

INTRODUCTION

The "Thinking Beyond the Bin" education resource takes a closer look at the waste generated in the classroom and school environment, with a particular focus on school lunches.

Around half of the waste generated at school is organic. Each day food scraps and garden waste that can be composted at school are put in a rubbish bin and sent to the landfill.

This resource is designed to take students from an introduction of natural resources and their uses; to what happens to something when we are finished with it; to ways to conserve, prevent, compost, and recycle.

Teachers can choose lessons from each chapter according to their class needs (provided students are given the appropriate background information and vocabulary). Factsheets are also available throughout this resource; they provide interesting facts and figures that students can take home to share with their family members.

Curriculum links for Years 3 – 4 are provided at the beginning of each lesson; however lessons can easily be adapted to suit other year levels too.

With this resource, comes the introduction of WasteNet's mascots – 'Norton and Wendall'.

Norton, an alien from the planet Wastetopia, comes to earth to teach people about waste minimisation. Norton teams up with **Wendall**, a Southland school boy and together they teach students how to be 'waste wise' at school and in their everyday lives.



Documentation of achievements (and therefore success) is an important part of this learning process, and as such it is envisaged that schools utilising this resource will create a pool of knowledge/scrapbook and record their progress in becoming a rubbish free school.

'Thinking Beyond the Bin' also provides support to those schools taking part in the "Waste Free Lunch Challenge". The aim of the challenge is to compete against other schools to reduce the most waste from their school lunches. This will be assessed on a term basis, with the "Waste Cup" being awarded to the school that reduces the most waste throughout each term.

OBJECTIVES OF THE KIT:

- To reduce the percentage of waste generated in school lunches
- To provide a set of simple actions and tools for schools (and households) to reduce their school lunch waste
- To increase the number of schools using environmentally friendly waste disposal methods e.g. composting, worm farming, bokashi and recycling.

THE RUBBISH FREE LUNCH KIT IS STRUCTURED AROUND FOUR CHAPTERS:

- 1 - Where does our waste go?
- 2 - Get in the loop
- 3 - Wrap it Up
- 4 - Create your own Eden.

We hope this teaching package helps you and your students to "think beyond the bin".

INTRODUCING

NORTON & WENDALL



Norton is an Alien from a small planet in outer space called Wastetopia. The residents of Wastetopia love waste as it is a very precious resource. The Wastetopians reuse and recycle everything they can; nothing goes to waste!

one day when Norton was out flying his spaceship he noticed Wendall, a Southland school boy who was having difficulties managing his waste at school. Norton decided to travel to Earth to teach Wendall how to be 'waste wise' and install some of his Wastetopian values such as how to reduce, reuse and recycle. Together, Norton and Wendal discover just how easy it is to minimise waste in the lunch box and at school.

THINKING BEYOND THE BIN



CHAPTER ONE

WHERE DOES OUR WASTE GO?

Norton and Wendall learn that there is no 'away' in 'throw it away'. This chapter takes students from an introduction to natural resources and their uses, to what happens to something when we are finished with it.



CHAPTER TWO

GET IN THE LOOP

Norton and Wendall discover just how easy it is to recycle in the classroom. This chapter teaches students that there are more than just 3 R's and encourages them to reduce, reuse, recycle and rethink!



CHAPTER THREE

WRAP IT UP

Join Norton and Wendall as they explore different options for reducing unnecessary packaging in the lunch box. This chapter helps students to identify how people are influenced to buy products through advertising and looks at the negative aspects of over-purchasing or buying over-packaged products.



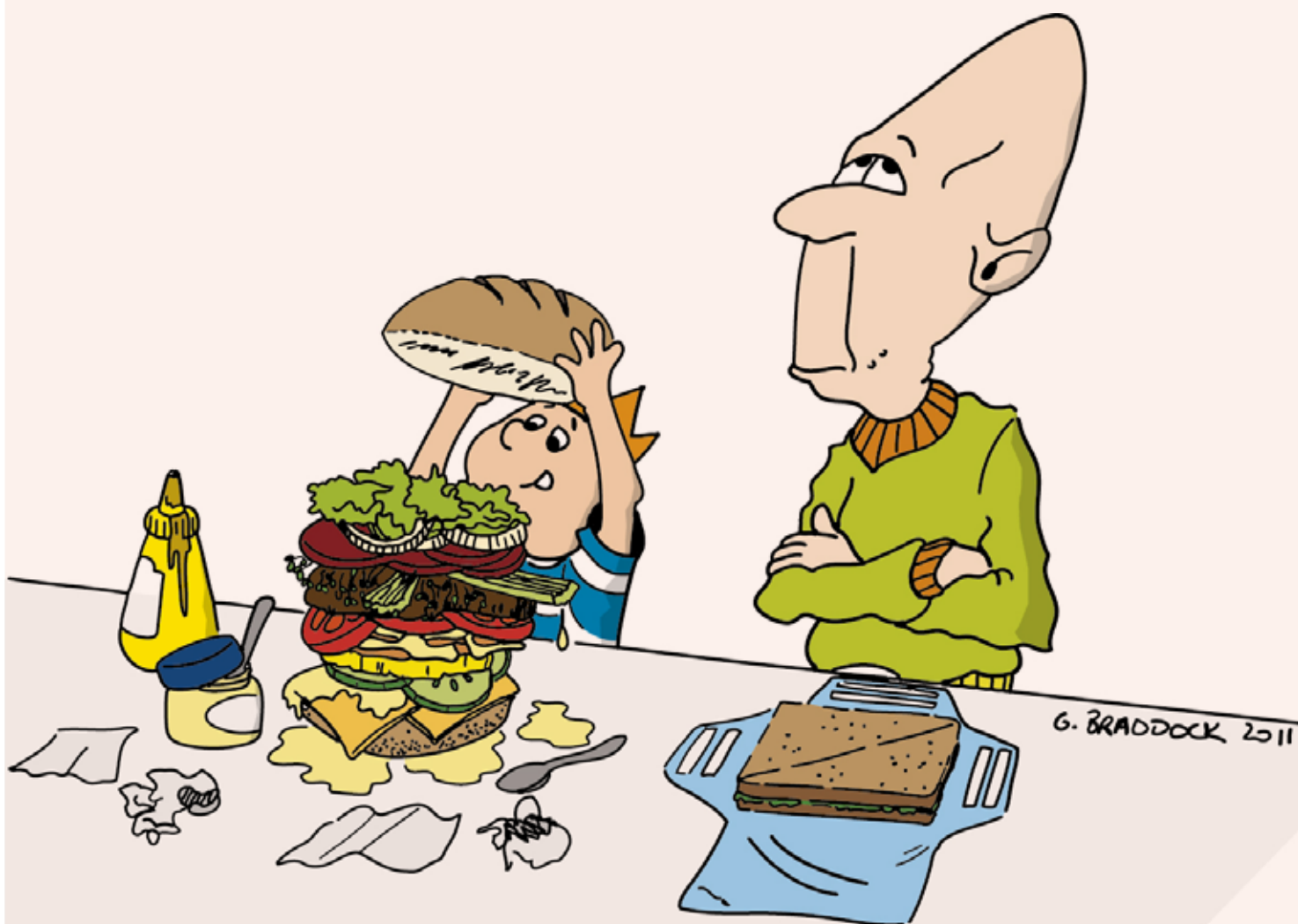
CHAPTER FOUR

CREATE YOUR OWN EDEN

Over half of the waste generated in the school environment is organic. This chapter looks at ways to recycle food and garden waste at school through methods of composting, worm farming and Bokashi.

CHAPTER ONE

WHERE DOES OUR WASTE GO?



Norton and Wendall learn that there is no 'away' in 'throw it away'. This chapter takes students from an introduction to natural resources and their uses, to what happens to something when we are finished with it.

