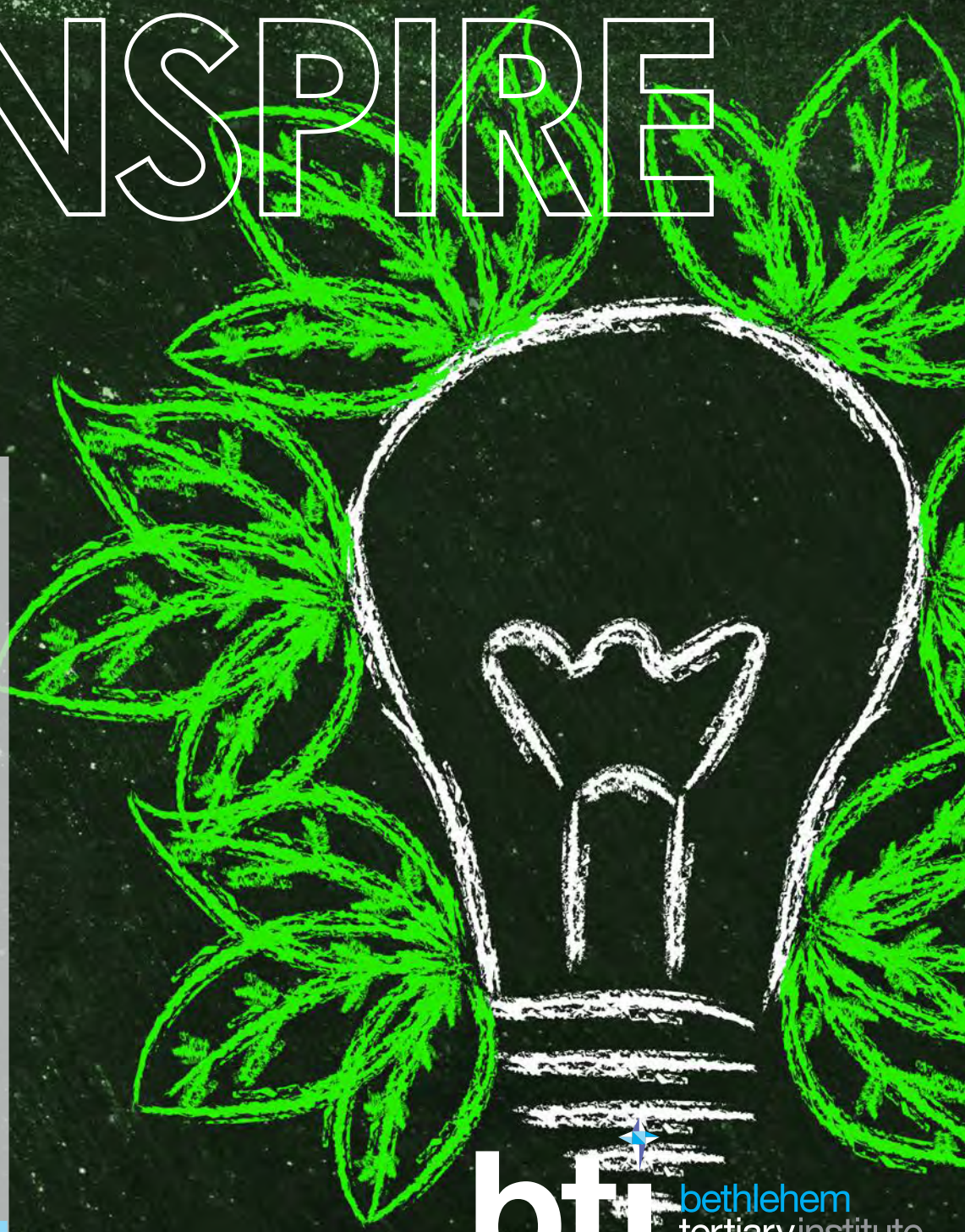
INSPIRE



In this series:

Education for a Sustainable Future

CULTURAL STORIES

CARING FOR OUR RESOURCES

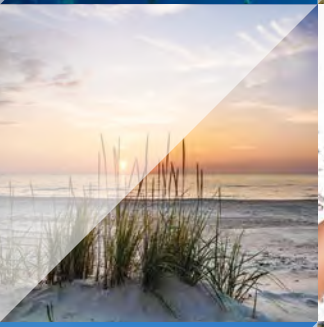
USE OF OUR RESOURCES

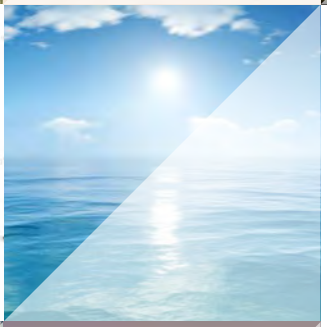
Series 1, Issue 2: 2017

bti bethlehem tertiary institute
TE WHARE TAUIRA O PETEREHEMA

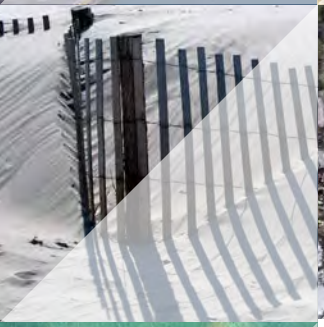


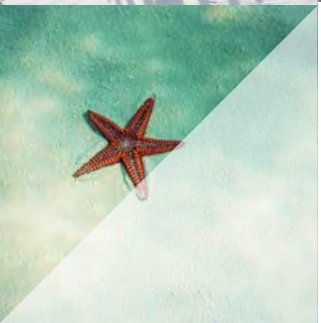
KEEP OFF
THE DUNES









CONTENTS - Series 1

Inspire is published by Bethlehem Tertiary Institute (BTI)
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COMMENT

Rachelle Hulbert, Teacher Educator, welcomes you to the second issue of our ***INSPIRE*** series.

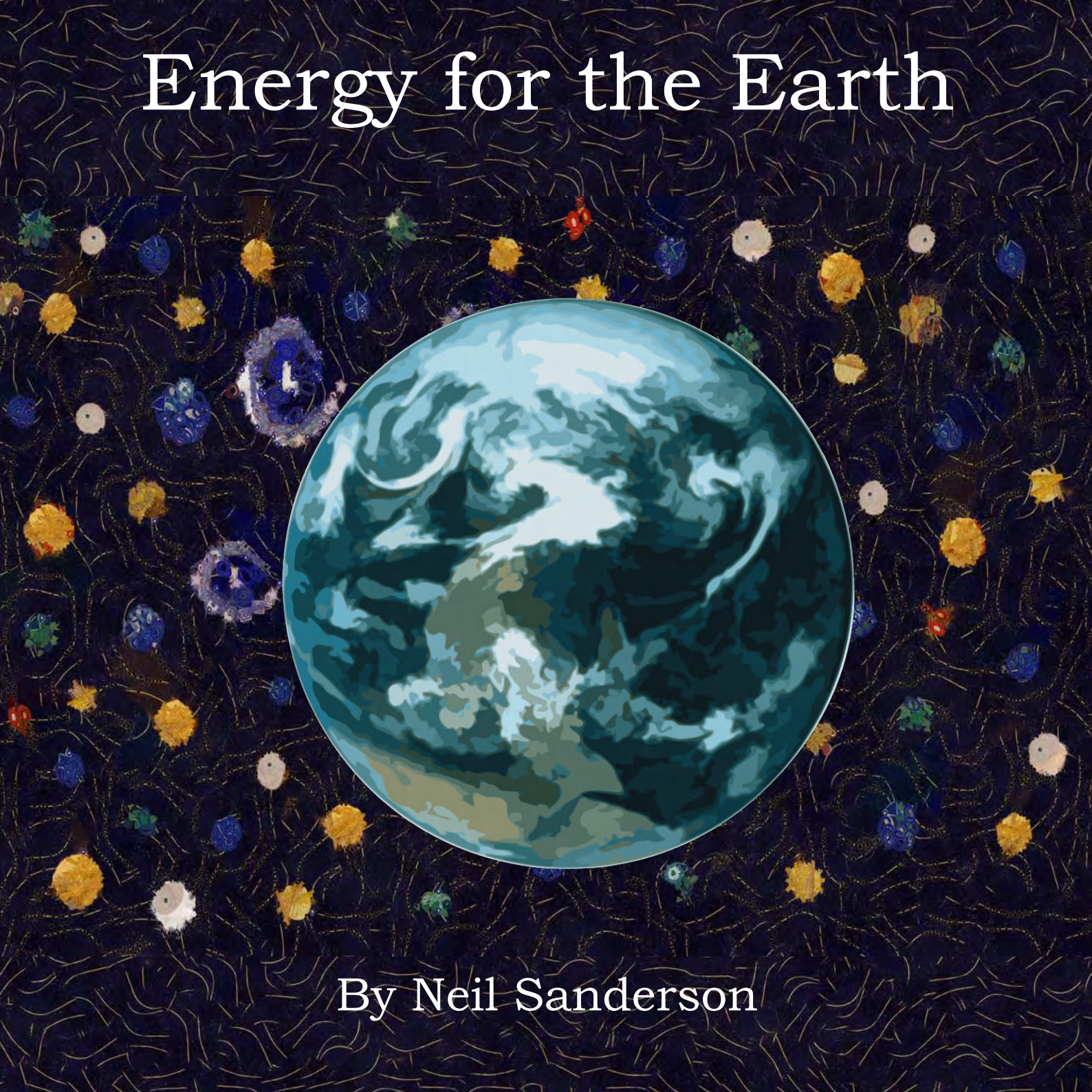
Welcome to the second issue in a series of three Education for a Sustainable Future learning and teaching resource journals published by BTI.

