EcoBuzz

Edition # 36 **Term 4, October 2009**

Richard de Hamel was caught riding a moa at a Conservation Week event at the Brook!

What's inside?

NELSON CITY COUNCIL
te kaunihera ō whakatū

tasman district council
lifestyle

Kia ora Tatou,
What a wonderful place we all live in – thanks goes to the Brook Waimarama Sanctuary for hosting the recent Conservation Week event. Read more about the event – through the eyes of students.

We have 2 main themes this issue – ecological buildings and the soil (growing healthy plants & food). Enjoy.
We hope you read from cover to cover and have fun sharing it all with your students.

Nā mātou noa na Karen, Jo, Rob & Claire

Make Paper Lanterns!

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WWF's Earth Hour has created a new learning resource called Project Lantern, designed to give children from New Zealand and all around the globe the chance to show their vote for saving the earth from runaway climate change. The project encourages children to make a paper lantern, decorating it with words and images that express care for the environment and asking world leaders for action by making the statement, “I Vote Earth because...”

Handcrafted lanterns from schools around New Zealand will be collected by WWF and used in a public display in Wellington. They will then be sent to Copenhagen for the crucial UN climate summit in December 2009, where lanterns from around the world will be paraded in the town centre reminding leaders that the fate of future generations is at stake. Making a lantern is child's play! Parents, teachers, after-school groups and children - we've produced easy step-by-step guides for how to make your own lantern and send it back to WWF-New Zealand by 20 November 2009.

Download your pack today from the WWF website www.wwf.org.nz

BIG DAY OUT AT THE BROOK

What a great day we had at the Brook Waimarama Sanctuary during Conservation Week. The sun shone, the birds sang and the kids were happy and busy from start to finish. After our welcome from Barney Thomas, who emphasised to the children that the success and future of the Sanctuary was up to them, we set off in our school groups around the six organised activities.

We began with John the puppeteer singing and dancing as the wistful birds who hope one day to live in a safe sanctuary. Sally showed us the inner workings of the traps that are designed to help achieve the predator-free status. Some children tried to manoeuvre a stoat puppet in and out of the trap with the egg.

On a grassy terrace, Roger and Richard led us through one game designed to show us the effect of possums on a verdant but vulnerable forest and a second game that opened our eyes to the extinction of the moa. We turned into moa in a wetland and encountered hunters of both the feathered and human variety. Down at the whale tent, Moetu Stephens and Barney introduced us to the vital statistics of whales, a mighty jawbone and passed around whale teeth and baleen.

We learned how Maori viewed a stranded whale as a koha from Tangaroa. Out on the path we unravelled a ribbon 130 metres long to represent the longest whale and it was an impressive length! After a zero-waste lunch we tested our bird-watching skills under the watchful eyes and ears of Pauline and other local members of the Ornithological Society of NZ and listened for bird calls outside and inside the sanctuary building.

Then we were off over the bridge, up the path and down to a terrace beside the Brook Stream where we found a plant classification tent, some mystery objects inside boxes and a whole lot more traps. Blindfolded children tried to identify the mystery objects – a morepork wing, a stuffed stoat, a fungus and more. Craig and Pam talked with us about native trees and showed us identifying features. We came away with a healthy respect for predator traps and heard Sanctuary Co-ordinator Rick Field talk about his vision of a fenced safe haven where trapping becomes unnecessary. Last but not least we were off to the river to look for bugs under rocks with Mel from Waimaori Streamcare and Lawson and Rhys from Fish and Game. Our feet became numb but who cares when you're having so much fun. It was a great way to finish a marvellous day.

In his farewell Barney reminded us of our future responsibilities and we climbed into our bus to head back to Hira School. The day went without a hitch and all credit to the organising team and all the people who were there to help us learn about this wonderful place and resource in our backyard.

