



The year is flying by!

I trust you all enjoyed the recent break and hopefully the weather gave you opportunities to get out and about. It never ceases to amaze me just how fast each year goes and to think that half the school year is already behind us is a little bit scary.

I thank the teachers of the 33 classes who have spent a day at the Pukeiti Rainforest School so far this year. That's an incredible response from schools, with many more booked in the next two terms. To this point only one visit has had to be postponed because of really bad weather. Several classes have taken the opportunity of being 'in the rain' in a rainforest and while they might have got wet, their enthusiasm wasn't dampened at all, nor it seems was their enjoyment. The four tree huts inevitably produce the 'wow' factor (not only for the students) and have also been used for studying the bush or as bird observation points. The river at night exercise was certainly exciting for everyone, even if many of the fish decided to keep themselves out of the spotlight, so to speak.

Thanks to the many teachers who have downloaded 'The Rainforest School' and other study units from our website. We are in the process of reviewing many of our study units, to bring them up to speed with the New Zealand Curriculum, to update information in them and to make sure the activities are relevant.

The Ministry of Civil Defence Emergency Management has set 21-27 September as this year's "Get Ready" week. The nationwide theme this year is "What Would You Do?" and the purpose is to encourage people to plan for a range of scenarios where normal routines are disrupted by a major disaster event. 'What's the Plan Stan?' is an important resource for schools and offers useful ideas and activities that could be used to support this programme.

Kind regards
Kevin Archer

Environmental Awards

Once again, the Council will be rewarding outstanding environmental work by individuals, community groups, farmers, companies and educational institutions through its annual Environmental Awards programme. Over the last two decades, many schools, early childhood and tertiary education centres have been recognized in this way for their outstanding achievements.

Nominations for this year's awards close on 29 August, with the winners receiving their awards at a presentation evening in New Plymouth on 6 November. To make a nomination or for further information go to trc.govt.nz/environmental-awards or contact Council Communications Manager, Rusty Ritchie ph 06 765 7127 or email: rusty.ritchie@trc.govt.nz

The river at night



These suitably rugged up enthusiasts of all ages enjoyed a night time search for native freshwater fish and freshwater crayfish in an unnamed tributary of the Timaru stream at Pukeiti recently. The session started with everyone learning how the Council uses long nets to trap fish for monitoring purposes. This was followed by a visit to the Bublitz Education Centre to look closely at some of the native freshwater fish in our fish tanks and then it was into the exciting bit of spotting the fish or at least trying to spot them in their natural habitat. Plenty of freshwater crayfish (koura) were seen, captured, observed closely and released but the native freshwater fish were more elusive, even though we were assured they were definitely there. Despite this, a fun time was had by all on a clear and cool night. The very welcome hot drinks and biscuits at the end provided a perfect finish to a great evening.

GROUNDWATER

This issue of SITE looks at groundwater, where it is stored, how and why the Council monitors its quality and how it is used in Taranaki.

GROUNDWATER

What is groundwater?

Groundwater is the water found underground. It is stored in and moves slowly through the cracks and spaces in soil formations, sand, gravel and rocks called aquifers.

The Water Cycle

Water has always been on the move. From the time planet Earth was formed, it has been endlessly circulating in a process called the water cycle. The cycle involves the continuous movement of water above, on and below the surface of the earth. Surface water includes rivers, streams, lakes and wetlands, while groundwater is held underground.

Usage in New Zealand

Many people are surprised to learn that around one third of the water used in New Zealand comes from groundwater. New Zealand's groundwater storage has been estimated to be 612 billion cubic metres. That is a lot of water and it might be easier to visualise the amount as being the water in millions of Olympic-sized swimming pools. In some parts of New Zealand, the availability of groundwater is crucial to the prosperity of the region. In Taranaki, the demand for groundwater, particularly for agricultural use is increasing, but is still not at levels seen around other parts of New Zealand.

Groundwater - hot or cold?

Tourists from all over New Zealand and indeed the world enjoy the benefits of bathing in our warm, sometimes hot mineral waters. New Plymouth has its own, naturally warm mineral pools which were discovered by mistake, as the original drilling was for oil. The water was discovered at a depth of 900 metres which is regarded as being deep by normal groundwater standards. At greater depths groundwater becomes saline (salty). The temperature of most New Zealand groundwater that is located near the surface reflects the mean air temperature at that location.