This series of journals represents the work undertaken by student teachers during their third year of study in the Bachelor of Education (Teaching) programme at Bethlehem Tertiary Institute (BTI) and is the result of work submitted for one of the assignments for the course, Education for a Sustainable Future.

The focus of this series of resources is to provide educational articles for students, teachers and schools related to educating children for a sustainable future. It includes consideration of the socio-cultural, historical and political values and practices that underlie living sustainably. In keeping with BTI's special character, it recognises the biblical commitment towards stewardship, justice and love.

We hope that you find these articles thought-provoking, engaging and useful in classroom learning and teaching.

Energy for the Earth



By Neil Sanderson

What is renewable energy?

Renewable energy is made from things that will not run out such as water, wind, sunlight, plants and more. These are things we can reuse.

Non-renewable energy comes from things that will eventually run out such as fossil fuels and uranium.

A lot of New Zealand's energy is supplied by renewable energy sources including geothermal power, biomass and other sources of renewable electricity generation.

Renewable

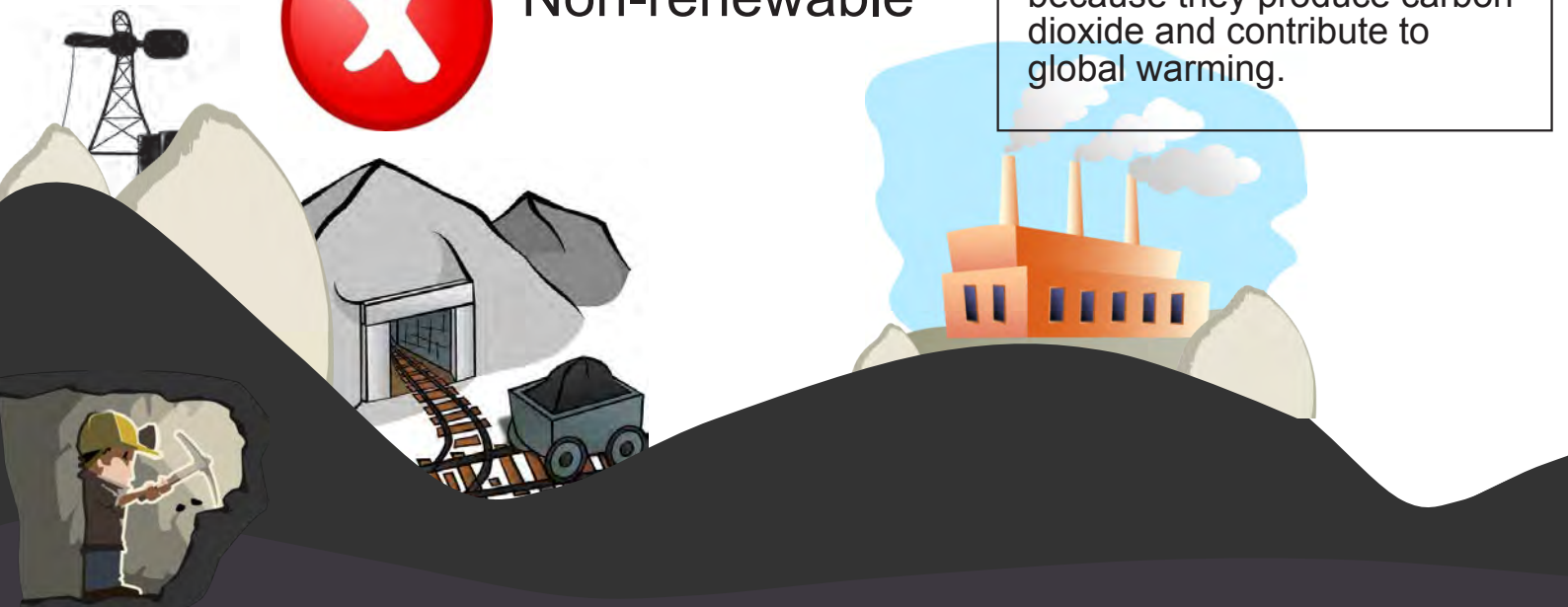
Non-renewable

Fossil Fuels

Fossil fuels such as coal, oil and gas, produce around 30% of New Zealand's electricity.

Fossil fuels are classed as a non-renewable resource because they take millions of years to form and are being used up faster than they are made.

Non-renewable



Quick Facts

Fossil fuels are fossilised plant and animals or natural gas pockets that have been changed and formed deep underground.

Fossil fuels include coal, natural gas and oil.

Because of the time they take to form, fossil fuels are a non-renewable energy source.

Fossil fuels are mined underground or on the surface and oil is drawn from oil wells.

Fossil fuels are not environmentally friendly because they produce carbon dioxide and contribute to global warming.

Wind Power

Wind energy contributes about 5% of New Zealand's total electricity supply.

Wind energy is one of the cheapest options for generating electricity and has one of the lowest overall environmental impacts.

Quick Facts

Wind power turns energy from the wind into electricity we can use.

Wind power is both environmentally friendly and renewable.

Wind turbines are the most common form of wind energy generation.

Groups of wind turbines are called wind farms.

New Zealand has several wind farms located across the country.

Renewable

Solar Power

Solar power is generated by harnessing the energy of the sun.

Solar panels are used to harness the power of the sun's rays and convert it into energy.

Only 0.1% of New Zealand's electricity is generated by solar power.

Some houses use a solar panel to heat up their water.

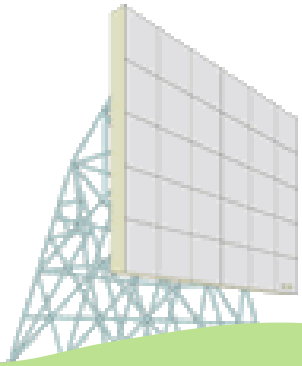
Quick Facts

Tapping the sun's energy does not usually destroy the environment.

Large numbers of solar cells are put together to create solar panels.

Solar energy does not produce air pollution or carbon dioxide.

A downside is that the sun isn't always shining and can be affected by location, time of day or year and the weather conditions.



Renewable

Nuclear Power

New Zealand does not have any nuclear power plants and therefore does not generate any electricity from nuclear power.

Nuclear energy splits atoms which are tiny particles that make up every object in the universe, including you!

Nuclear power plants do not produce much air pollution.

Some of the metals used in nuclear reactors are uranium and plutonium.

Quick Facts

Nuclear power uses fission (splitting an atom) to generate energy.

Nuclear energy is renewable and produces no carbon dioxide.

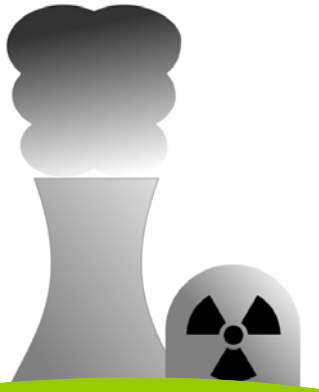
New Zealand is a nuclear-free country.

The largest producers of nuclear energy are the U.S, France and Japan.

Nuclear power plants have a reasonably good safety record but they do pose the potential risk of environmental disaster.

Nuclear reactors produce radioactive waste which is both difficult to dispose of and is an environmental hazard.

Non-renewable



Hydro Power

Hydroelectric power stations generate the majority of New Zealand's electricity - up to 45% of it!

Our hydropower mainly comes from the South Island.

Hydropower is a renewable energy source. This energy source doesn't release particles into the atmosphere which cause air pollution.

Renewable

Quick Facts

Hydropower creates electricity by using the force of falling water.