By Jane Pearson. Hira School

eDay Success for Schools

Thank you to all schools that dropped off their computer waste at our eDay events this year. 21 schools used the events that we had set up for them in Lower Moutere and Stoke on 8th September and many more brought their materials along on the main day in Stoke, Lower Moutere, Takaka and Murchison. eDay in this region collected a total of 52 tonnes from schools, households and small businesses. Nationally 976 tonnes of material was collected and saved from landfill. This event serves to ensure that the materials are recycled for reuse rather than being buried in landfill and it also works to raise awareness of the importance of recycling and reusing computer waste. If any schools are interested in finding about future eDay events please contact **Mary Curnow at Nelson Environment Centre on 03 545 9176 or marycurnow@nec.org.nz**
The eDay website (www.eday.org.nz) provides more information about what happened to the materials after they were dropped off at eDay.
Many thanks go to our regional sponsors and the volunteers that helped at each event. Our sponsors were Tasman District Council, Nelson City Council, ENZA, Fonterra, K&F McLean, BlueBerry IT, Nelmac, Fulton Hogan, Downer EDI, NMIT, Nelson Environment Centre and Waste Education Services.

Enviroschools

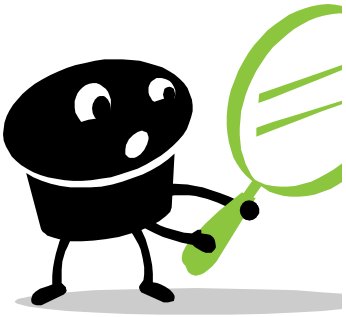
Kia ora koutou,
This term we are very pleased to welcome two new facilitators to the team – Mariam El Orfi and Monique Patterson. Mariam takes over from Sarah Langi and will be supporting Nelson Enviroschools. Monique will be working alongside Kate as a facilitator in the Tasman district. Both bring with them a wealth of experience and enthusiasm for the role.

The eco-building project is proving to be a great success with those who have registered. We are very grateful to local community members who have supported these projects with time and resources. We are particularly indebted to the local experts and enthusiasts who have been linked up with each school to provide personalised attention.

Many schools in our region are now taking up the challenge to measure the sustainable changes they are making, with **www.measuringchange.org.nz**. Each unit takes just a couple of hours to complete, has detailed supporting documents for the students to use and a clear online calculator for interpreting and recording the results. Waste audits have been popular so far and other areas include energy, water and use of landscapes. Your facilitator is able to support you in using this tool, so do get in touch if you and/or your Envirogroup are keen to give it a go.
In 2010 we hope that we will be welcoming some new primary Enviroschools into the network. If you know of anyone who would be interested in making their school a more sustainable learning environment, then please encourage them to get in touch with us.
Also, when you get a moment check out the new re-vamped Enviroschools website on www.enviroschools.org.nz
Have a happy, healthy and sustainable term everyone!
From Kate & Claire x

Enviroschools

SPOTLIGHT SCHOOL
Tasman District – Dovedale



Dovedale School has been involved with the Enviroschools programme for nearly two years. In that time the whole school has made considerable progress on their journey towards becoming a sustainable learning environment.

The school is involved with a number of sustainable initiatives. One major focus area is reducing waste and students' have designed their own waste-free lunch boxes and have focus days where recognition is given to those who are making efforts to reduce their waste. They recycle and re-use wherever possible and turn any food scraps into compost to add to their productive edible gardens. They are actively encouraging their local community to be involved and regularly include tips on waste reduction in their school newsletters.

Envirogroup Leaders writing the care code.

Recently the whole school have been working on the paperwork side of maintaining an Environmental Education focus within the school. The Envirogroup decided that they needed something to focus everyone in the school on the direction they wanted to take. A care code was the perfect solution. The group explored care codes from other schools to see what might work for them and then brainstormed all of the features they would like to include. The idea of an acrostic care code appealed to everyone so they went about creating three different codes, each with a slightly different focus. Each code was then presented to the whole school and students, teachers and parents voted for the one they preferred. This then became the Dovedale School Care Code and is on display throughout the school, so everyone is clear what they are working towards.

Bird feeders to encourage native birds to the school grounds.

The teaching staff have been inspired by the impact of the care code and have started to work on writing their own vision statement, which they will share with the school community once they have finished. Environmental Education is given status within the school and is included in the strategic goals and planning documents. All of this helps to provide a stable structure on which to base a sound and sustainable EE programme.

Planting at Poorman Stream

Nayland Primary students with the support of Nelmac planted 100 native plants along the bank of Poorman Stream in the area that the school monitors regularly.