Irrigation circle in south Taranaki



TRC hydrogeologist monitoring groundwater quality

Use of groundwater in Taranaki

The biggest use of groundwater in Taranaki is for water supply for towns, mainly in south Taranaki. This is followed by its use in agriculture and for domestic supply. In rural areas, wells are often used to supply water for domestic use. Much of the water is taken from relatively shallow wells and can therefore be susceptible to the effects of land use, eg fertilisers that have been applied to the land or animal wastes that have filtered through the ground and into the groundwater. The water table level can fall, particularly in summer and autumn, and this can affect the volume of water available for use in those seasons. Groundwater is also used in industrial processes, dairy and meat processing and in hydrocarbon exploration and production activities. Only a very small proportion is used in our region for horticultural use.

The Council's role in groundwater monitoring

The Council has a number of on-going groundwater monitoring programmes which it carries out as part of its overall State of the Environment Monitoring programme. Specific monitoring programmes include:

- Nitrates in groundwater at 27 sites
- Groundwater levels at 10 sites
- Pesticides in groundwater at 7 sites

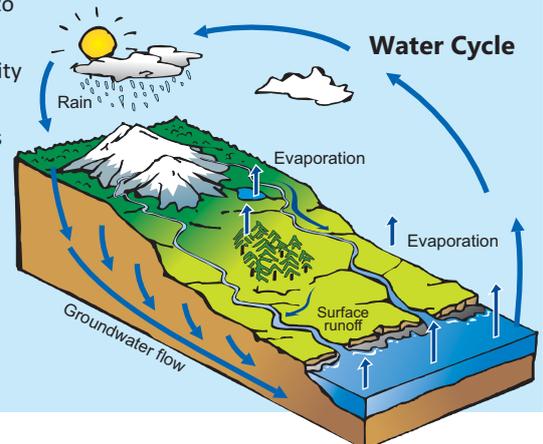
In addition, the Council maintains a record of all consented groundwater takes throughout the region and it also monitors abstraction volumes.

The Council also participates in the National Groundwater Monitoring Programme administered by the GNS (Geological and Nuclear Sciences) which involves maintaining a long-term record of groundwater quality at five sites across the Taranaki region.

Council assistance

- Contact the Council Education Officer to arrange for a Council hydrogeologist to talk to your class on the topic of groundwater in Taranaki and New Zealand.
- Invite the Council Education Officer to talk to your class about the quality of our groundwater and how this in turn, affects the quality of the water in our streams and rivers. He could also explain why some of our streams and rivers never run out of water, even in very dry conditions.
- Invite the Council Education Officer to explain how the water cycle works. This lesson includes a role play exercise where the students act as the water. Lots of fun so I am told!

- Visit the New Zealand Hydrological Society's website www.h2know.org.nz. There are a series of three posters available for you to download and a teachers' kit. The posters are named, The Water Cycle, Where Is our Water and Who Needs Water.





Word match

Match the word with its meaning:
seepage, contamination, pesticide, septic tank, landfill, fertilizer, groundwater

- A. This process occurs when man-made products such as petrol, diesel or oil get into the groundwater making it unsafe to use.
- B. A lined area of land where waste material is buried.
- C. Water that is found underground in the cracks and spaces between rocks and soil.
- D. Any chemical that is used to kill insects and other pests.
- E. A chemical that is used to improve the soil and promote plant growth.
- F. A tank that is used to temporarily treat and store human waste.
- G. This word is used to describe a leak from a landfill or a storage tank.



Word find

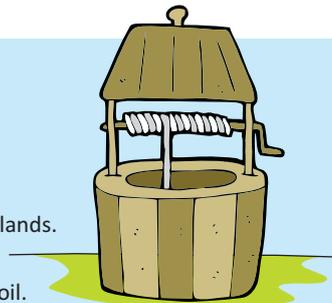
abandoned well
 biodegradable
 chemical
 clean
 conservation
 depletion
 drinking
 environment
 glass
 irrigation
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 plastic
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 recharge
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 vinegar
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 yard waste

B A P C M I O N S Y E N V C H E M I C A L
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Facts and myths

See if you can decide which statements are facts (true) and which are myths (sometimes thought to be true but never are).

1. Groundwater always flows in underground rivers.
2. Groundwater and surface water may be connected through wetlands.
3. Groundwater in Taranaki is always of the highest quality.
4. Groundwater flows at different speeds between the rocks and soil.
5. Some of the purest water in the world can be found in the Te Waikoropupu Springs near Nelson.
6. All groundwater has a constant temperature of 20 degrees celsius until it reaches the surface.
7. Water from a well is always safe to drink.
8. Groundwater is never connected to rivers and streams.
9. Some people aren't concerned about the quality of groundwater because they never really see it.
10. We can always count on groundwater to be available when we want to use it.