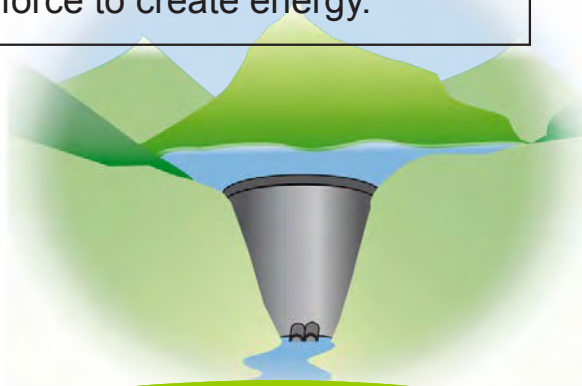
Hydropower is clean and renewable.

However, damming rivers may destroy or disrupt local wildlife.

Most hydroelectric power stations use water held in dams to power turbines and use generators which create electrical energy.

New Zealand produces a majority of its electricity through hydropower.

Tidal power is another form of hydropower. It uses the tidal force to create energy.



Geothermal Power

Geothermal energy provides New Zealand with about 20% of its energy needs.

Most of our geothermal power is generated around Taupo.

Wairakei is New Zealand's largest geothermal power station.

Quick Facts

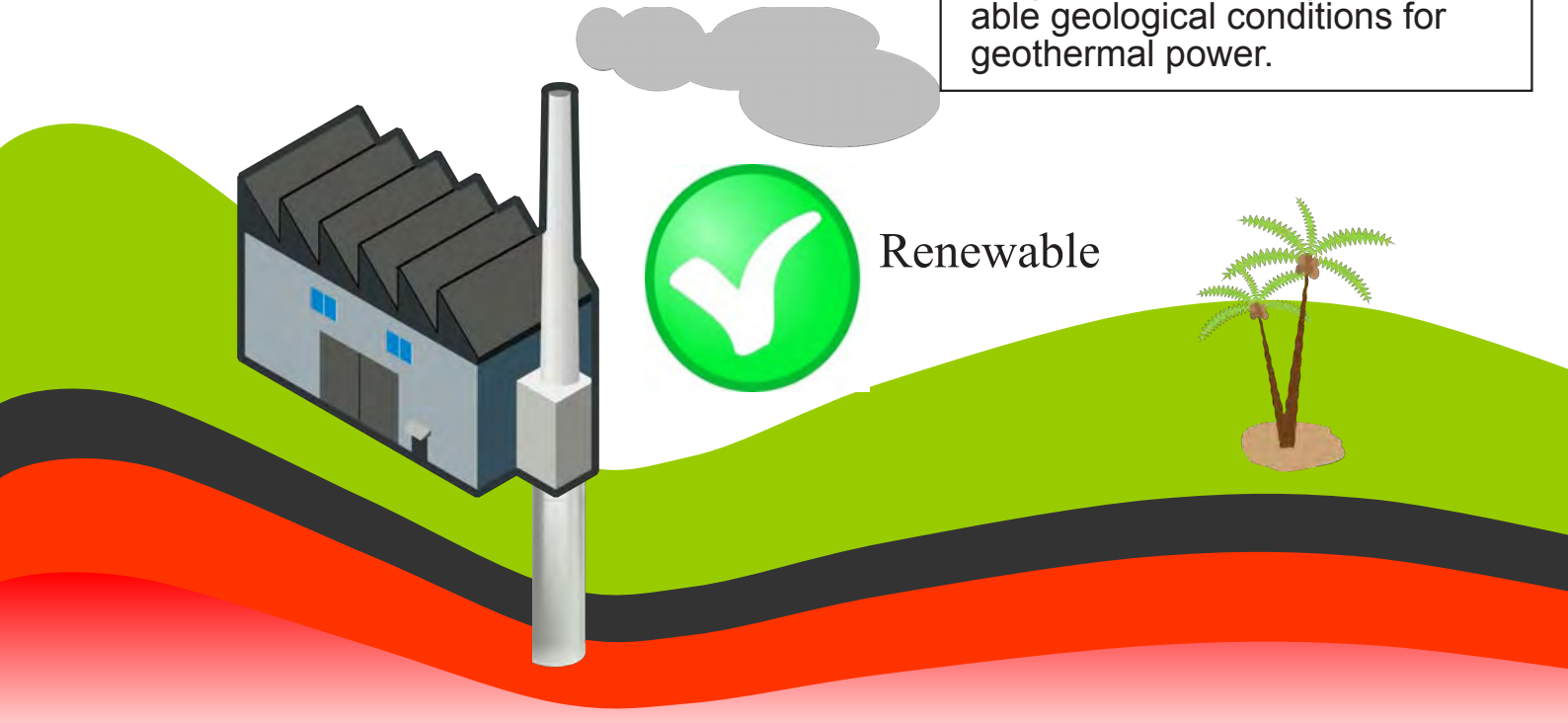
Geothermal energy is found deep inside the Earth.

Geothermal power is clean and reliable but requires aspecific area of geothermal activity.

New Zealand generates a large portion of its electricity needs through geothermal energy.

Humans have used geothermal energy for thousands of years by enjoying hot springs.

New Zealand lies on the 'Pacific Ring of Fire', creating favourable geological conditions for geothermal power.



Biomass

In New Zealand, biomass resources can include wood or plant resources, residue from agriculture and forestry, as well as animal waste such as manure.

Fuel can be made using biomass and it is called biofuel. Some types are biodiesel and bioethanol. Biodiesel is made from vegetable oils and animal fat, while bioethanol is produced from sugars and corn.

Quick Facts

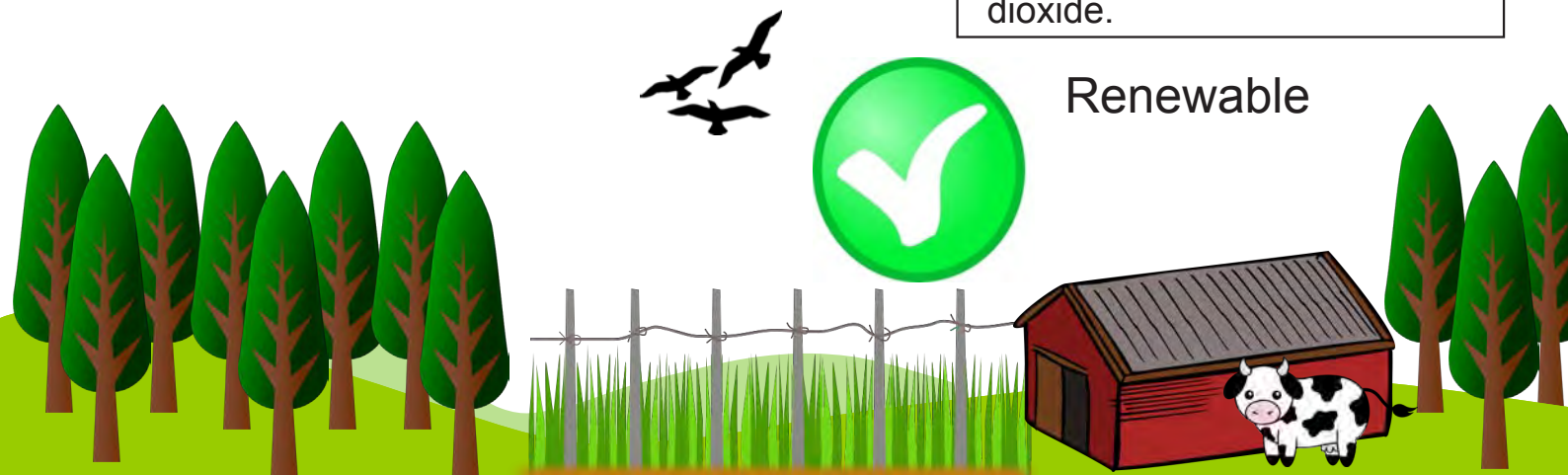
Biomass is organic material made from plants and animals, such as wood, crops, manure, and some garbage.

Biomass is a renewable energy source because we can grow more trees and crops and we produce waste.

Wood and some garbage can be burned to create steam for generating electricity or to provide heat for homes.

Burning biomass for energy will often produce carbon dioxide.

If cultivated and harvested in a sustainable manner there is no increase in carbon dioxide.