This area had previously had many trees growing that were weeds, like plum and bay trees. There was also mint and Tradescantia and many other garden plants growing prolifically. The students have been learning about the advantage of native planting and what makes a plant become a classified weed. As many of these weeds as possible, were cleared by Nelmac, and the area sprayed ready for planting. Now there are flaxes and grasses planted along the flood zone and kowhai and manuka higher up the bank. Our aim is to make this a place here the community can enjoy the stream and appreciate beauty of our natural flora. We are very lucky to have such a pristine stream in the suburb and the schools aim is to celebrate this and work towards making it a better place. This inaugural planting has been a great start towards this goal.

Janice Cowley Nayland Primary School

Fresh Fruit Free-For-All in the Top of the South: Open Orchards Nick Kiddey

http://www.healthyas.org.nz/fresh-foods/

While it's easy to think there is an abundance of fresh food available to everyone in Nelson & Tasman, it's not always the case. Many people can't afford it, get it, or even aren't aware of how important it is to eat plenty of fresh, unprocessed food. So how can we help those that aren't getting fresh fruit?

In response to these issues, a group of people got together to discuss the idea of "Open Orchards" – that is, fruit and nut trees planted on public land, for the benefit of all. The idea came from the South Coast Environment Society in Riverton. Pretty soon, an application to the Nelson Marlborough District Health Board's Nutrition and Physical Activity (NPA) fund for $4000 to purchase trees was made by the Nelson Community Organic Gardens Trust (NCOGT). The application was successful, and the rest is history…

An initial 200 fruit and nut trees (including feijoas, quinces, apples, pears, plums, hazelnuts, almonds and more!) have been planted at 14 different 'open orchards' throughout Nelson and Tasman, and there's more to come! Sites so far include schools, neighbourhood reserves and even high-profile spots like Decks Reserve in Motueka!
The benefits of these orchards may take a while to bear fruit, but they will eventually provide not just free fresh fruit and nuts in season, but also material to propagate more trees, so that people can get together in their neighbourhoods to look after the public trees as well as take cuttings and grafting material to grow their own at home as well!
To find your nearest Open Orchard, as well as any other public fruit and nut trees in your area, the NPA team have created an online map called the Nelson Marlborough Fruit Map. You can find this by going to **http://www.healthyas.org.nz/fresh-foods/** and clicking on the 'Open Orchards' link. This is a collaborative map, so if there are any fruit or nut trees you know of on public land (not on private land!) you can add them to the map. There are heaps on there already – you may be surprised what's in your neighbourhood! Trees on the map planted prior to the open orchard project (many of which are producing fruit and nuts already!) include cherry guavas, macadamia nuts, carobs, loquats, walnuts and figs, as well as more apples, plums and feijoas than you can shake a stick at…

Some people haven't even bothered waiting for someone else to do the planting but have taken action in their own neighbourhoods by getting people together, talking to the Council, and organising the planting of their local reserve. If you're lucky, the Council might even pay for the trees! There's no harm in asking, so get out there, rustle up some keen parents and neighbours and work with the Council to establish your own local Open Orchard.

Healthy Soil for Now and the Future.

For growing plants, the first rule in healthy soil is to actually have some.
Soil has taken hundreds of years to build up, mostly from volcanic activity, weathering of rock, water movement and leaf litter and decaying trees in the forest.
When we talk about Sustainable Land Management, loss of soil due to erosion is one of the greatest issues that we face.
Soil can be eroded by:

- Rain – washes soil particles into waterways and out to sea
- Rivers and streams - water moving along the streambed can wash away parts of the streambank
- Wind – small particles of soil are picked up and blown away (eg. the recent dust storms in Sydney)

Although erosion is a natural process, it has dramatically increased since the arrival of Europeans into New Zealand. To build our towns and cities and to grow food, we have cleared the land of its natural cover and replaced it with things like concrete, pasture and exotic trees to be harvested for wood.

Trees and plants are the very best thing to hold the soil in place. Their roots bind the soil together and the leaves and branches slow and reduce the amount of rainfall that reaches the ground. They also drop leaf litter, branches and other material which help improve the soil by adding organic matter, they also reduce the likelihood of soil blowing away in the wind.

Although pasture and pines trees are also plants, they are farmed or managed for a particular purpose and therefore do not have the same effect as plants that are left undisturbed in the ground for long periods of time. Because pasture species do not have deep root systems, they don't have the binding ability of trees and shrubs. Also the grass is grazed really low which can open up the soil, or the ground gets pugged because stock have access when it is too wet and this allows erosion to occur from wind and rain.