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1.2 What Happens to Waste?	Students will: <ul style="list-style-type: none"> Recognise that there is no 'away' in 'throw it away'. Identify the destination of waste they throw away at home and at school. Identify what happens to waste when buried in a landfill. 	1.2.a Word Match 1.2.b Bury It 1.2.c Dig It Up	15 - 16 17 - 18 19
1.3 Look at a Landfill	Students will: <ul style="list-style-type: none"> Identify landfills as the most common method of disposing solid waste. Describe the form and function of a sanitary landfill by observing a model Understand that waste does not 'go away' or decompose when it is placed in a landfill. Discuss how landfills take up space and are located in areas that are, or were, habitats for people and wildlife. 	1.3.a Build a model of a landfill 1.3.b How waste ends up at the landfill 1.3.c Landfill Word Search	21 - 24 25 27
1.4 Natural Cycles	Students will: <ul style="list-style-type: none"> Recognise cycles in nature Evaluate the usefulness of natural cycles. 	1.4 Cycles	28
1.5 The Waste Hierarchy	Students will: <ul style="list-style-type: none"> Learn about the waste hierarchy and key ways to reduce, reuse and recycle. Understand the cyclic process of recycling versus the linear process of rubbish disposal. Borrow the "Story of Stuff" DVD from WasteNet.	1.5.a 3R's Waste Hierarchy 1.5.b Recycle Scramble 1.5.c Waste Words	35 37 - 38 39 - 40

CURRICULUM LINKS

VISION (What we want for our young people)

Our vision is for young people to seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic and environmental future for our community.

PRINCIPLES (Foundations of curriculum decision making)

Community Engagement - The curriculum has meaning for students, connects with their wider lives, and engages the support of their families, whanau, and communities.

Students will develop knowledge and understanding of:

- Different cycles in nature and evaluate the usefulness of these cycles;
- The negative aspects of dumping and burning waste;
- Ways to best manage waste;
- The similarities and differences between natural cycles and landfills

Values (to be encouraged, modelled and explored)

Students will be encouraged to value:

- Community and participation for the common good;
- Ecological sustainability, which includes care for the environment;
- Innovation, inquiry and curiosity by thinking critically, creatively and reflectively.

Key competencies (capabilities for living and lifelong learning), such as:

- Thinking - make sense of information, experiences and ideas;
- Using language, symbols and texts representing information;
- Manage self by making plans, managing projects and developing strategies for meeting challenges.

Achievement objectives from selected curriculum statements that could be used as a focus for the environmental education topic 'Where Does Our Waste Go' these include:

- **English - Speaking, Writing and Presenting: Ideas**
Select, form and communicate ideas on a range of topics.
- **English - Speaking, Writing and Presenting: Purposes and Audiences**
Show an increasing understanding of how to shape texts for different purposes and audiences.
- **Mathematics - Statistical Investigation**
Conduct investigations using the statistical enquiry cycle.
- **Social Sciences - Social Studies**
Understand that events have causes and effects.
- **Nature of Science - Participating and Contributing**
Explore various aspects of an issue and make decisions about possible actions.
- **Science - Material World: Properties and Changes of Matter**
Grouping materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.
- **The Arts - Communicating and Interpreting: Drama**
Present and respond to drama, identifying ways in which elements, techniques, conventions, and technologies combine to create meaning in their own and others' work.

Suggested learning experiences that could enable students to meet the learning outcomes of environmental education in association with achievement objectives from selected curriculum statements

- Establishing prior knowledge on natural cycles by brainstorming cycles and playing the Cycle Game.
- Create a classroom bulletin board using artwork to display their understanding of natural cycles.
- Describe, illustrate or act out a natural cycle.
- Reducing waste (the 3 R's).
- Bury It/Dig It Up
- Understanding "Our Natural Resource"
- Build a model of a landfill - associate this with our environment and evaluate associated problems.

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LESSON ONE :

OUR NATURAL RESOURCES

OBJECTIVES

Students will:

- Differentiate between natural resources and man-made items.
- Describe how families use natural resources.

BACKGROUND

We live in a wasteful world. Southlanders on average throw away over 45,000 tonnes of rubbish each this year - this is the same weight as 112 Boeing 747 Airplanes or 6,428 African Elephants!

Everything we use and throw away is made from the earth's natural resources - water, oil, gas, coal, air, rocks, plants and animals. Paper was once a tree in a forest. Your soft-drink can was once rock. Glass bottles were sand. Clothing can come from a variety of resources like plants and animals and plastics are made from oil.

We are using up our planets resources at a very fast rate. If we keep going like this, we will need several planet 'earth's' to sustain us. Waste does not have to be wasted. It can have many uses, especially if it can be recycled or reused.

WASTE MATTERS

Waste represents an inefficient use of our resources. It can be bad for our environment, bad for our health and bad for our economy.

The improper disposal of waste can have a significant impact both on our environment and us personally:

- Waste is unsightly;
- Decomposing organic waste in landfills makes methane, a harmful greenhouse gas;
- Landfills produce leachate (a liquid pollutant) that can contaminate our water and soil;
- Burning waste can release hazardous and toxic substances; and
- Waste creates a large cost, from production to treatment to disposal.

Use the following table for ideas for activity 1.1A.

Natural Resources	Activity	Products
Air	Fly kites, sail	Balloons, tyres, soccer ball
Water	Fish, swim, ski	Soft drinks, swimming pools, electricity
Soil	Dig for worms, gardening	Sand boxes, glass
Plants	Climb trees, play on the grass	Apples, bread, strawberries, peanut butter, paper, clothes (cotton), furniture (wood)
Animals	Playing with a pet, fishing, bird watching	Hamburgers, cheese, milk, eggs, bacon, silk blouse, shoes (leather), woollen jerseys
Fossil Fuels	Watching TV, using computer games, heating (natural gas), riding in a car or plane.	Plastic toys, gasoline/petrol, backpack, winter coats
Minerals	Climbing on rocks, playing at a play-ground.	Fizzy cans, bikes, cars, school desks, swing sets.



ACTIVITY 1.1.A NATURAL RESOURCES

Materials:

- x7 index cards
- Pen

Instructions:

1. Before the lesson, label each one of the seven index cards with the name of a natural resource.
Tell the children to imagine they are standing in their backyard or in their favourite park. What do they see? (Get plenty of responses) Everything that they have named is either a natural resource or is made from natural resources. Natural resources are all the things in nature which we use to live. eg, Fossil fuels, water, plants, animals, air, minerals, soil.
2. Show students the index cards with the name of one natural resource on each. Let each student choose a card (without looking) and give an example of how they use that resource or how a product is made from that resource.
3. Discuss how the product, like writing paper, is different from its source – a tree.



ACTIVITY 1.1.A EXTENSION

- Play "Find the Resource." Let one student name a manufactured object, such as a car. The first student to name a natural resource used in the object gets to offer the next man-made object.
- Teach the importance of natural resource preservation. In a show and tell, have each student share their favourite item and list the resources used to make it. Discuss with the student what would be done if it were broken. Could it be repaired or used in some other way?



ACTIVITY 1.1.B HOW FAMILIES USE NATURAL RESOURCES

Materials:

- Worksheet - How Families Use Natural Resources (Page 12)
- Pen

- 1) Have students complete the worksheet, "How Families Use Natural Resources." (Page 12)
- 2) Ask students to describe what would happen if we used or polluted all or most of our natural resources like trees, oil, or rivers.
- 3) Make a list on the board of suggestions for conserving natural resources such as:
 - Not wasting products - don't take more napkins, towels or packets than you need
 - Using both sides of writing paper (or making note pads out of single - sided used paper)
 - Finding ways to reuse things: like glass jars, plastic tubs or bottles
 - Collecting unwanted items at the end of the school year that are still useable and redistributing them the next school year
 - Recycling as much as you can.