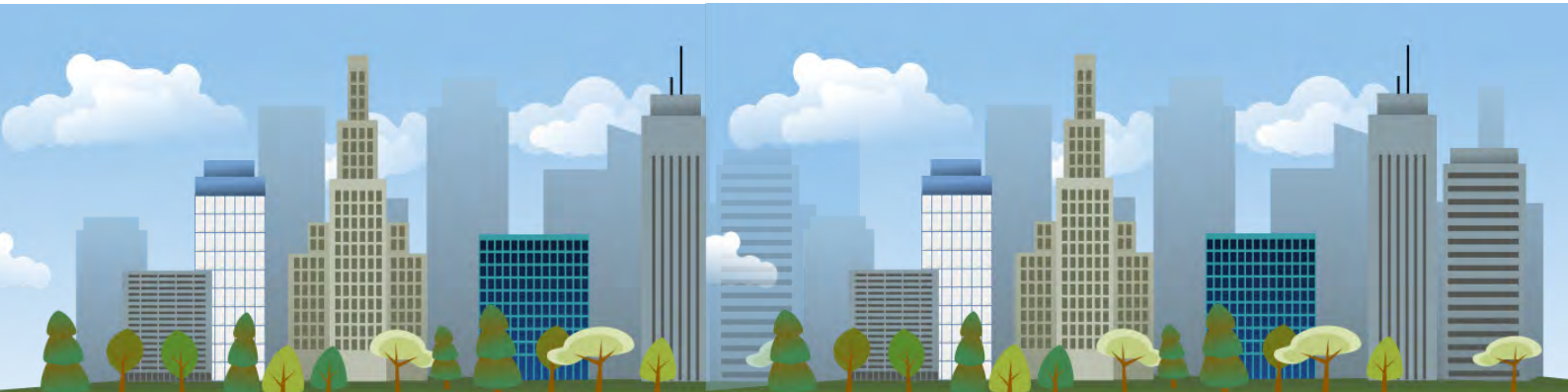


Renewable

The Future

In our world we are dependent on electricity; we need it for many different things in our lives. We know that some of our ways of generating electricity have a negative effect on the environment.

Renewable energy such as wind, solar, geothermal, hydroelectric and biomass provide clean and green energy. There are still some challenges to be overcome but renewable energy can provide great benefits for our planet, our health and for our future.



Activities & Websites

Learning websites:

http://www.energystar.gov/ia/kids_site/swf/ny_te.swf

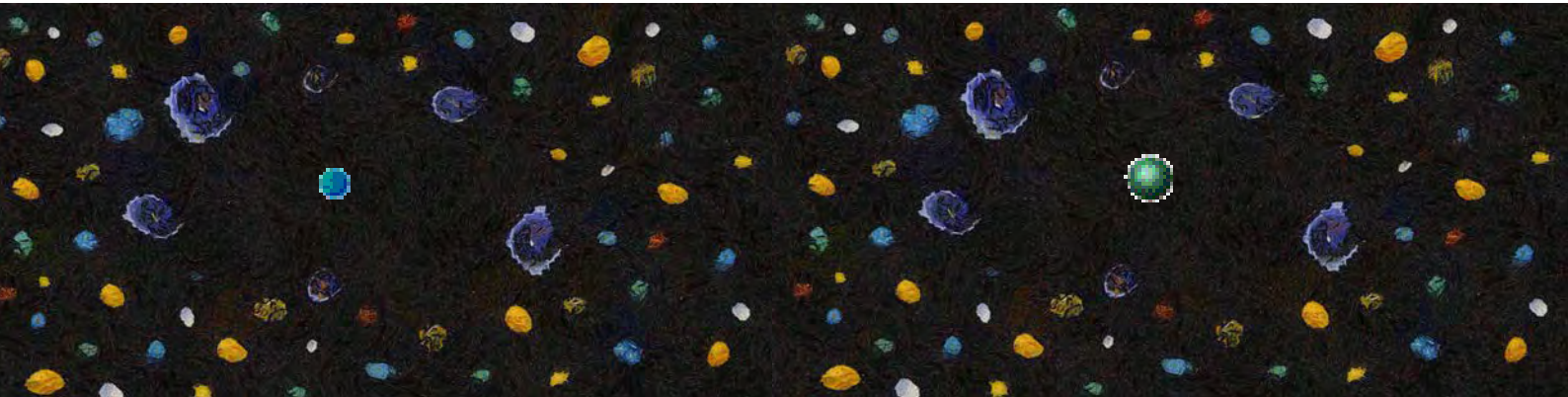
http://www.eschooltoday.com/energy/renewable-energy/what-is-renewable-energy.html

http://www.sciencekids.co.nz/sciencefacts/energy.html

http://www.cleanlineenergy.com/sites/cleanline/media/resources/students/renewable/Saving_Energy_Elementary_Infobook.pdf

Design a solar cooker:

http://www.globaleducation.edu.au/teaching-activity/sustainable-energy-sources-up.html#activity3



Living Water

Think thirst, think rain, think hot sunny days at the beach.
What do all these things have in common?
WATER!

By Anna Roughton

The World's Most Valuable Resource

Water is one of the world's most valuable resources.

Unlike many other natural resources, humans can't live without water. It *sustains* the plants which humans and animals eat; causing them, and us, to grow. When water takes the form of mist and frost, it gets rid of harmful bacteria from the ground.

Water plays an important role in our bodies too, keeping our organs functioning and our bodies healthy.

Water is **essential** to all life.

The Many Uses of Water

What is Water Good For?

Humans use water for many different things including; cleaning, cooking, washing, and drinking. However one thing that many people don't realise is that water not only plays an essential role in our day-to-day lives, but is also an important resource for our economy. Water provides *irrigation* for farmers crops and *agricultural* needs. These crops and agriculture are some of New Zealand's main *exports*. Water is also one of New Zealand's main sources of power and energy. It provides electricity for homes, schools and businesses. This electricity gives us light and warmth, and even power for our iPads and mobile phones. But water is not *inexhaustible*. Every drop of water that we use has to come from somewhere, and every drop of water that we use makes a difference.

The Problems With Water

Fresh & Clean Water

Of all the water that covers the earth's surface, fresh water makes up only 3% of it! Over the years the demand for fresh water has increased, and with this increase in demand, our country's fresh water supply is under *strain. Not only this, but the fresh water that we do have is often exposed* to harmful chemicals and *pollutants* which impact upon the quality of the water that we drink, clean and cook with. When our water supplies become polluted with these chemicals, plants, animals and human life can suffer.

What is Water Pollution?

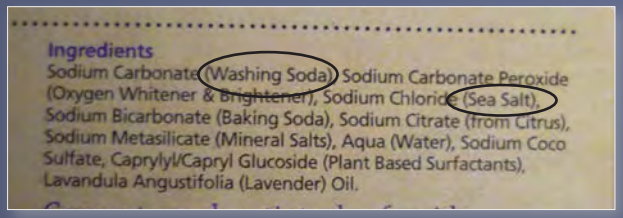
Water pollution is a major problem around the world. When water goes down the drain, it travels through a series of wastewater systems that lead it back to the ocean. Water is then taken up into the air, where it forms clouds. When these clouds are full, they drop back to the earth as rain, which refills our streams and rivers and restores our water supply. The problem is that the chemicals and pollutants that remain in the water after it has travelled through the wastewater systems can be damaging to plant, animal, and human health. Polluted water can cause sickness, and sometimes even death.

Using Water Well

"And God placed man in the garden and charged him to take care of it" (Genesis 2:10)

So What Can You Do?

Many of the chemicals that are found in everyday soaps and detergents can have harmful effects on the soil and environment. When these chemicals get into the water, they can be dangerous to human, plant and animal health and affect the way that they grow and develop. One way that we can make sure that we look after our water supply is by using cleaning products that don't have lots of chemicals in them. That way, when the water from your shower, washing machine, dishwasher and toilet runs down the drain, it will not be as damaging on the soil that produces the food you eat. This will mean that you, and the people around you will stay healthy – and so will your environment!


Ingredients
Sodium Carbonate (Washing Soda), Sodium Carbonate Peroxide (Oxygen Whitener & Brightener), Sodium Chloride (Sea Salt), Sodium Bicarbonate (Baking Soda), Sodium Citrate (from Citrus), Sodium Metasilicate (Mineral Salts), Aqua (Water), Sodium Coco Sulfate, Caprylyl/Capryl Glucoside (Plant Based Surfactants), Lavandula Angustifolia (Lavender) Oil.

DID YOU KNOW?

The best way to check whether your cleaning products are safe for you and your environment is to read the label on the packaging. Do you know what the ingredients are or what they are made of? A product with an ingredient like 'citric acid' will be better for your environment than something like 'pareth-7'.

Simple Steps

Water Conservation

A second way to steward our water resources well is by *conserving* the water that we do have. By being careful not to use more fresh water than we need to use, we will help to ease the impact of water over-use and will be helping to preserve this natural resource for future generations.

How Can I Conserve Water?

There are many ways that we can conserve and look after water. These can include simple things like making sure to turn off the taps properly, flushing the toilet only when you need to, and using a re-usable drink bottle instead of running water from the water fountain at school. Even though some of these ideas seem very simple, they are an effective way to ensure that we look after our water resources carefully.

Think!

What sorts of things could you do to save water? With a buddy come up with as many ways as you can think of that would help you and your classmates to be good stewards of the water that you have. Compare your list with another group and see who came up with the most inventive ideas!