Trees that are grown for their wood are usually clear felled (all cut down at once) when they get to about 25-30 years. The trees are chopped down and dragged by heavy machinery to a site where they can be put onto trucks. When you look at the hills around Nelson and see where the pine trees have been removed you can see how much soil has been disturbed. Add to the soil disturbance, the steepness of some of the hills and it doesn't take much rain to wash the soil away.
(Look at this photo of the Grampians in Nelson).

Other times when soil can be eroded is when the land is ploughed to plant it into crops for food. Even in your own garden when you dig it over, you are opening up the soil to wind and rain. The best thing you can do is get plants growing again as soon as possible. Adding good compost is important too, but that is another story for another time.

Roadworks and land clearance for development are often times when soil can be disturbed. If there is large earthmoving machinery anywhere, chances are that the soil is going to be exposed to erosion.

The other major time of erosion is during heavy rain when our streams and rivers are in flood. You can see that the water does not look clear and clean. This is because it contains lots of soil particles that have washed off the land or is the result of big pieces of steambank being washed out and into the steam. This is when riparian planting is beneficial. Trees help to hold the streambanks together and also trap some of the soil that is carried overland by the rain, stopping it from getting into the waterways.

Our soil is precious, once it has washed out to sea – it is gone, we cannot get it back again. The best thing we can do is to plant trees and shrubs for the long haul. In the garden, keep adding compost to rebuild the soil and remember - the less that our soil is disturbed and eroded away the more we will have for growing healthy food and vegetables into the future.

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2009 Plant Conservation Awards

The New Zealand Plant Conservation Network (www.nzpcn.org.nz) invites nominations for this year's Plant Conservation Awards. Nominations close 4th November.

Categories are: Individual, Plant nursery, School project, Community project, Local authority, Young plant Conservationist of the year

Details are available from the NZ Plant Conservation Network website or email either Ian Spellerberg ian.spellerberg@lincoln.ac.nz or John Sawyer john.sawyer@doc.govt.nz

Vote for Enviroschools! - SBN National Award nomination and Peoples Choice Award

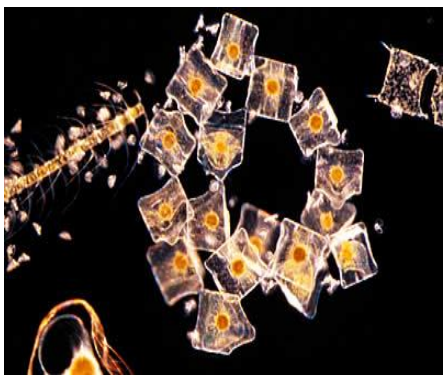
The Enviroschools Foundation has been nominated for a National Sustainable Business Award (Sustainable Design and Innovation category). The Awards ceremony will be held in Auckland on November 12. As part of the Awards night, there will be a Peoples Choice Award. It would be great if you could all vote for us! http://www.sustainableawards.org.nz/peoples-choice

Richard de Hamel's watery point of view!-

If I was a plant I'd live in the sea! Healthy plants need four things to help them grow, nutrients (food), water, carbon dioxide and of course sunlight. If supplied with these things a plant will grow and give out oxygen. Between half and three quarters of the oxygen on planet earth comes from ocean plants! Most oceanic plants are very small – microscopic in fact. In science we call them phytoplankton.

Living in the ocean, drought is not normally a concern. Many larger shoreline plants can withstand being cast up on the beach and being dried out, but will re-hydrate if they are covered by the sea again later.

The biggest issue for a marine plant is light. A plant living greater than about 60m deep, will have trouble surviving in the low light. Many small marine plants have oil within their cells. Oil, being buoyant, keeps them up near the surface. On windy, rough days you may have seen foam blowing across rocky beaches. This is caused by the oil in these tiny marine plants being released as the waves pound the rocks and smash the plant cells. The foam is caused by the seawater being mixed with plant oil – the original marine salad dressing!



Of course most marine plants don't need to worry about having roots. Why bother? They are soaking in water and nutrients continually. Plants on land on the other hand have the problem of water and nutrient uptake, and so have to use roots to do this. Roots mean that it is hard for a land plant to move unaided. Microscopic marine plants often do move, why stay in one place? They can move to where light and nutrients are.