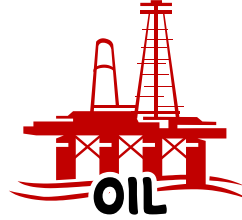
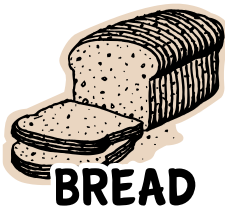
ACTIVITY 1.1.B EXTENSION

Have each student make a drawing or poster of his/her family enjoying natural resources. Don't forget to include products made from natural resources!

Can you think of anything that is not provided by the earth?

HOW FAMILIES USE NATURAL RESOURCES

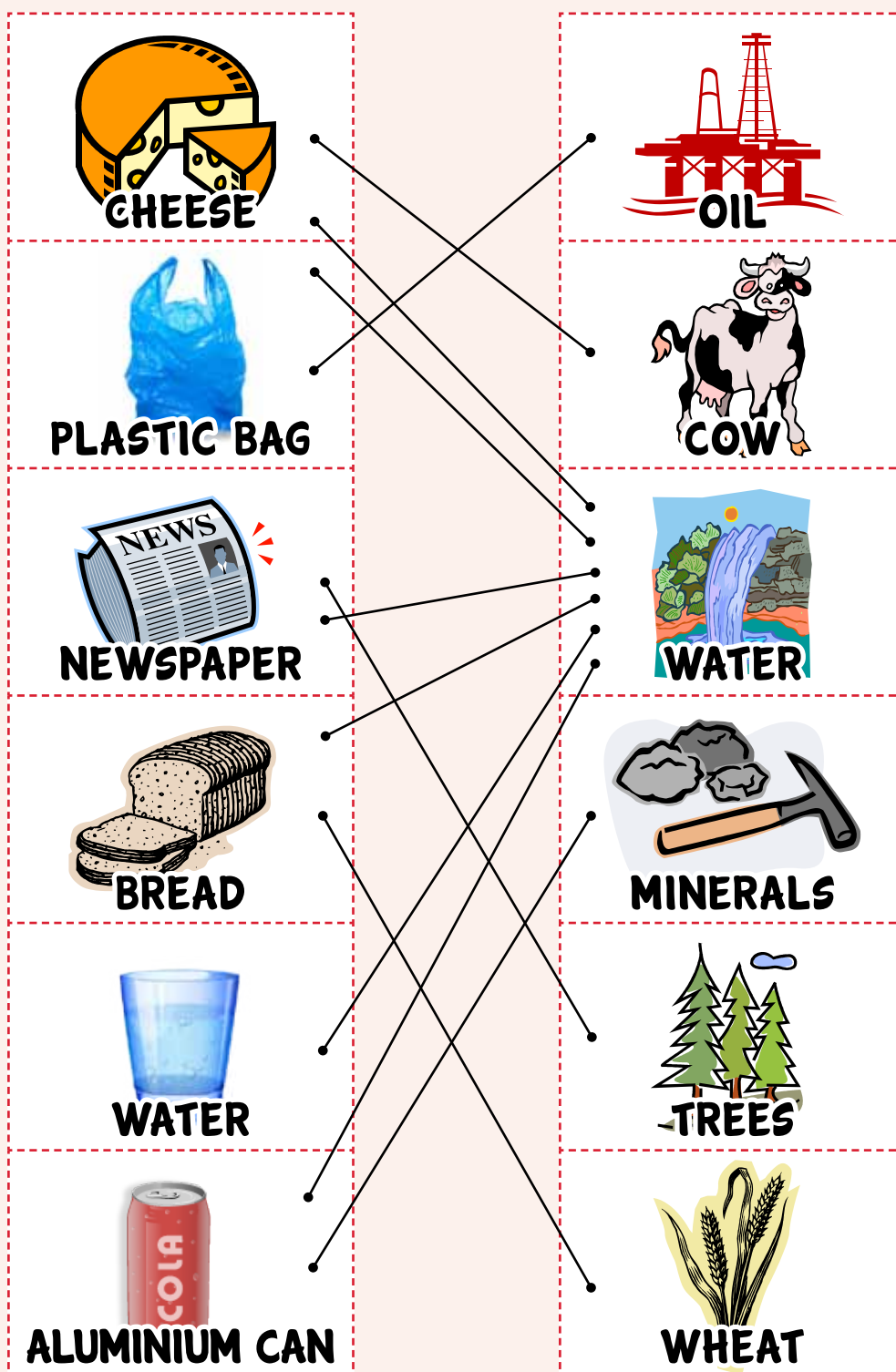
Draw a line from each item on the left to the natural resource it came from on the right.
Some pictures may match more than one resource, can you find them all?





ACTIVITY 1.1.B

ANSWERS : HOW FAMILIES USE NATURAL RESOURCES



LESSON TWO :

WHAT HAPPENS TO WASTE?

OBJECTIVES

Students will:

- Recognise that there is no “away” in “throw it away”.
- Identify the destination of the waste they generate at home and at school.
- Identify what happens to waste when buried in a landfill.

BACKGROUND

On average Southlanders throw away 45,000 tonnes of rubbish every year. If we were to measure this in 10-tonne buses, it would equate to 4,500 busloads of rubbish - that's more than 12 buses every day.

Waste is what people throw away because they no longer need or want it. We get rid of it by putting it in the rubbish bin. But do we need to make so much waste?

Waste is created in many ways. A baby wearing disposable nappies, manufacturing a vehicle, a person throwing away the packaging from a muesli bar, demolishing a building and using a plastic supermarket shopping bag are all examples of activities that generate waste.

Waste can be difficult to define, as what one person regards as rubbish could be a useful resource (or treasure) when used again by someone else. For example refilling your drink bottle, trading items on trade-me, donating second-hand goods to a local charity or wrapping up takeaways in yesterday's newspaper are all ways of reusing items instead of throwing them away.

What happens to our waste?

Much of our waste ends up buried in our regional landfill and the remainder is reused or recycled. In a landfill, rubbish is dumped, bulldozed, squashed and covered with layers of soil and more waste.

Southland's rubbish is disposed of at the Southland Regional Landfill. In November 2007, a study was done at the regional landfill to answer the question - What is in our waste? The results are as follows:

- Almost half (42%) of the waste to landfill in the region is compostable i.e. food scraps, organic material, garden waste, kitchen waste
- Timber is the second largest material in the landfill at 11.1%
- Combined, Paper and Plastic make up 21% of the materials found in the site (Note: paper and plastic are both recyclable).

WORD MATCH

Matching words and explanations

Draw a line from the word to the description that best fits the answer.

RUBBISH	To find a new use for something instead of throwing it away.
LITTER	A recyclable material made from trees.
REUSE	To buy less and to throw away less rubbish.
NATURAL RESOURCES	Leaves and grass clippings that are broken down by natural forces and can be used on gardens.
LANDFILL	Our waste, all the things we throw away.
RECYCLING	Rubbish that is in the wrong place, such as on the ground or in the street.
ALUMINIUM & TIN	Damage to the environment from chemicals or other human activities.
PAPER	Metals that are made from minerals in the ground.
REDUCE	A special place in the ground where rubbish is buried.
COMPOST	Things that are found in nature eg. air, water, trees, minerals, that can be use to make other things.
POLLUTION	A process that makes something new out of something old.