Water Around the World

"I tell you, whatever you did for the least of these, you did it unto Me…" (Matthew 25:40)

Struggles for Water

In New Zealand we are blessed with an abundant supply of fresh water. Getting water is as simple as turning on your kitchen tap. It is easy to forget that this is not the case for many people around the world. In many places, children spend all day walking to and from large wells carrying water for their families to drink, cook and clean with. These children don't go to school, but instead, work to help carefor their families. For these children, fresh water is a gift.

How Can I Help?

There are many ways that we can help people who don't have access to clean water. One thing that we can do is pray. Even though we feel like we are helpless, God has promised that He hears us when we cry out to Him for help. There are also many organisations that provide wells for remote villages where they have no access to clean water. By supporting their work, we can help to make sure that everyone has access to fresh, living water.

Think!

What could your school do to help support people who have no access to clean water?

Jesus' Take On Water

A Fresh, Bubbling Spring

Water is mentioned often throughout the Bible. In John 4, we read about a lady who was standing at a well collecting water for her family. As she went to draw water from the well, Jesus asked her why she was spending so much time gathering water when He could give her water that would stop her from ever being thirsty again.

When the lady heard what Jesus said, she was confused and asked Him how this could be, because He didn't even have a bucket to collect the water in! Jesus replied to her and said, "I am the Living Water. Anyone who drinks this water will soon become thirsty again. But those who drink the water I give will never be thirsty again. It becomes a fresh, bubbling spring within them, giving them eternal life."

What does all of this mean? How can water last forever? What sort of water was Jesus talking about? **Was Jesus just a little bit crazy?**

What did Jesus *Really* Mean?

In our lives, we can be thirsty for things other than water. Many people spend their whole life trying to be popular, or smart, or even loved, but when they get those things, they find out that actually it didn't satisfy them like they thought it would. When Jesus talks about being the Living Water, He isn't just talking about the type of water that you pour into a glass and drink. Instead, He is talking about being the one person who can satisfy you with life. Just as water is one of the most important things involved in keeping our bodies alive and healthy, so Jesus is the only One that can give us real and meaningful life that lasts forever. He wants to give you life that will be satisfying and hope-filled. And the best thing is, that the water He offers is **free!**

I am the Living Water… Whoever drinks of the water I give Him will never be thirsty again."

John 4: 13-14

Glossary

abundant – more than enough

agriculture – related to farming

conserve – to save, use or manage wisely

exports – selling goods and services to other countries

inexhaustible – endless; not able to be used up

irrigation – watering the land or soil using man-made systems (like sprinklers)

pollutant – something that damages or pollutes the environment

remote – not easy to access; far away

strain – pressure

sustain – to keep in existence; to maintain

Going for a dip in the sea is great on a hot and sticky summer's day, but have you ever wondered what is beneath the sand or out there in the ocean depths?

By Rebekah Trinder

Did you know...

Over half of the world's population lives on or near the coast?

In New Zealand most of us live within about an hour's drive of the sea. Our oceans are vital to sustaining life on our planet. Their waters gush over nearly three-quarters of our planet, and they hold 97% of the planet's water. Some of the tiniest living things in the sea, phytoplankton, are responsible for providing over half of the oxygen in our atmosphere. Our oceans are an important source of food and people use them for travel, trade and sports.

No matter how far from the shore you live, everyone, everywhere depends on a healthy sea!

FLOWING WITH RESOURCES

..the waters that were gathered together He called Seas. And God saw that it was good.

Genesis 1:10

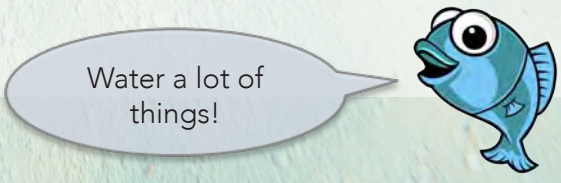
The Energy Crisis

Oil and gas take millions of years to form. Scientists believe that if we continue to squeeze out all of the oil and gas as quickly as we are now, they will be used up in 100 years. We need to find new reserves and new sources of energy to create power.

A New Source

Scientists are still trying to find a way to use wave power. They know that when the wind blows over the ocean, energy is transferred to the water, creating waves. If the power of the waves could be harnessed, it would create a never-ending supply of energy.

Coastal zones play a big part in most of our lives especially as Kiwis. They're used to go for walks or playing games, for water sports or fishing - the activities are endless! Our oceans also contain many other valuable resources. The sea is an essential part of New Zealand's trading and transporting. After all, the sea is what brought us here in the first place! The earliest settlers arrived by waka from Polynesia and others on ships from Europe. Almost all of the goods New Zealand sells are shipped via the sea to other countries. The sea also supplies us with food such as fish and salt. Here in New Zealand, the fishery industry provides many people with jobs, catching and selling fish to other countries which also benefits our *economy*. Seafood is also enjoyed by us too! Deep in the ocean floor, gravel and sand can be mined from continental shelves. They are then used for building on land. Minerals such as oil and gas are mined too which are then used as sources of energy. From oil, petroleum is made which is then used to power cars and engines in order to generate electricity.



- Test Wave Energy -

You will need:
Craft knife, 3 plastic bottles, tape, shallow tank, dowel as long as the width of the tank, modelling clay, 2 pegs, water, large paddle

Steps:

1.Ask an adult to help you cut the top off the bottles and cut the bottles in half lengthwise. Make a hole in the end of each bottle half.

2. Slide the two halves of each bottle into each other and tape together. Thread all the bottles, or floats, onto the dowel. They should hang freely.

3. Attach the ends of the dowel to the bottom of the tank. Support the dowel with pegs. Now fill the tank halfway with water.

4. Move the paddle towards the floats.

Result: The barrier will swing gently and water will ripple more on one side of it than the other because the floats take up some of the energy of the water. If used on a large scale at sea, this energy could be used to turn an engine which could then produce electricity.

But OUR OCEANS are in trouble...

Marine Litter: Abandoned plastics have formed a toxic “plastic soup” in oceans around the world. As the plastic breaks down, it is eaten by sea animals, causing illness and even death. People and animals can also get sick from eating large fish that have consumed other sea creatures that have eaten tiny bits of plastic. An estimated 1,000,000 seabirds and 100,000 sea animals are killed every year because they eat, or get trapped in rubbish.



Overfishing: In parts of the world, fishing trawlers with huge nets sometimes take too many of the same species of fish from a small area. This means that some oceans waters are overfished. As a result, there are not enough fish left to breed in these areas, and this affects the fish in the food chain which also affects people because eventually there may not be enough fish left to eat. The way that we treat the oceans today will affect the Earth, our oceans and the creatures that live in them in the future.

SO WHAT CAN YOU DO!

Show yourself in all respects to be a model of good works – Titus 2:7

Make a choice!