Waters sayings and meanings

There are many sayings involving water that have very little to do with water but have another meaning altogether. See if you can match the saying with its meaning from the list. The first one is done for you.

1. **A fish out of water**
2. Be dead in the water
3. Be in deep water
4. Water off a duck's back
5. Blood is thicker than water
6. Spend money like water
7. Test the water
8. Treading water
9. Water under the bridge
10. Watering hole



Meanings

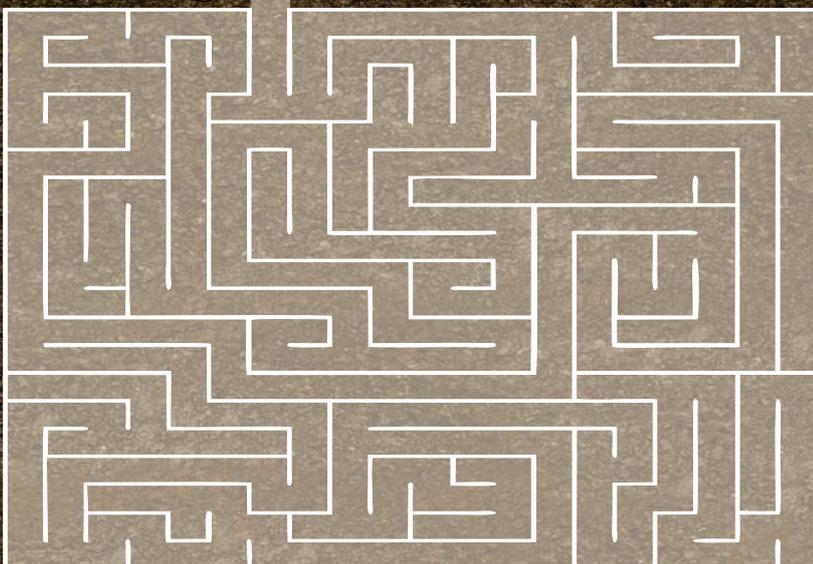
- A. Spend far too much
- B. A place where animals (including humans) drink
- C. **An uncomfortable position**
- D. Not going forwards or backwards
- E. Having no effect at all
- F. Find out something first before taking action
- G. Be in a difficult situation
- H. Family comes first
- I. Something that has happened and cannot be changed
- J. A failed attempt at something



Maze



See if you can help Walter the worm find his way home.



HOME
SWEET
HOME

Right: Students from the two junior rooms at Fitzroy School look closely at photos, plastic examples and pinned creepy crawlies during their visit.

Below: These junior students from Stratford Primary really enjoyed the view from one of the four tree huts.

Bottom: Lani Rova and Luke Mischefski identify bugs they found during the creepy crawlly activity.



This and That

Fonterra Taranaki Science and Technology Fair

The annual Fonterra Taranaki Science and Technology Fair will be held at the Pukekura Raceway Function Centre in New Plymouth from 28-30 July. The fair is open to all students over Year 6. The Council sponsors prizes for displays that best exhibit aspects of environmental science.

Thank you letters

I really enjoy students writing to thank me for supporting their school programmes or sending me examples of their work. Here are a few sentences I found particularly interesting.

Mr Archer made a joke when he said that if he was taking the pot-a-plant lesson, everyone would be taking a weed home to plant.
(Fitzroy School student)

Thank you Mr Archer for teaching us about the rocky shore. Your stories made me laugh and our rock pool visit was my best day ever. I definitely will go back there again, because it was fun. (Inglewood Primary School student)

All your knowledge about the rocky shore helped us out loads but the part that really made me laugh was when I realized you had the same shoes as me!! (Inglewood Primary School Student)

I think rock pools are important because they mean love to me, what do they mean to you?
(Tyler Read, Puketapu School).



Answers from page 3

Match the word with its meaning: A. contamination B. landfill C. groundwater D. pesticide E. fertilizer F. septic tank G. seepage

Facts and Myths: 1.Myth 2.Fact 3.Myth. 4.Fact 5.Fact 6.Myth 7.Myth 8.Myth 9.Fact 10.Myth

Water sayings and their meanings

1-C 2-J 3-G 4-E 5-H 6-A 7-F 8-D 9-I 10-B

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