As with many things in the sea, we land-based humans sometimes have to rethink what we think is normal. The most common plants on this planet can move!

What are you and your class doing on October 23/ 24th??
A Global call for Climate Change Action

www.350.org – have a look for ideas.

Nelson Growables Garden Fair

All things gardening

• Founders Park •
Sun Nov 15 • 10am-5pm

At Nelson Growables you can:

- Buy plants & garden goodies
- Learn to grow healthy plants, fruit & vegetables for quality & flavour
- Learn to harvest & cook for good nutrition & eat for good health
- See chooks in the garden
- See a rock wall built
- Plus lots more

Schools and other local groups are invited to be involved. Nelson Growables will be a fun family day out!

Contact:

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Oh how wonderful it was to find www.seussville.com and www.seussville.com/lorax/ - my all time green hero! It is a lovely website for younger children.

The New Zealand Association for **Environmental Education**
Education for sustainability
Te mauri o te taiao

CONFERENCE
www.nzaeeconference2010.co.nz
The Conference is in Hawke's Bay -
January 19 – 22
The theme is
Te Ahu Whakamua
"Taking the Next Steps"
For people working in Local & Central Government, ECE, Primary, Intermediate, Tertiary, Business and Community.

Some useful Soil information Websites:

http://www.createyourowneden.org.nz/index.html

http://www.gardenorganic.org.uk/schools_organic_network/index.php

http://soil.gsfc.nasa.gov/students.htm

http://www.landcareresearch.co.nz/research/

http://www.seafriends.org.nz/enviro/soil/

www.dirtdoctor.co.nz

PAPATŪĀNUKU'S THOUGHTS ON LAWNS

PAPATŪĀNUKU: Rongomātāne you know all about gardens and nature. What in the world is happening on my surface? What happened to the dandelions, violets, thistles and stuff I started eons ago? I had a perfect no-maintenance garden plan. Those plants grow in any type of soil, withstand drought and multiply with abandon. The nectar from the long lasting blossoms attracts butterflies, honeybees and flocks of songbirds. I expected to see a vast garden of colours by now. But all I see are these green rectangles.

RONGOMĀTĀNE: It's some of the tribes that settled there, Atua. The Suburbanites. They started calling your flowers 'weeds' and went to great lengths to kill them and replace them with grass.

PAPATŪĀNUKU: Grass! But it's so boring. It's not colourful. It doesn't attract the butterflies, birds and bees; only grubs and sod worms. It's sensitive to temperatures. Do these Suburbanites really want all that grass growing there?

RONGOMĀTĀNE: Apparently so, Atua. They go to great pains to grow it and keep it green. They begin each spring by fertilizing the grass and poisoning any other plant that crops up in the lawn.

PAPATŪĀNUKU: The spring rains and warm weather probably make the grass grow really fast. That must make the Suburbanites happy.

RONGOMĀTĀNE: Apparently not, Atua. As soon as it grows a little, they cut it – every week.

PAPATŪĀNUKU U: They cut it! Do they bail it like hay?

RONGOMĀTĀNE: Not exactly Atua. Most of them rake it up and put it in bags.

PAPATŪĀNUKU: They bag it! Why? Is it a cash crop? Do they sell it?

RONGOMĀTĀNE: No Atua, just the opposite. They pay to throw it away.

PAPATŪĀNUKU: Now let me get this straight. They fertilize the grass so it will grow well, and when it does grow they cut it off and pay to throw it away? Amazing! These Suburbanites must be relieved in the summer when Ranginui cuts back on rain and turns up the heat. That surely slows the growth and saves them a lot of work.

RONGOMĀTĀNE: You aren't going to believe this Atua. When the grass stops growing so fast, they drag out hoses and pay more money to water it so they can continue to mow it and pay to get rid of it.

PAPATŪĀNUKU: What nonsense. At least they kept some of Tānemahuta's trees. That was a stroke of sheer genius, if I may say so myself. The trees grow leaves in the spring to provide beauty and shade in the summer. In the autumn they fall to the ground and form a natural blanket to keep moisture in the soil and protect the roots. It's a natural cycle of life.