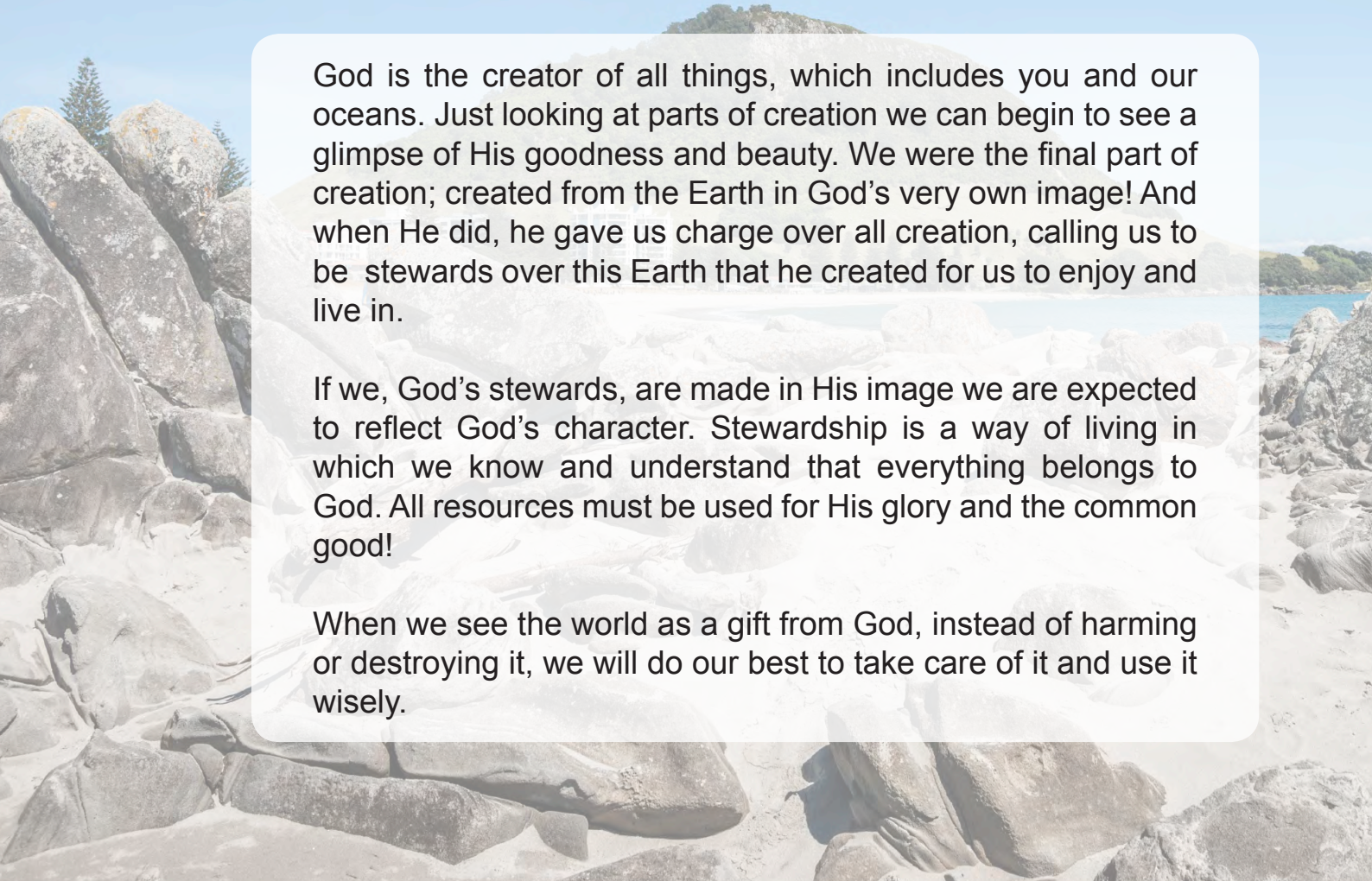
Plastic pollution in our oceans is mainly caused by individual littering. Over 70% of the rubbish found on New Zealand's beaches is made of plastic which has been used only once. We can all look after our coastlines by disposing of our litter carefully, whether we are at the beach or on the street. Buying fewer disposable, single-use plastic products helps too.

Organise your own clean-up!

Your local beach is a great place to do your bit. When you're at your nearest beach next, with your family or friends, pick up all the rubbish you find. You'll be surprised at how much of it is plastic!

THE CREATOR OF OUR OCEANS

Then God said, “Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth.” - Genesis 1:26-28



God is the creator of all things, which includes you and our oceans. Just looking at parts of creation we can begin to see a glimpse of His goodness and beauty. We were the final part of creation; created from the Earth in God’s very own image! And when He did, he gave us charge over all creation, calling us to be stewards over this Earth that he created for us to enjoy and live in.

If we, God’s stewards, are made in His image we are expected to reflect God’s character. Stewardship is a way of living in which we know and understand that everything belongs to God. All resources must be used for His glory and the common good!

When we see the world as a gift from God, instead of harming or destroying it, we will do our best to take care of it and use it wisely.

Did Jesus like fishing?

Yes! But not for fish...

In Luke 5:1-11, we see how Jesus figuratively catches Peter in His net. Jesus provides a miracle for Peter when he least expected it. After he had been fishing all night but caught nothing, Jesus tells Peter to put his net down in deep water. When Peter did this he caught so many fish that his net couldn't contain them! Jesus then says to Peter, "From now on you will catch men."

By obeying Jesus, Peter was able to experience both the miracle and the resulting blessing. Through this, Jesus' first disciples were able to see that Jesus is more than capable of supplying their every need. Just like for them, he is capable of providing your every need too. God only wants what is best for us and even though sometimes we can't understand why he does things the way he does, we must trust him just like Peter did.

GLOSSARY

Coastal Zones - area where land meets the sea or ocean

Economy – wealth or earnings of a place

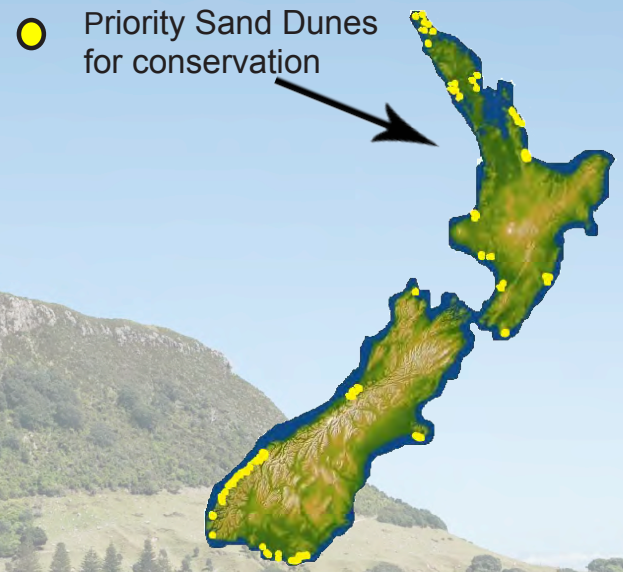
Fishing trawlers – commercial fishing boat made to control fishing trawls (fishing nets that are pulled along at the bottom of the sea)

Pollution – something that damages or pollutes the environment

Sustaining – to keep in existence; to maintain

Stable Sand Dunes...

By Kate Bradnock



Crabs, Rodents, Birds and Spiders all make homes in Sand Dunes.

New Zealand has a lot of coastline surrounding its land. The sandy beaches in New Zealand have sand dunes that can sometimes reach more than one hundred metres high! The dunes are made from strong winds, the loose sand from the beach and waves. The wind blows the sand from the beach upward, the waves push the sand toward the back of the beach. There used to be many more dunes on our beaches but some dunes have not been looked after properly.

There are many actions that are destroying sand dunes. Prople's activities are the main cause of costal erosion. People often don't realise how they might be damaging the sand dunes. Below are some causes of dune erosion.

Sand dunes are affected when housing development are too close to the shoreline. This is because the plants and trees that are the buffer to coastal hazards are often removed. Sometimes this is done to 'improve' or 'enhance' the view of the beach for property owners.

Although playing on the dunes is great fun, we must only walk on the paths provided so we don't cause more damage.

Driving through the dunes destroys native flora and fauna that grow in the dunes. It also makes the dune very unstable.

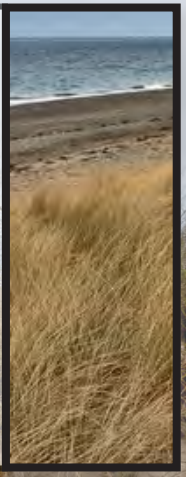
Good For What?

Katipo Spider: This spider is native to New Zealand and a cousin to the Australian Red Back Spider. The katipo generally live on the sheltered side of sand dunes for protection.

DID YOU KNOW...

Only female Katipo are Black with a Red stripe on the back!

Marram Grass: Introduced by botanist Leonard Cockayne, Marram grass was used to help stabilise sand dunes that were being restored. Marram grass is still used today to help restore sand dunes.



Pingao: The leaves from this plant are used by Māori for weaving. The leaves turn yellow as they dry out. Pingao is also native to New Zealand.

Sand dunes are extremely important for society. They give us protection from strong storms that can damage property. Dunes also help restore beaches after rough weather has taken sand and caused damage to the beach environment, and they provide excess sand to refill the beach. Sand dunes also help to filter water that makes its way back into the ocean. Sand dunes are their own eco-system, providing a home for plants that are special to the Māori people like Pingao and Spinifex which are still used for weaving. Rodents, birds and ocean life also live in the dunes.

DID YOU KNOW...

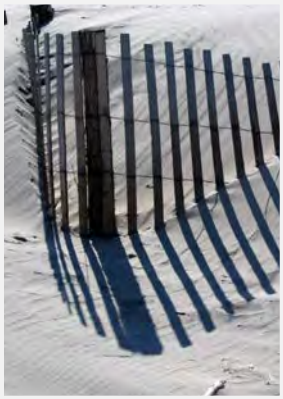
Your school could get involved with a planting day?

Organisations like Coastcare plan and run community planting days. Usually Marram is planted to help the dunes form and stabilise. Schools can take part as well.

There are many organisations that are trying to restore and keep sand dunes stable for future generations. Public working bees, usually planting Marram grass, are a popular way to encourage the local community to get involved. Local councils and trusts are taking on projects to build structures to help the sand dunes grow.

Warning signs are placed around dunes for their protection.

Pathways are being put in place for public use, these help keep dune ecosystems from being harmed.



Councils and organisations are building fences at the bottom of dunes to encourage growth for the future.

What Can We Do?

Your choices can make a huge difference!