RUBBISH	=	Our waste, all the things we throw away.
LITTER	=	Rubbish that is in the wrong place, such as on the ground or in the street.
REUSE	=	To find a new use for something instead of throwing it away.
NATURAL RESOURCES	=	Things that are found in nature eg. air, water, trees, minerals, that can be use to make other things.
LANDFILL	=	A special place in the ground where rubbish is buried.
RECYCLING	=	A process that makes something new out of something old.
ALUMINIUM & TIN	=	Metals that are made from minerals in the ground.
PAPER	=	A recyclable material made from trees.
REDUCE	=	To buy less and to throw away less Rubbish.
COMPOST	=	Leaves and grass clippings that are broken down by natural forces and can be used on gardens.
POLLUTION	=	Damage to the environment from chemicals or other human activities.



Materials:

- An area within the school for burying waste
- Digging tools and bucket
- 'Bury It' record sheet (Page 18)
- Scales
- Class chart
- Rubbish
- Gloves
- Marker Pegs.

Instructions:

1. Using gloves collect different pieces of waste from around school or classroom bins. Find a piece of metal, plastic, paper, food, and different types of clothing, e.g. cotton and nylon.
2. As individuals, or in small groups, take a piece of waste, weigh it and record observations on the first part of the 'Bury-it Record Sheet'. Record individual and combined weights on a class chart.
3. Bury the waste in soil outside, close to where you can monitor changes, or in a large container of earth (not potting mix but soil dug out of the ground).
4. Use marker pegs to mark where each piece of waste is buried.
5. Draw up a class chart to record the name of each piece of waste buried and individual predictions about:
 - Which pieces are biodegradable and non-biodegradable?
 - How long each piece will take to break down?
6. Decide how you will check the buried waste every week (for approximately 4 weeks). See 'Dig It Up' for instructions.

Tip: Keep the soil damp!
It helps with decomposition.



- ***Which waste do you think will break down easily and which will stay the same?***
- ***What do you think is needed to help waste break down?***

Notes :

BURY IT RECORD SHEET

1. Use this part of the sheet to record initial information about your piece of waste.

My piece of waste is:

It weighed:

I think that in four weeks' time it will:

2. Use this section to keep a close eye on any changes over the next four weeks. Draw and/or write about the changes you notice. Remember to also record what is happening around the piece of waste (see Dig it Up - Page 19).

WEEK 1

I noticed... ..

This tells me that... ..

It weighed:

I think that in three weeks' time it will:

WEEK 2

I noticed... ..

This tells me that... ..

It weighed:

I think that in two weeks' time it will:

WEEK 3

I noticed... ..

This tells me that... ..

It weighed:

I think that in one weeks' time it will:

WEEK 4

I noticed... ..

This tells me that... ..

It weighed:



ACTIVITY 1.2.C

ACTIVITY : DIG IT UP

Dig up your buried waste to find out which waste is biodegradable and which is non-biodegradable through the process of decomposition.

Decomposition is the breakdown of materials by the action of insects, worms, fungi and bacteria.

Materials:

- Digging tools
- Class Chart
- Gloves
- 'Dig it Up' record sheet

Instructions:

1. Revisit the class chart made in the 'Bury It' activity.
2. Dig up your waste each week for four weeks and record the results
3. Using gloves, look for changes in shape, colour, texture, weight and smell. Look around the waste and identify which organisms are helping to decompose the waste.
4. Cover up your pieces again when you have finished.
5. Write or draw any changes you observe using your record sheet.
6. Discuss and collate the class findings for recording in your scrapbook/pool of knowledge.



ACTIVITY 1.2.C OBSERVATION

- What was the result of burying different pieces of waste?
- How has the waste affected the surrounding land?
- What other types of inorganic, non-biodegradable waste are there?
- How many generations will it take for your waste to break down?



ACTIVITY 1.2.C EXTENSION

Go on the World of Waste field trip – This is a behind the scenes tour of a second hand shop, waste transfer station, recycle centre and closed landfill. To book a tour contact WasteNet. Visit www.wastenet.co.nz

Notes :

LESSON THREE :

LOOK AT A LANDFILL

OBJECTIVES

Students will:

- Identify landfills as the most common method of solid waste disposal.
- Describe the form and function of a sanitary landfill by observing a model.
- Understand that waste does not “go away” or always decompose when it is placed in a landfill in comparison to a natural cycle.
- Discuss how landfills take up space and are located in areas that are, or were, habitats for people and wildlife.

BACKGROUND

Waste in Southland

Each person in Southland disposes of over 495 kilograms of waste to landfill each year (on average).

What is a landfill?

Landfilling is the primary method of waste disposal in New Zealand. Landfills have existed since the early 1930's. Early landfills were only open pit dumps covered with dirt regularly to hide the rubbish and cut down on pests and smells. Modern landfills are lined on the bottom (liner) with dense clay, limestone or soil. Landfills have been sited on old quarries, mines, canyons and former wetland.

Before the 19th century and the industrial revolution, disposing of waste was not the problem that it is today. Because most rubbish came from natural products it broke down readily in a relatively short space of time. Pre-twentieth century customers did not have the volume of packaging that exists now, much of which is manufactured from non-biodegradable materials and accounts for much of the modern landfill content. Prior to the 20th century the population was considerably lower so less rubbish was created.

Modern landfills have a liner to contain the leachate, a leachate collection and treatment system, a cap to reduce rain infiltration and an extensive monitoring system to ensure that its effect on the environment and public health is minimal.

The combination of water and the organic matter in the waste creates a chemical, biological and physical process that breaks down the waste. How this process is managed will determine any possible threat to the environment. The process in a modern landfill is extremely slow because they are specifically designed to control the amount of air and water which enters them. The process is likely to take 3-100 years or more. Some materials break down faster than others, vegetation and food scraps will decompose long before a car or washing machine, which may take centuries to break down.



ACTIVITY 1.3.A

BUILD A MODEL OF A LANDFILL

Materials:

- A prepared 1.5 Litre clear plastic bottle (or more if you would like students to work in small groups to construct their own)
- 3-4 cups of garden soil (not potting soil)
- Scissors
- Sticky Tape
- Grass
- Leaves
- Sticks
- Plastic bag for lining
- Blue paper
- 'Landfill in a Jug' Diagram (Page 24)
- Pieces of daily rubbish

Instructions:

Using the 'Landfill in a Bottle' Diagram (page 22) follow these steps and answer the following questions; (Optional: Have groups construct models along with you.)

1. Cut the top off the clear plastic bottle. Tape around the cut edge of the bottom half of the bottle.
2. Before filling the bottle with soil, line the bottom of the bottle with blue paper to represent ground water.
3. Fill the bottle with 3-4 cups of garden soil
4. Dig a hole for the landfill in the soil.
5. Use a piece of plastic film or a grocery bag for the lining of the landfill. (Thick plastic liners are used on the bottom of landfills in order to prevent garbage from leaking in the ground water).
6. After placing the plastic liner in the landfill, add about six or seven pieces (about 3-4cm in size) of waste and/or allow students to find something in the classroom that they could put in their landfills. For example a piece of crayon, part of a snack/lunch, a leaf, a piece of paper, or a tissue.
7. Pack down the rubbish, as compactors do at a real landfill.
8. Cover the rubbish layer with soil. (This simulates how the rubbish at a landfill is covered daily with soil to eliminate odour and to keep animals, such as rats and seagulls, out of the landfill).
9. Have students record a description of a landfill and draw a picture of the classroom model. Do some reflection and response on what will happen to the rubbish in their model landfill.



ACTIVITY 1.3.A OBSERVATION

Q. What does the blue paper on the bottom of the landfill represent?

A. Water under the ground. People pump this water through wells and use it to drink and farmers use it to water their crops. Garbage should not touch or leak onto the blue paper.