RONGOMĀTĀNE: You'd better sit down. The Suburbanites have drawn a new circle. As soon as the leaves fall, they rake them into great piles and pay to have them hauled away.

PAPATŪĀNUKU: No! What do they do to protect the shrub and tree roots in the winter and to keep the soil moist and loose?

RONGOMĀTĀNE: After throwing away the leaves, they go out and buy something which they call mulch. They haul it home and spread in around in place of the leaves. People cut down trees and grind them up to make mulch.

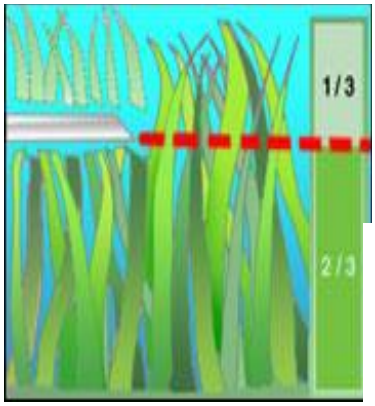
PAPATŪĀNUKU: Enough! I don't want to think about this anymore. Hinewao, you are in charge of the arts. What movie have you scheduled for us tonight?

HINEWAO: 'Dumb and Dumber', Atua. It's a story about ….

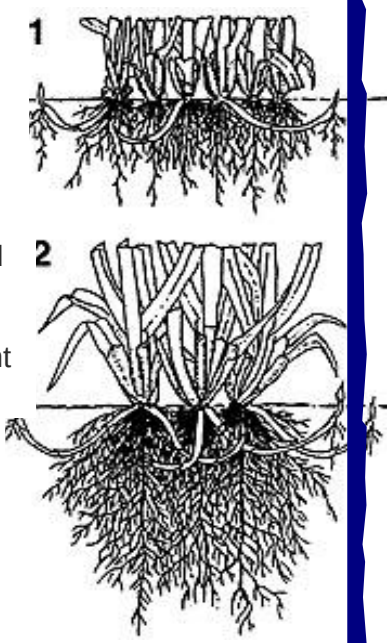
PAPATŪĀNUKU: Never mind. I think I just heard the whole story from Rongomātāne.

Lawns clippings – what should we do with our grass clippings?

The best option is leave them on the lawn because grass clippings returned to the lawn provide up to 25 percent of your lawn's total fertilizer needs. Clippings contain about 4 percent nitrogen, 2 percent potassium and 1 percent phosphorus. While decomposing, they also serve indirectly as a food source for the bacteria in the soil, which are doing many beneficial things (such as decomposing thatch) for a healthy turf environment.
Grass should be mowed tall and clippings should be returned to the lawn to produce a healthy lawn. Set your mower at a tall setting so clippings easily fall into the lawn. Mow frequently so you remove no more than one-third of the total plant height.



Regular mowing with a sharp blade is essential for reducing the need to collect clippings. Grass must be mowed often enough so that no more than a third (about 1 inch) of the vertical grass height is removed with each cutting. Figure 1 shows recommended cutting heights.



A comparison of turf-grass mowed at two heights.
1 The closer-mowed turf-grass has fewer roots and uses water inefficiently
2 The higher-mowed turf-grass has a more extensive root system and is more drought resistant

When you set your mower at a higher cutting height, the grass plant produces a deep and efficient root system that can reduce the need for watering. Taller mowing also helps to "shade out" many weeds. Simply remember to set your mower at a tall setting so clippings fall easily into the lawn.

The low down dirt on the good stuff – soil.

Why are we focusing on soil?
Well somewhere beneath your feet is the ground. It might be covered up and sitting dormant or it might be busy growing plants but it is there. And it is vital to life on this planet – certainly terrestrial life anyway. It might not seem like very exciting stuff but just think of the ways we (humans) use it everyday.
Soil provides us with the –

- Food we eat – meat, fruit, vegetables and grain
- Clothes we wear – wool, hemp, cotton and linen
- Building materials – wood, bricks, concrete and glass
- Oxygen we breathe – produced by plants that live in the soil
- -Water we drink – stored, filtered and let go by the soil.

This could make a wonderful brainstorm activity with your class!

Mātātoa tahi - Activity 1:- Is the soil healthy? Find out!