Students in New Zealand can make choices for a better sand dune environment in their local area by using the key competencies that are part of the New Zealand Curriculum. Making choices to respect the environment by walking on paths provided, using rubbish bins and realising that even though the dunes are fun to play on is important. The dunes are an ecosystem for New Zealand native plants and animals. Making a choice to participate in organised events to help conserve the dunes is also something that students can join in on with their community. This encourages the wider school community and general public to help too. You could start your own dune conservation team!

Relating

- Encourage respectful use of dunes to others
- Create a caring community
- Work together with a team of friends.

Participating

- Take part in organised planting days
- Fundraise for supplies
- Have your own working bee.

Thinking

- Walk on the paths provided
- Hold onto rubbish until you find a bin.
- Keep driving and playing away from the dunes.

Why care?

We need to care for our sand dunes now so that in the future they are still here to protect our towns and beaches. In Genesis 1, God gave people dominion over the Earth and everything within it. It is our responsibility as humans on Earth to tend for the environment and preserve it for as long as we can so that future generations can live in a world where nature still has lots of resources that can be used and replenished.

Challenge:

Find the meaning of the Hebrew phrase from Genesis 2….

“le’ovdah uleshomrah”

Genesis 1: 26

Then God said, *“Let us make mankind in our image, in our likeness, so that they may rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground.”*

Remember to be a tidy Kiwi and look out for the dune environment in your local area!

Glossary

Ecosystem:

A mini system of living creatures that form an environment.

Erosion:

Earth being worn away from either water, wind or waves.

Generations:

A group of people/ animals who were born at the same time and living at the same time.

Overall, coastal sand dunes are very important ecosystems that need to be looked after and restored. They provide society with a natural barrier between land and sea and protect us from harsh weather that could cause damage to property. They also provide valuable habitat to native animals and plants that can only be found in New Zealand.

Now that you have an understanding of why sand dunes are important, can you think of any other ways you could help with conserving the sand dune ecosystem in your community?

Are Your Cleaners Clean?

By Michelle Thorpe

"DANGER"

"CORROSIVE"

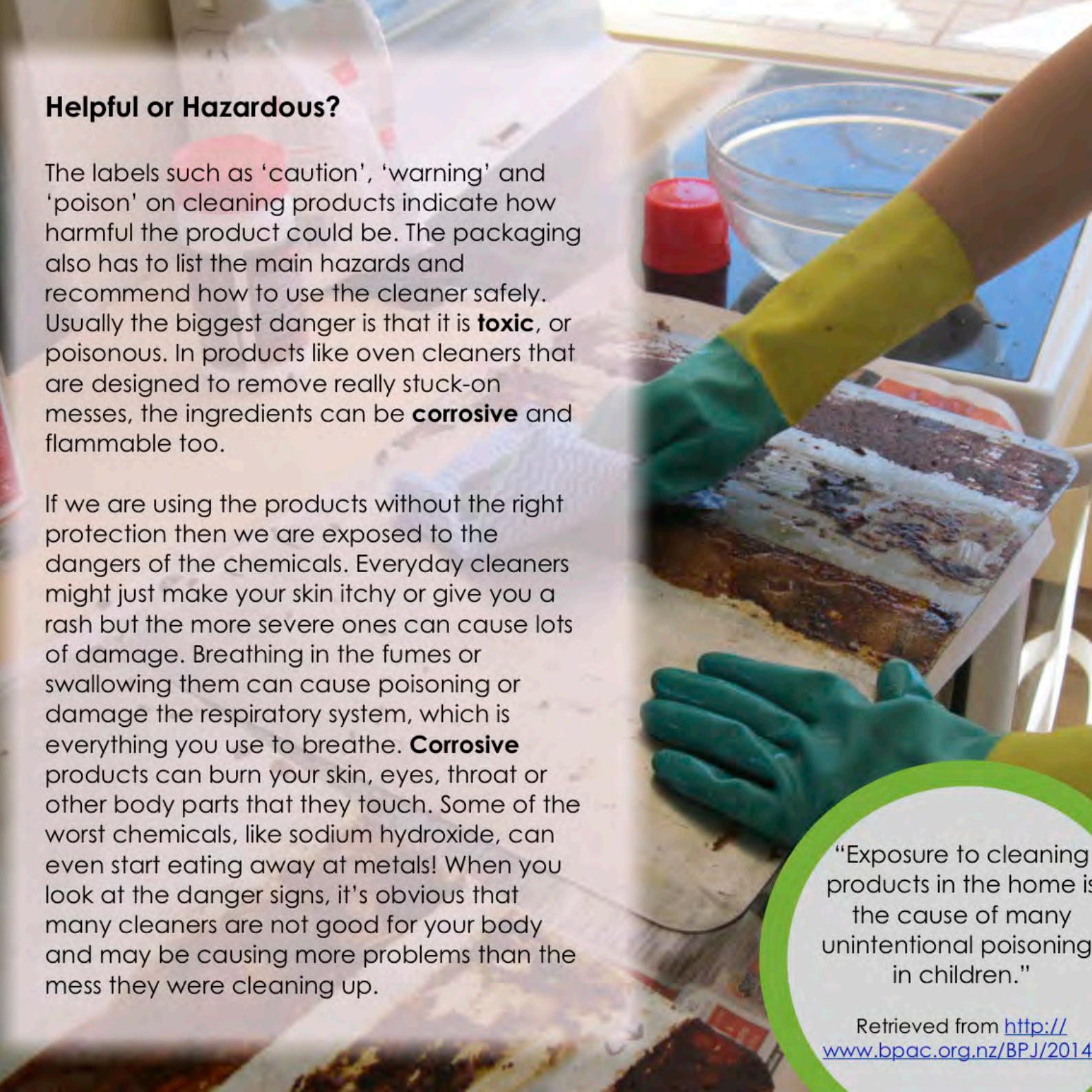
"POISON"

You will find these words on the labels of many cleaning products in your home. Cleaners are designed to get rid of dirt we don't want, but have you ever thought about what gets left behind when we use them? Most household cleaners contain chemicals that need to be strong enough to break down tough stains, greasy food and bacteria. However, these harsh ingredients can also be harmful to our health and the environment.

Helpful or Hazardous?

The labels such as 'caution', 'warning' and 'poison' on cleaning products indicate how harmful the product could be. The packaging also has to list the main hazards and recommend how to use the cleaner safely. Usually the biggest danger is that it is **toxic**, or poisonous. In products like oven cleaners that are designed to remove really stuck-on messes, the ingredients can be **corrosive** and flammable too.

If we are using the products without the right protection then we are exposed to the dangers of the chemicals. Everyday cleaners might just make your skin itchy or give you a rash but the more severe ones can cause lots of damage. Breathing in the fumes or swallowing them can cause poisoning or damage the respiratory system, which is everything you use to breathe. **Corrosive** products can burn your skin, eyes, throat or other body parts that they touch. Some of the worst chemicals, like sodium hydroxide, can even start eating away at metals! When you look at the danger signs, it's obvious that many cleaners are not good for your body and may be causing more problems than the mess they were cleaning up.