Q. What could be done with the soil that is dug up to make the landfill?

A. It will be used later to cover up the disposed rubbish.

Q. What can be done with our rubbish now that our landfill is full?

A. Students might recommend using another landfill or digging a new one.

Q. Will digging a new landfill cause any problems?

A. Yes, it will impact the land and the plant and animal life in the area. Remember, landfills could possibly leak into groundwater.

Q. What could we do to keep the landfill from filling up so quickly?

A. Lead class to a discussion of reducing, reusing, and recycling. See Lesson Five in this Chapter "Waste Hierarchy" (The 3R's) Reduce, Reuse and Recycle!

Q. Are there any objects in the landfill that could be recycled or reused?

A. Create a list of the pros and cons of placing rubbish in the landfill. Write it on the board or have students make their own lists.

- *Pros include:* we need a place to put our rubbish; landfills are constructed to help protect the environment.

- *Cons include:* the plastic liner might eventually break and let pollution get into the groundwater; when the landfill gets full it is hard to find a good place to build a new one; things that are buried in the landfill are no longer able to be used by nature or by people.

Visit www.wastenet.org.nz to discover how long items take to decompose. Note: the number of years refers to rubbish decomposition when exposed to open air and sunlight, not when buried in a landfill!



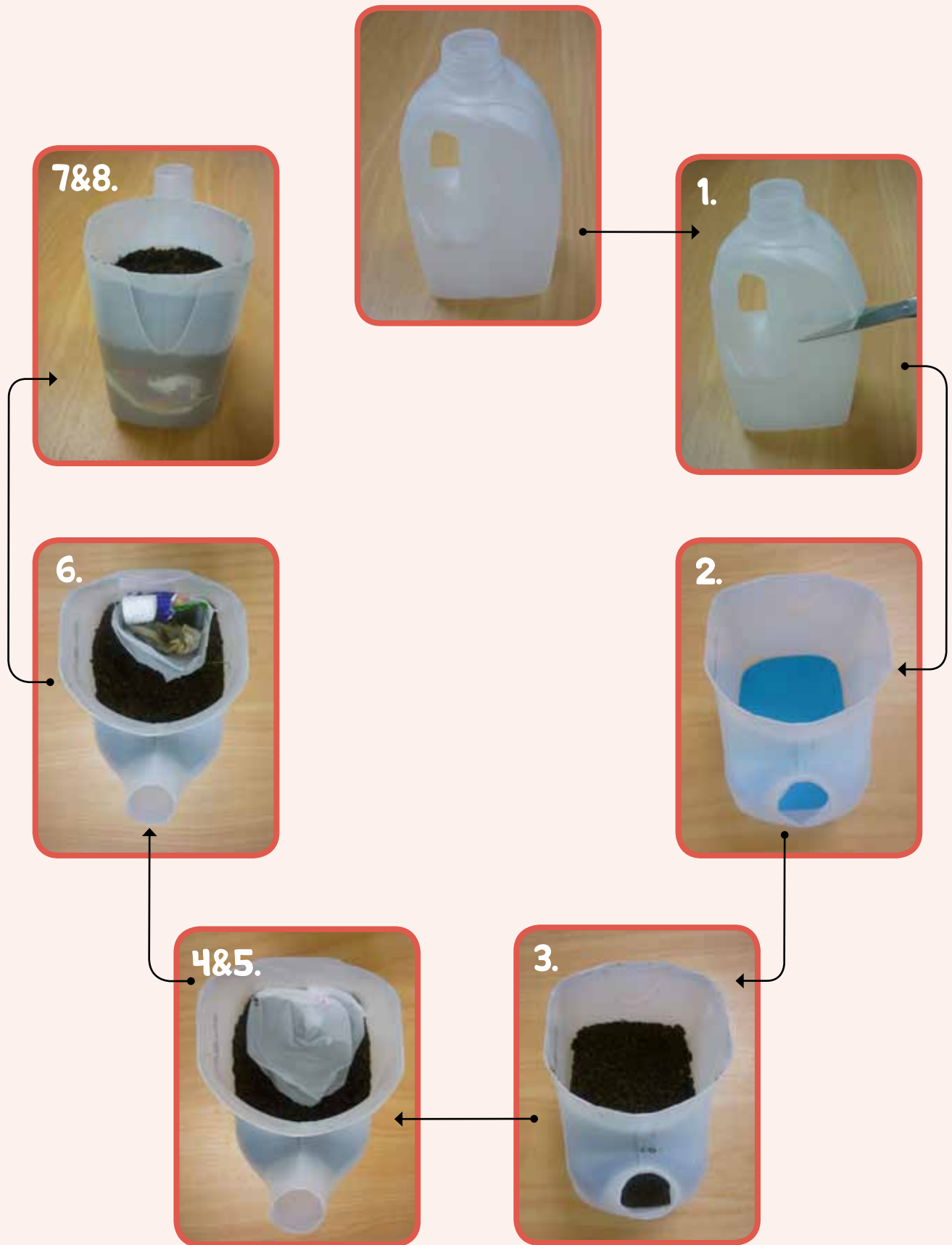
ACTIVITY 1.3.A EXTENSION

- Ask students to write or illustrate their ideas for keeping waste out of a landfill. For example to give away toys to others, compost food and greenwaste at home, reduce the amount of disposable items that they use, repair things where possible, never take more than what is needed, etc.
- Ask students to illustrate waste leaving their home and the route it passes as it goes to the landfill.
- Take students on a World of Waste Tour - This is a behind the scenes tour of a second hand shop, waste transfer station, recycle centre and closed landfill.
- Ask the waste educator from WasteNet to visit your class and what you can do to reduce the amount of waste going to the landfill.



ACTIVITY 1.3.B

LANDFILL IN A BOTTLE DIAGRAM



HOW WASTE ENDS UP AT THE LANDFILL

Cut around the dotted lines.
Make a flow diagram of what happens to our rubbish in the correct order.



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Transfer Station

The collection truck takes the rubbish to the waste transfer station where it is compacted into trucking containers.



Car

People who do not have a kerbside collection take their rubbish to the Transfer Station.



Regional Landfill

Trucks empty the rubbish in to the regional sanitary landfill.



Non-Recyclable Item

Chip packet – an item that cannot be recycled or composted.



Red Rubbish Bin

Items that cannot be recycled or composted go in the red rubbish bin.





ACTIVITY 1.4.C

ANSWERS : HOW WASTE ENDS UP AT THE LANDFILL



Non-Recyclable Item

Chip packet – an item that cannot be recycled or composted.



Car

People who do not have the kerbside collection service take their rubbish to the Transfer Station.



Red Rubbish Bin

Items that cannot be recycled or composted go in the red rubbish bin.



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Transfer Station

The collection truck takes the rubbish to the waste transfer station where it is compacted into containers.



Regional Landfill

Trucks empty the rubbish in to the regional sanitary landfill.

