litres per hour

Garden hose, uncontrolled up to 2,000 litres per hour.

What can we do to reduce our use?

- Water early morning or late at night to avoid evaporation.
- Mulch your garden.
- Avoid overwatering.
- Use greywater and/or rainwater to water your garden.
- Use a soaker hose.



Shower at 6 litres per minute for 5 minutes uses 30 litres .

Shower at 18 litres per minute for 5 minutes uses 90 litres.

- Take shorter showers.
- Change your showerhead to one that produces a lower flow rate.



A full load in a top loader uses 130 litres or more.

A full load in a front loader uses approximately 50 to 70 litres.

- Wash with a full load or use economy settings for part loads.
- Buy a washing machine with at least a four star WELS rating.



The average single flush toilet uses 11 litres per full flush.

Modern dual flushing toilets use only 3 to 6 litres per flush.

- Use the dual flush appropriately.
- Install a dual flush toilet.
- If you have a single flush toilet install a Council supplied lead weight to manage the flush.



A tap that loses 2 drips per second can lose 380 litres per month send 15 to 30 litres of water down the drain every minute.

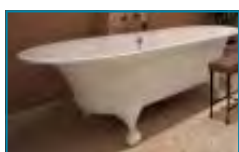
- Fix dripping taps.
- Don't leave the tap running when you clean your teeth.
- Don't leave the tap running to rinse the dishes or when you peel vegetables.



A dishwasher uses approximately 28 to 40 litres per wash cycle.

The kitchen sink holds 14 litres.

- Run the dishwasher with a full load of dishes.
- Buy a dishwasher with an AAA water conservation rating.
- Wash the dishes in a half full sink instead.



A bath uses 80 to 200 litres of water depending on size.

- Consider showering instead of taking a bath.
- Use less water in the bath.



He tāonga te wai — water is precious

Taking personal action to save water home

We can talk about saving water or we can ACT and do something every day to save water. Here is an action plan for you and possibly your family to save water.

- Select a water saving practice you (or you and your family) could take on and use this graphic organiser to identify what might encourage you or your family to adopt the water saving idea and what might be a barrier to adopting the practice.

Opportunities

Water saving idea

Barriers

- Work out how you or your family can overcome any barriers you have identified and check you or your family are willing and able to carry out the water saving practice you have identified.
- Make a plan and start saving water. Observe how you are saving water and make changes to your plan and action if required. Make a life-long change to the way you use water.

Water saving action

Start date

Who is involved

Exactly what I/ we will do each day/ week /or other time I/ we do the action

How I/ we will know we are saving water

What I/ we will do if my/ our enthusiasm for saving the water begins to fade

How I/ we will determine that our water saving action is successful



He tāonga te wai — water is precious

Taking action to save water at our college

Your task, as a class, is to find out if your college uses water efficiently, and implement some actions that will reduce water use at your college.

To achieve this you will need to:

- plan and conduct a water use audit of your school and review the results of the audit
- identify areas where the school could save water
- assess what actions the school (students, teachers, parents, Principal and Board of Trustees) can take to be more water efficient
- plan for action or actions
- carry out the action and
- evaluate the impact of the action or actions.

Use any action planning process or tools your class is familiar with.

Some ideas to consider are:

- similarities and differences between how water is used at home and school
- the amount of water used outside (especially in terms 1 and 4)
- the use of water in specialist areas e.g. science laboratories, technology areas, and the staffroom
- how water efficient appliances in the school are
- use of rain water and greywater to water gardens
- behaviours of students e.g. leaving water running
- modifications to toilets and bathrooms that could make them more efficient.

School water meter

A water meter has been connected to the school. You can measure how much water the school uses every day. If you started a campaign to get students to reduce the amount of water they use (e.g. turn off taps in the bathrooms) you could see if this has any effect on the school's daily use of water. However, water use will vary depending on the weather and you will need to decide how to factor this in your results.

Changing behaviour

Some of the actions that will save water will involve changing the behaviour of the students, teachers and other people in the college community. You will need to consider how to motivate and encourage them to change their behaviour.

Changing infrastructure or appliances

Other actions could involve the school making infrastructure changes e.g. replacing toilets with dual flush systems, or installing tanks and capturing rain water and using it for gardening. This will involve the college spending money and you will need to present a case outlining the benefits of the expenditure and a proposed budget to the Principal and/or the Board of Trustees.