You will need: a spade, water, notebook & pencil and a sheet of plastic for each group testing different soil.
Have each group dig up a spade full of topsoil and put it on the plastic sheet. Have them fill in the table below to answer the following questions:

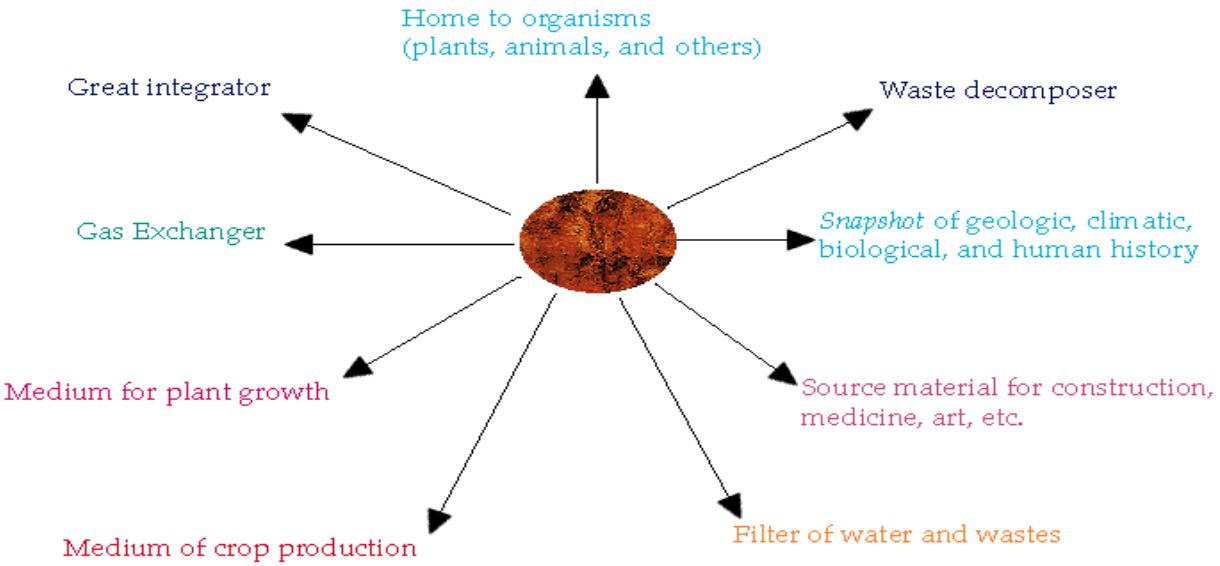
1- What macro-organisms are living in the soil? What can you see?
2- What colour is the soil?
3- How deep is the topsoil? Look at the spade sample and in the hole to work this out.
4- What is the consistency of the topsoil like? To test this, wet your fingers a little and roll a bit of the soil into a ball. Squeeze it gently with your fingers to flatten it a bit. Does it crack?
5- What is the topsoil structure like? Has it stayed together in a solid block, or does it break easily into smaller bits of soil? Has it gone to dust?
6- What is the texture of the topsoil like? Rub some between your fingers to help decide.

Macro-organisms	worms	grubs	beetles	centipedes	others
Topsoil colour	pale brown	light brown	brown	dark brown	black
Topsoil depth	1/4 spade	1/2 spade	3/4 spade	1 spade	more than 1 spade
Topsoil consistency	firm	sticky			
Topsoil structure	hard to break up	breaks up alright	Easy to breakup		
Topsoil texture	sandy	gritty	stony	crumbly	

Soil health table

	Macro-organisms	Soil colour	Soil consistency	Soil depth	Soil structure	Soil texture
	Insects in the soil are an indicator of soil health. A variety of insects generally means good health.	Soil colour is often an indication of drainage. Exceptions to this basic rule are bog wetlands and peat soils, which are poorly drained but are often very dark in colour.	Soil consistency is important because it indicates how well the soil can absorb and retain moisture.	The more soil, the deeper plant roots can go and the more nutrients they can absorb. Deeper roots make larger plants more stable.	Soil particles bound together by organic matter and clay are called aggregates. Varying amounts of the ingredients change the shape of the soil and indicate stability.	Soil texture changes with differing proportions of sand, silt and clay. Soil texture depends on the parent material and the age of the soil.
Healthy	Many different sorts of insects (particularly worms) in the soil.	Darker coloured soils are rich in organic matter. This normally means they are well drained.	Firmer, less sticky soil will absorb water and retain moisture.	Deeper soil.	Softer soil, that easily breaks up, but not to dust.	Soil with smaller, finer particles.
Not so healthy	None, or only one type of insect in soil.	Soils that are pale in colour are generally poorly drained.	Sticky soil tends to repel water. This means that the soil does not absorb water well and will not hold moisture.	Shallow soil.	Hard, solid soil that is difficult to break up and stays in hard clumps.	Stony, gritty, sandy, dry soils.