LANDFILL WORD SEARCH

Help! Some very valuable things are on their way to the landfill. Save them from being thrown away. Can you spot any bonus words? Be sure to look for:

**NEWSPAPER
TIN CANS
PLASTIC BAG
CARDBOARD
JARS
CRAYONS
BOTTLES**

**GROCERY BAGS
PENCILS
MILK JUGS
MARGARINE TUB
BLANK PAPER
OLD TOYS
BOX**

**ART PAPER
BRUSH
MOTOR OIL
ALUMINIUM
PLATES
SOCK**

S	O	C	K	Y	A	R	E	D	U	C	E	L	M	N	O	P
V	W	X	Y	Z	L	X	R	E	P	A	P	K	N	A	L	B
G	H	I	T	B	U	T	E	N	I	R	A	G	R	A	M	J
F	T	X	I	P	M	I	L	K	J	U	G	S	S	Q	R	S
L	P	E	N	C	I	L	S	C	O	L	D	T	O	Y	S	A
U	N	E	C	V	N	R	E	U	S	E	I	C	X	M	D	X
N	I	T	A	M	U	S	A	V	E	C	R	A	Y	O	N	S
C	E	B	N	C	M	A	B	C	B	N	Q	R	S	T	E	R
H	O	W	S	U	X	P	Q	A	T	O	M	D	R	O	G	E
B	A	R	S	Z	P	Y	G	B	S	I	S	B	L	R	A	C
A	R	E	L	P	L	R	M	R	O	T	B	O	X	O	D	Y
G	T	U	Z	J	A	R	S	U	P	U	O	A	K	I	R	C
S	P	S	K	R	T	P	K	S	M	L	T	R	D	L	A	L
F	A	E	L	M	E	P	E	H	O	L	T	D	M	L	G	E
R	P	X	Y	Z	S	O	P	R	C	O	L	D	O	N	T	M
O	E	C	Y	T	N	E	V	E	R	P	E	W	A	S	T	E
G	R	O	C	E	R	Y	B	A	G	S	S	E	R	O	X	J

LESSON FOUR :

NATURAL CYCLES

OBJECTIVES

Students will:

- Recognise cycles in nature
- Evaluate the usefulness of natural cycles.

BACKGROUND

Cycles are a part of life. A cycle may go through changes, yet the changes eventually lead back to where the cycle began. Cycles ensure that life can go through many changes, yet maintain its stability. In order to understand the concept of recycling, students must first understand cycles and their role in nature.



ACTIVITY 1.4.A CYCLES

Materials:

- Worksheet: Cycles.
- Scissors.

Instructions:

1. Photocopy and cut out the examples of cycles on activity sheet 1.4a.
2. Get the children to put the pictures in the correct order of each cycle.
3. Show how you can name all the many phases of a cycle: day-night, summer, autumn, winter, spring, days of the weeks, and months of the year.

Playing the Cycle Game with older students;

- Explain that cycles are important to our everyday lives. Have students draw a cycle of their typical day and week.
- What would happen if every day or every week were completely different?
- What if there were no repeating patterns in our lives?
- Would you accomplish as much if you had to re-decide regular habits like brushing teeth, tying shoes, etc, every day?



ACTIVITY 1.4.A OBSERVATION

- Have students describe, illustrate, or act out a natural cycle.
- For a homework assignment, ask students to find an example of a cycle at their home that they can draw or write down to share with the class.



ACTIVITY 1.4.A EXTENSION

- Create a classroom or school bulletin board using student artwork about cycles.

WORKSHEET : CYCLES



DAY



NIGHT



SUMMER



AUTUMN



WINTER



SPRING



GROW FOOD



PROCESS FOOD



BUY FOOD



CONSUME FOOD



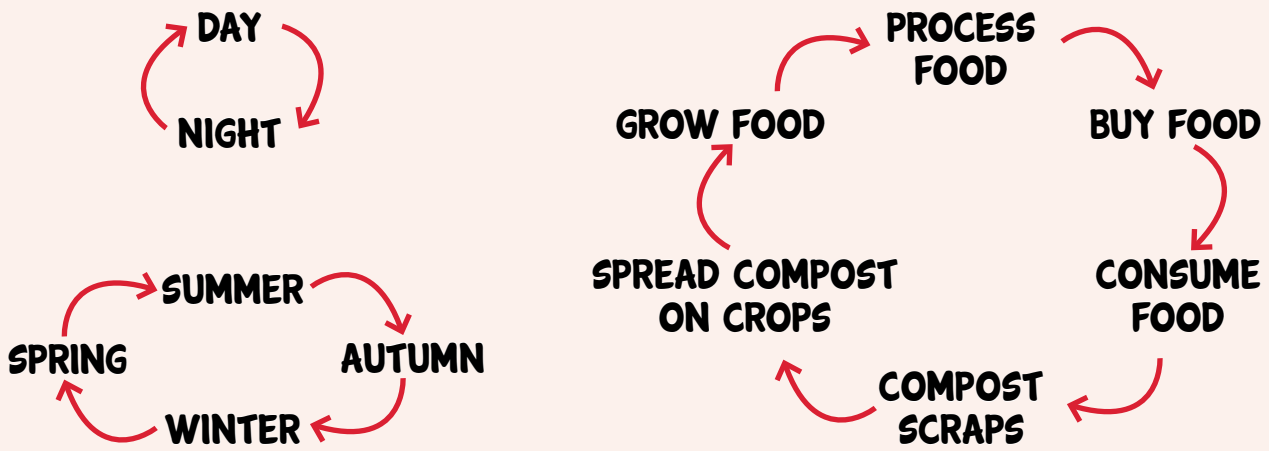
COMPOST SCRAPS



SPREAD COMPOST ON CROPS



Examples of Cycles



Notes :

LESSON FIVE :

THE WASTE HIERARCHY

OBJECTIVES

Students will:

- Learn about the waste hierarchy and key ways to reduce, reuse and recycle.
- Learn that waste is a resource.

BACKGROUND

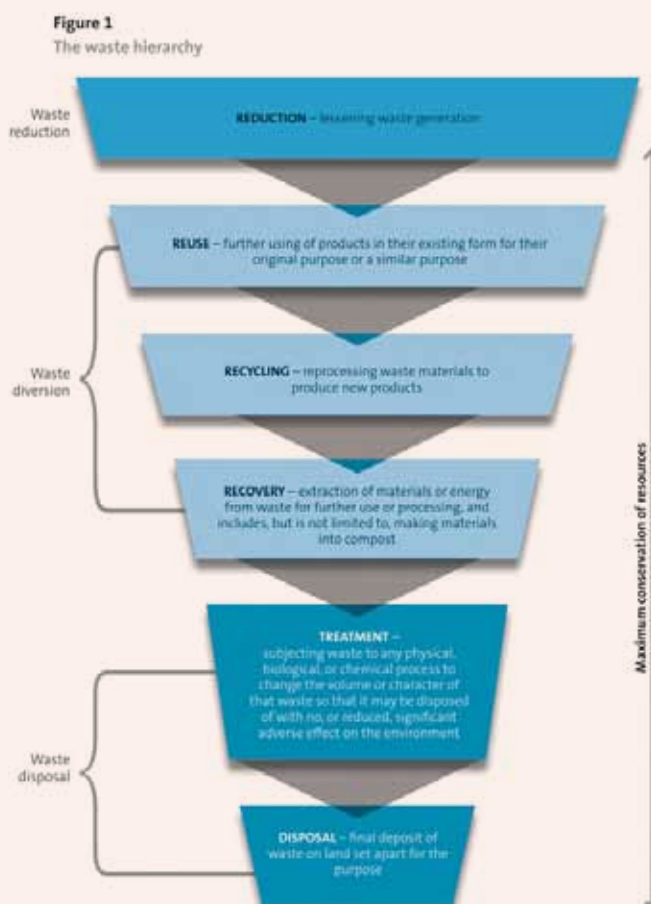
The challenge we face

The amount of waste we produce is directly linked to how many goods and services we consume – the greater our wealth the more we waste. Our challenge is to break the strong link between economic development and waste generation. We need to ensure that as our economy grows, the amount of waste we generate decreases.

Our current linear approach to production considers waste to be a natural part of the system. By changing our approach from linear to circular we can close the loop on resource use and waste generation. The cyclical approach does not accept that waste is a normal part of doing business.

We must avoid producing waste materials, but if they are produced we must re-use them and only release them onto our land, air and water at a rate that will not compromise the ability of natural systems to support life.

This lesson focusses on the hierarchy of the 3R's; Reduce, Reuse and Recycle. This is a hierarchy because reducing waste is the most important thing we can do, followed by reusing things and then recycling. Recycling comes lower in the hierarchy because it takes energy to collect and transport recyclable materials and then to process them into new products.