He tāonga te wai – water is precious

Teachers' notes: Safe water for all

Introduction and resources

This section is a brief introduction to the global issue of providing sufficient clean and safe water for the growing world population and the unequal distribution of Earth's water resources.

The section is based on the use of two World Vision DVDs, *Safe water for all* and *Waterways* that can be borrowed from the Water Adviser, along with the poster *Everyone everywhere needs water*.

A student worksheet *Safe water for all* is provided for use with the DVDs.

Key ideas in this section are:

- Water is a finite resource.
- Water is precious.
- Many people in the world do not have access to water.
- Access to safe water is important for healthy living.
- People need to manage sustainable water resources, especially when there is a shortage of water.
- We need to protect water sources and water from becoming contaminated.



The internet provides access to a range of case studies about the supply of water to developing countries or countries such as Tuvalu, do not have a source of fresh water.

Out of the classroom activities

How much water can we use?

The Water Education Facilitator can provide an activity kit that contains 50 1 litre water bottles, 4 labels, 5 sets of laminated task cards.

- Set this activity up outside using the kit provided.
Lay out the four labels:
Bathing Sanitation Food preparation and Drinking
- Place :
15 bottles by the Bathing label 20 bottles by the Sanitation label
10 bottles by Food preparation label 5 bottles by Drinking water label.
- Explain that we are conserving water and need to imagine that the bottles are full of water.



The 50 litres is the amount of water recommended for daily healthy use.

- Ask how many litres people in industrialised countries like New Zealand use. *We use more than 200 litres per day, 4 times this amount.*



He tāonga te wai — water is precious

Teachers' notes: Safe water for all continued

How much water can we use? Activity continued

- Divide the class into five groups and give them each ten bottles (10 litres) and tell each group they live in a water-stressed area or an area in a state of extreme difficulty caused by lack of water. Ten litres is all the water each person has for the day.
- Give each group a set of task cards and enough time to decide how to allocate their 10 litres of water. Tasks are: *Have enough to drink, Wash your clothes, Water the garden, Wash the dishes, Make food to eat, Wash yourself, Clean the toilet and Water the chickens*
- Have each group report back to the class on how they would use their allocation then evaluate their allocation by answering these questions:
 - ◇ Did they have enough water?
 - ◇ Which tasks are the most important?
 - ◇ Which water did they recycle?
 - ◇ What is the minimum amount needed to wash? (In some parts of the world people wash using only 250 ml of water.)
 - ◇ After using this amount of water for a month or longer what long term or serious health problems do they think might occur and why?
- Have the students consider a natural disaster hitting the Kāpiti Coast and for three days they will be dependant on 10 litres of water per person per day. Discuss how they would allocate their water.

Activity 2 Carrying water

The Water Education Facilitator will provide a range of water carrying containers. You will need a source of water, metre rulers or measuring tape and ropes to mark out a course.

- Explain the average distance someone in Africa and Asia walks to collect water is six kilometres. The water an adult carries on their head (20 litres) is equivalent to the airport luggage allowance of 20 kg (1 kg = 1 litre of pure water). Older children carry around 10 litres but young children may manage only 1 to 2 litres per trip.
- Fill a suitable carrying container with 20 litres of water and measure how far selected students can carry 20 litres of water. Most students will not be able to carry this amount of water. **Do not let students carry water on their heads**, as this is a cultural practice that needs to be developed from when you are young. Students can experiment with how easy it is to carry different containers, how much water they contain when they are full and consider how long it would take them to carry 20 litres 6 kilometres.
- Have your students work in teams and have a race to carry 20 litres of water over a marked course. Students will need to work out how much they want to carry at once, what containers they want to use and they will need to replace any water spilt.
- The students can reflect on what they have experienced by answering questions like these:
 - ◇ How would you feel if it was your job to carry this amount of water every day?
 - ◇ What challenges would you face so you can get enough water for your family?



He tāonga te wai — water is precious

Safe water for all

- Watch the DVD *Safe water for all* and work in pairs or groups to discuss:
 - ◇ the problems villages in Niger face with water shortages in the dry season and lack of access to safe water
 - ◇ what changes occurred in the village after it had a reliable source of safe water.

Zalifa and Houra have different views than New Zealand teenagers. On your own paper create an image of Zalifa or Noura and one of yourself. Use speech bubbles to indicate the thoughts or values a teenager in rural Niger and a teenager in New Zealand might have about water and water usage.