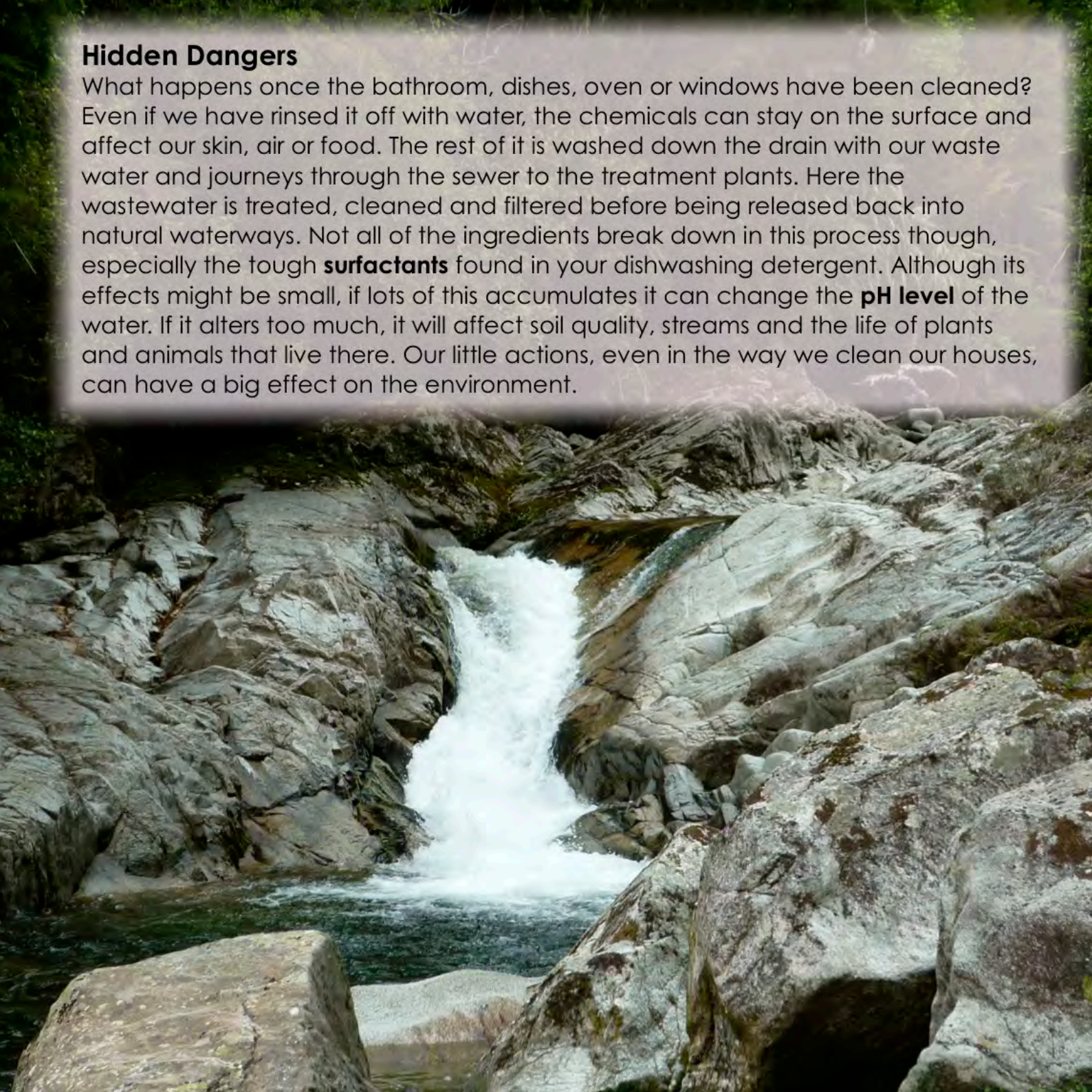


"Exposure to cleaning products in the home is the cause of many unintentional poisoning in children."

Retrieved from http://www.bpac.org.nz/BPJ/2014

Hidden Dangers

What happens once the bathroom, dishes, oven or windows have been cleaned? Even if we have rinsed it off with water, the chemicals can stay on the surface and affect our skin, air or food. The rest of it is washed down the drain with our waste water and journeys through the sewer to the treatment plants. Here the wastewater is treated, cleaned and filtered before being released back into natural waterways. Not all of the ingredients break down in this process though, especially the tough **surfactants** found in your dishwashing detergent. Although its effects might be small, if lots of this accumulates it can change the **pH level** of the water. If it alters too much, it will affect soil quality, streams and the life of plants and animals that live there. Our little actions, even in the way we clean our houses, can have a big effect on the environment.



So what can we do?

You are probably thinking you have a great excuse not to do any cleaning now! However, God asks us to steward our resources wisely, so we need to take care of what we have in a way that looks after ourselves, others and our world. We can honour God through the little things we do every day, even things like cleaning. It is about making wise choices every day that show that we care for what God has entrusted to us.

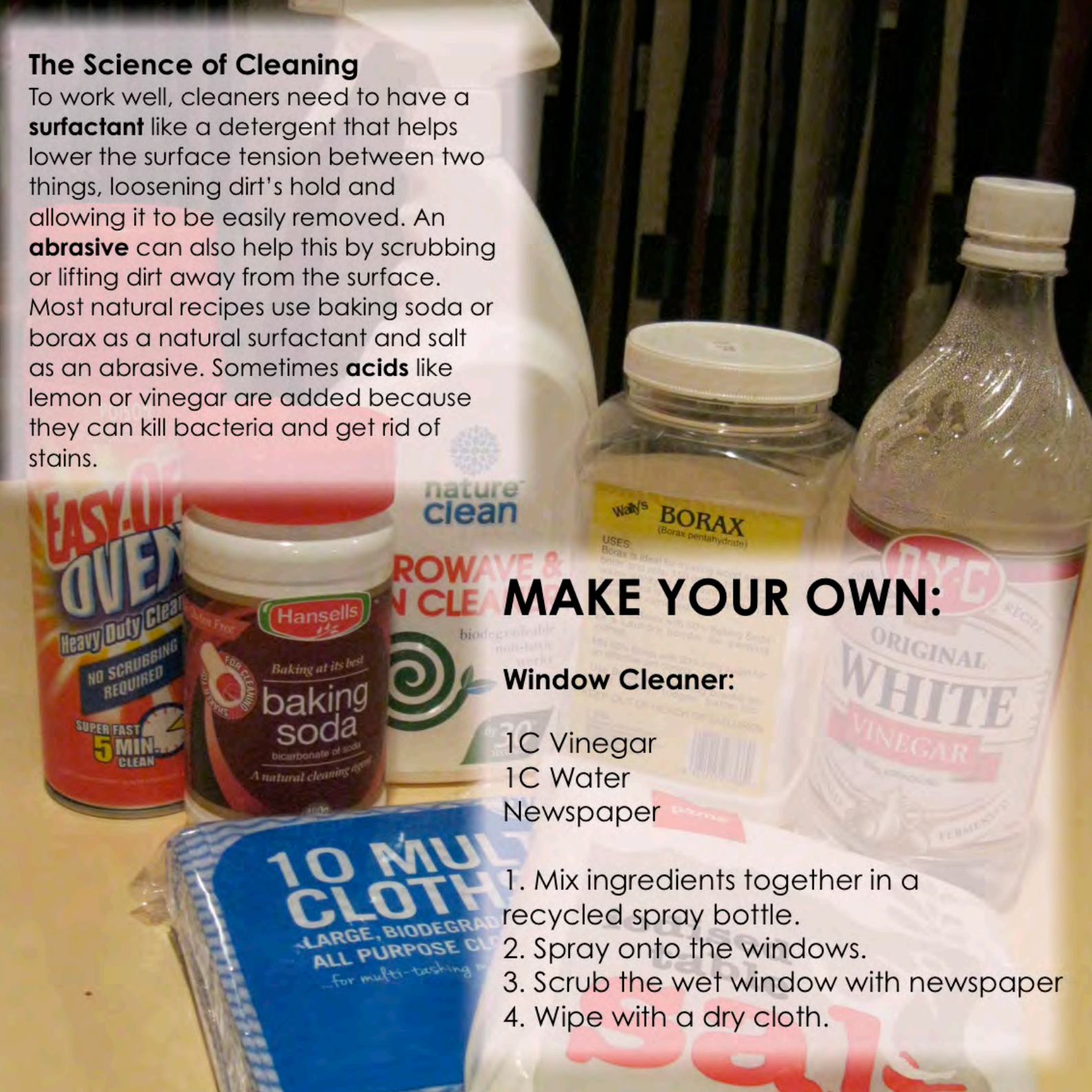
"Look carefully then how you walk, not as unwise but as wise"

(Ephesians 5:15 , ESV).

We have the choice and the ability to make a difference, participating and contributing to keeping our world a healthy, enjoyable place to live for others that come after us. We can respect ourselves, others and the environment by rethinking the cleaners we use and choosing healthier options. While there are natural cleaning products you can buy, you can also make your own effective, safe cleaners using everyday ingredients.

The Science of Cleaning

To work well, cleaners need to have a **surfactant** like a detergent that helps lower the surface tension between two things, loosening dirt's hold and allowing it to be easily removed. An **abrasive** can also help this by scrubbing or lifting dirt away from the surface. Most natural recipes use baking soda or borax as a natural surfactant and salt as an abrasive. Sometimes **acids** like lemon or vinegar are added because they can kill bacteria and get rid of stains.



MAKE YOUR OWN:

Window Cleaner:

1C Vinegar
1C Water
Newspaper

1. Mix ingredients together in a recycled spray bottle.
2. Spray onto the windows.
3. Scrub the wet window with newspaper
4. Wipe with a dry cloth.

All-purpose Kitchen Cleaner:

1/4C Water
3/4C Baking Soda
1/4C Salt
1/4C Vinegar in a spray bottle

1. Mix water, baking soda and salt into a paste.
2. Spread over dirty surface and scrub it off with a damp cloth.
3. If you are cleaning an oven or stuck-on mess, leave the paste on for 15-30 minutes.
4. Spray on vinegar and let sit for five minutes.
5. Wipe clean with a damp cloth.

Glossary:

Abrasive - a substance used for grinding, polishing, or cleaning a hard surface.
Corrosive - a substance, especially a strong acid; capable of destroying or eating away by chemical action.
pH level - the measure for how acidic or basic a solution is.
Surfactant - reduces the tension or hold between two substances.
Toxic - poisonous.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