Here are some key ways that we can reduce reuse and recycle:

Reduce

We can reduce by refusing to purchase products that we do not need, by producing more durable goods that last longer, by making more efficient use of raw materials and energy by minimising packaging.

- Always ask whether you really NEED the product before you buy.
- Use waste paper for art or as scrap paper
- Make sure you use the double sided facility on the photocopier.
- Always buy reusable containers, batteries and energy saving bulbs.
- Use a reusable box for your lunch instead of cling film or tin foil.
- Buy products that are made from recyclable materials.
- Buy products that have less packaging and highlight the issue to suppliers.
- Say NO to plastic bags, use reusable bags instead.
- Contact your local council or WasteNet (www.wastenet.org.nz) to find out about composting in your area.

Reuse

We can 'reuse' by using an item for another purpose such as refilling containers, wrapping chips in newspaper or by taking our goods to second-hand shops to be used by others.

- Use old bottles, jars and containers for storage or for use in art class.
- Use refill packs of detergents.
- Re-use plastic drinks bottles for your lunch instead of cartons or cans.
- Use lunch boxes instead of tinfoil or cling film for your lunches.
- Leave a box for scrap paper beside the photocopy machine.

- Use re-usable bags when you go shopping.
- Swap clothes, books, video games and music with friends instead of throwing them away.
- Give old clothes to charity shops - someone might need them.
- Avoid buying disposable products i.e. cameras.
- Always get machines regularly serviced to ensure long life.

Recycle

We can recycle by composting organic material such as food and grass clippings and collecting and reprocessing materials such as glass, metals, paper and plastics.

- If you don't have the Southland Kerbside Recycling Collection Service, you can find out from the WasteNet website www.wastenet.org.nz where your nearest recycling centre is.
- Visit the Orange Pages (www.orangepages.co.nz) to find out how to correctly recycle/dispose of an item.
- Always rinse out bottles, tins and cartons before recycling.
- Aim to buy products that are recycled
- Set up a school recycling project to reduce your waste mountain.



ACTIVITY 1.5.A 3 R'S HIERARCHY

Materials:

- 3R's Waste Hierarchy (Page 35)
- Pen
- Paper.

Instructions:

1. **Discuss with students what they might do to create less waste.**

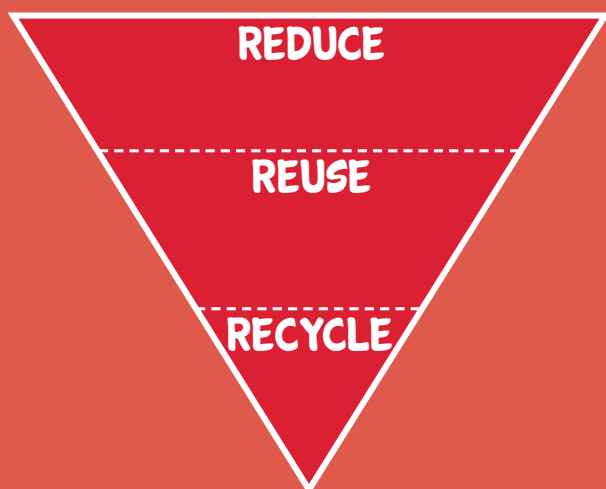
Students should mention things like: not taking or using more items than you need (like paper in class or napkins in the cafeteria), recycling newspaper and plastic, repairing broken objects instead of buying new ones, giving used clothes to others, etc.

2. **Teach students about "The 3 R's" (Reduce, Reuse, Recycle).**

We want people to reduce first, reuse everything you can, recycle what is possible, and then properly dispose of waste as a final option!

3. **Use the template (Page 25) to come up with examples of ways to reduce, reuse and recycle.**

(To save paper get students to draw their own pyramid on a piece of scrap paper that has only been used on one side).



ACTIVITY 1.5.A OBSERVATION

What would happen if the Collection Truck stopped coming?

Have younger students illustrate a story. Older students might write an imaginative essay about such a story.



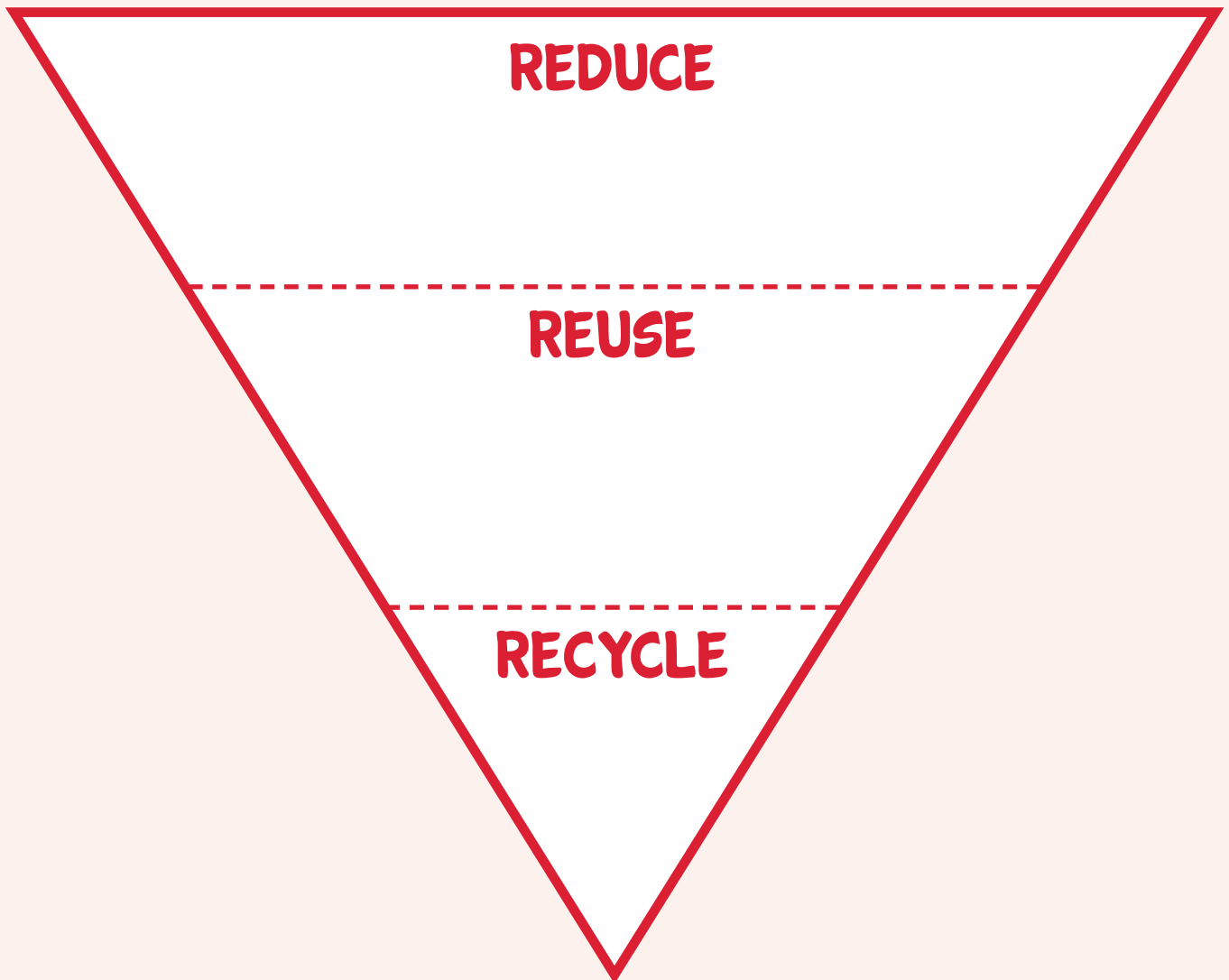
ACTIVITY 1.5.A EXTENSION

Go on the World of Waste field trip – A behind the scenes tour of a second hand shop, waste transfer station, recycle centre and closed landfill. To book a tour contact the team at WasteNet www.wastenet.org.nz

3 R'S WASTE HIERARCHY

Solid Waste Hierachy ("The 3 R's" pyramid)

Fill out the pyramid below with ways to Reduce, Reuse and Recycle your waste.