- Watch the DVD *Waterways* and/or complete some internet research.
- Present a short case study of a water issue faced by a named country and how they are dealing with it.
- Use these suggestions to guide your research:
 - ◇ Provide a description of the problem.
 - ◇ Give an explanation of how the problem affects local people.
 - ◇ Describe any short or long term solutions to the problem.
 - ◇ If the solution is in place, describe what has happened since the solution has been in place and how this has affected the lives of the local people.
- If appropriate, describe what might be developed in the future.

The world's water crisis

In 2011 our world population reached six billion. By 2025 the world population is expected to reach eight billion, yet the planet cannot produce more fresh water.

What do you think will need to happen by 2025 for everyone to have an adequate supply of safe drinking water?



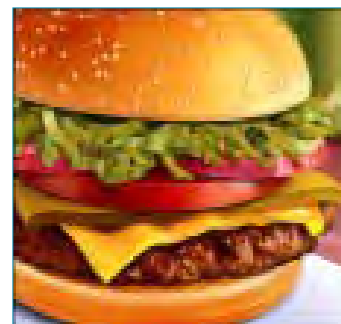
He tāonga te wai — water is precious

My water footprint

The world is thirsty because it's hungry and we like consumer products.

Do you agree or disagree with this statement?

- Do some online research and give an informed opinion.
- Go to www.waterfootprintkemira.com/meter and calculate your water footprint. New Zealand is not listed as a country so either use the global average or select Australia as a country similar in water usage to us.
- Go to www.unwater.org/worldwaterday/animation101.html. and www.unwater.org/worldwaterday/allyoueat.html to calculate the number of litres of water used in a meal you like. Some factual supporting material is available under the FAQ section on this website.
- Do these facts surprise you enough to take action and reduce your consumer spending? What would it take to persuade you to use less water in selecting food and when you buy consumer products like clothes.
- As class set a topic or topics for a class debate that considers who is responsible for addressing global and local water issues.
- Create your own visual image and message to focus people's attention on global water issues.. <http://bestdesignoptions.com/?p=11638> could be useful
- In a small group decide what approach is likely to work best with an identified target audience (e.g. young people, people with disposable income, people with families) and target your image and message to have impact.
- Check out the Outlook for Someday Sustainability Film Challenge. The challenge is to make a short sustainability-related film. It can be any genre, filmed with any camera and any length up to 5 minutes. Anyone up to age 24 can enter, either individually or in a team. Go to www.theoutlookforsomeday.net and see past entries and make a film.



It takes 2,400 litres of water to make a hamburger.

Then there's 10,850 litres to make a pair of jeans, 8,000 litres for a pair of shoes and 400,000 litres to make a car.

What will save more water — having shorter showers all year or not buying another pair of jeans and a few T shirts at 4,100 litres of water a time?



He tāonga te wai — water is precious

Teachers' notes: He tāonga te wai — the unit conclusion

Introduction and resources

In this final section students consider the viewpoints or perspectives of some individuals who represent water user groups on the Kāpiti Coast. The students then reflect on what they have learnt and present their own views on water and the need to respect it and use it wisely.

The Water Education Facilitator will arrange for a panel presentation of four to six people living on the Kāpiti Coast. The individuals will come from some or all of these groups:

- a farmer
- a local kayak adventure company representative
- the Green Gardener or a garden club member
- a member of a local conservation group
- a trout fisher
- someone from industry.

In their presentation the individuals will explain:

- why water is important to them and to the group or organisation they belong to
- how they are involved with water on the Kāpiti Coast
- what inspires them about our coast and water
- what concerns them about water and water use of the Kāpiti Coast
- how they would like to see people value and use water on the Kāpiti Coast in 50 years.



Our views on water

Prepare your students for the panel presentation and have them complete group discussions after the presentations. Each group could present what they considered to be the important ideas presented by a nominated presenter.

My views on water

Students can develop a personal response about how they value water and the need to respect it and use it wisely.

The students can:

- review their initial ideas about water (first lesson formative assessment)
- discuss what they have learnt as they have completed the unit
- develop their personal response.



The response could be a poem, song, rap, or a photograph, drawing, graphic image, dance or movement sequence accompanied by a description or a written response. This response can provide the final assessment for the unit.