The soil is a:



There is a limited amount of soil, and so it must be properly cared for.

Mātātoa rua - Activity 2: How much soil is there on the Planet?

Pretend that this apple is the planet Earth, round, beautiful, and full of good things. Notice its skin, hugging and protecting the surface. Water covers approximately 75% of the surface. So cut the apple into 4 quarters. Remove three quarters (75%) this represents how much of the earth is covered with water - oceans, lakes, rivers, streams. What is left (25%) represents the dry land.

50% of that dry land is desert, polar, or mountainous regions where it is too hot, too cold or too high to be productive. So cut that dry land quarter in half and toss one piece away. When 50% is removed, this is what is left. (12.5% of the original)

Of that 12.5%, 40% is severely limited by terrain, fertility or excessive rainfall. It is too rocky, steep, shallow, poor or too wet to support food production. Cut that 40% portion away. You are left with approximately 10% of the apple. Peel the skin from the tiny remaining sliver.

The remaining 10% (approximately*) - this small fragment of the land area - represents the soil we depend on for the world's food supply. This fragment competes with all other needs - housing, cities, schools, hospitals, shopping centres, land fills, etc., etc. And, sometimes, it doesn't win.

How much soil around you is healthy and growing food?

Mātātoa toru - Activity three:

All the photos on the next page show different examples of Eco-friendly homes. There are lots of ways to be eco-friendly.
Cut out the labels and see if you can find an example of each in the photos. Put them beside the correct photo or draw lines to one or more examples of each eco-friendly design feature.

- **Saving clean rainwater to use in the house or garden**

- **A green–roof where you grow plants on the roof to create more insulation (keeping the inside of the house a nice temperature) and reducing rain run off too.**

- **Passive solar – where sunlight warms up a solid surface (floor) during the day to then radiate out the heat at night when it is cold outside – a free way to help heat your home!**

- **Heating your home, making hot water and cooking food without using electricity - is especially good if you live in the country and can grow your own trees for firewood. Remember wood must be dry and no smoky fires allowed!**

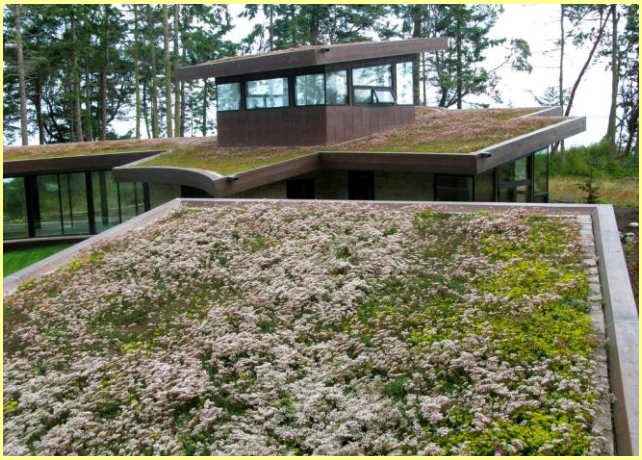
- **Some houses have really thick walls made of bales of straw – this makes for a wonderfully insulated house so no heat leaks out.**

- **Photo voltaic panels are clever – they catch sunlight and turn it into electricity which can be used straight away or stored in big batteries. Some homes don't have power lines come to the house at all – these panels make all the electricity the family need.**

- **Now most of us know growing vegetables at home is the cheapest and healthiest way we can go – they taste better too.**

- **Getting power from the wind is another clever idea – a bit like the PV panels make electricity from sunlight. Some wind turbines don't look like they used!**

- **How about not having to pay for hot water? If you have solar hot water tubes you can. Cloudy days do mean you don't make much hot water though!**

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