REDUCE

Buy less and throw away less rubbish.

Don't buy disposable items that can't be reused or recycled.

Buy in bulk e.g. buy a large tub of yoghurt instead of single serve sizes.

Purchase items with packaging that can be reused and recycled.

REUSE

Reuse items instead of throwing them away e.g.
reuse water bottles, plastic bags etc.

Create a new use for things e.g. reuse
yoghurt containers to plant seedlings.

Use reusable containers etc.

RECYCLE

Recycle items made from
Paper, cardboard,
Tin, glass and
Plastic

RECYCLED SCRAMBLE

Unscramble the following words using the clues provided.

Hint: think 'reduce, reuse, and recycle'

STAPCIL TOTLEB	=		This product can be ground up into small pieces and made into fabric used in jerseys, polar fleece, long johns and gloves.
DUREEC	=		To buy less and throw away less.
SOLCETH	=		You can take these to a second hand store when you no longer want them.
PARSC RPAPE	=		This product made from trees can be reused at home or school before it gets recycled.
YCLEREC	=		To make something new out of something old.
LCHUN OBX	=		Reduce the amount of food wrap you use by taking one of these to school.
THOLC GBSA	=		Take these to the supermarket so you don't need to use plastic ones.
GOSTINCOMP	=		A way of recycling organic materials.
SUERE	=		To find a new use for something instead of throwing it away.
SGARS	=		Organic material that can be composted.
ESTWA RICHEYHAR	=		The 3R's in their order of importance.
KUJN ALMI	=		Save the trees and put a sticker on your letter box to reduce the amount of this you receive.
LIEHEWE INB	=		Most people put their recycling into one of these.
ECCLY	=		The recycle symbol is an example of one of these.



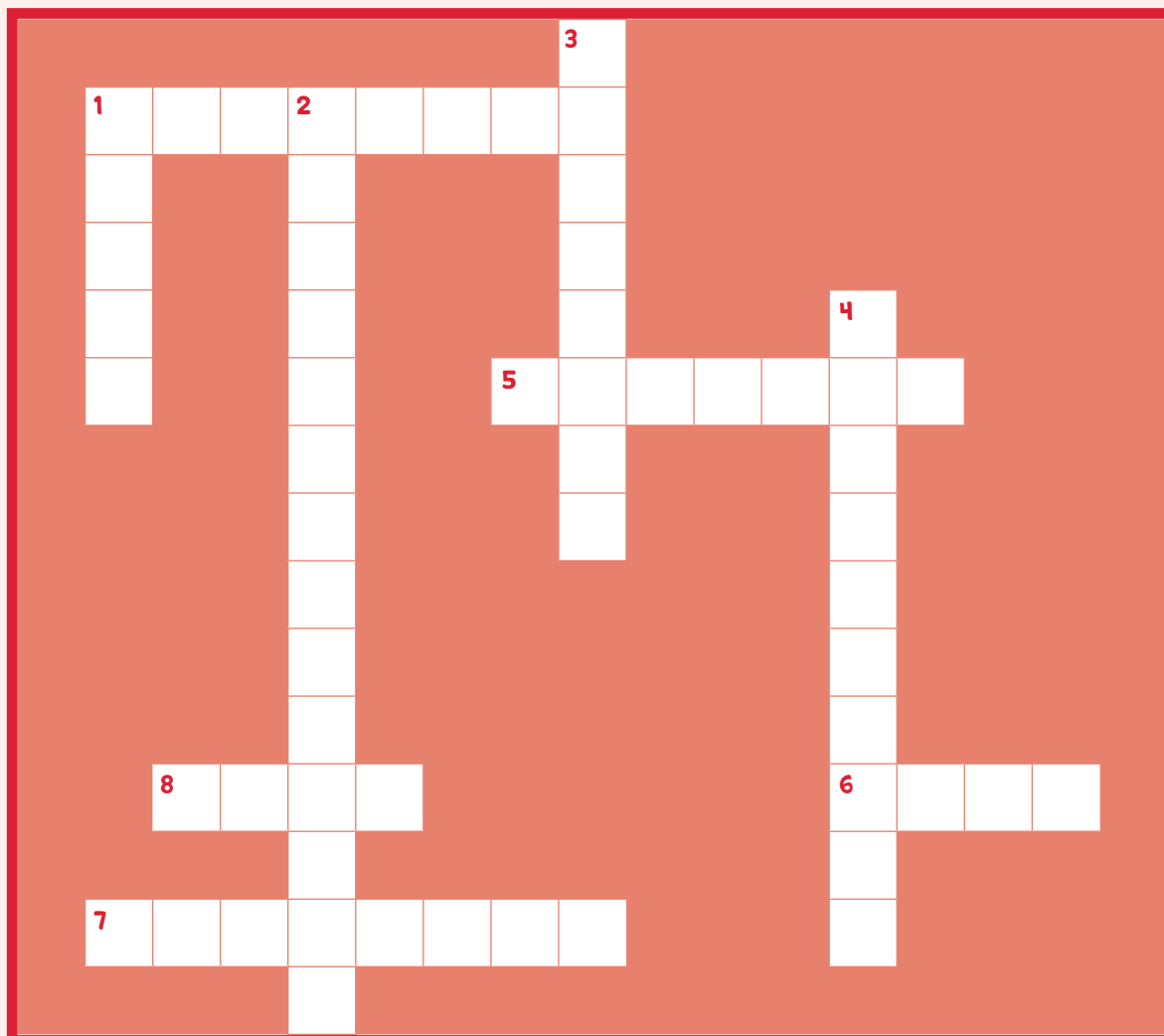
ACTIVITY 1.5.B

ANSWERS : RECYCLED SCRAMBLE

STAPCIL TOTLEB	=	PLASTIC BOTTLE	This product can be ground up into small pieces and made into fabric used in jerseys, polar fleece, long johns and gloves.
DUREEC	=	REDUCE	To buy less and throw away less.
SOLCETH	=	CLOTHES	You can take these to a second hand store when you no longer want them.
PARSC RPAPE	=	SCRAP PAPER	This product made from trees can be reused at home or school before it gets recycled.
YCLEREC	=	RECYCLE	To make something new out of something old.
LCHUN OBX	=	LUNCH BOX	Reduce the amount of food wrap you use by taking one of these to school.
THOLC GBSA	=	CLOTH BAGS	Take these to the supermarket so you don't need to use plastic ones.
GOSTINCOMP	=	COMPOSTING	A way of recycling organic materials.
SUERE	=	REUSE	To find a new use for something instead of throwing it away.
SGARS	=	GRASS	Organic material that can be composted.
ESTWA RICHEYHAR	=	WASTE HIERARCHY	The 3R's in their order of importance.
KUJN ALMI	=	JUNK MAIL	Save the trees and put a sticker on your letter box to reduce the amount of this you receive.
LIEHEWE INB	=	WHEELIE BIN	Most people put their recycling into one of these.
ECCLY	=	CYCLE	The recycle symbol is an example of one of these.

WASTE WORDS

Help! Answer the clues below and place the correct letter in each box of the puzzle.



Down

1. Make sure you always.....bottles, tins and cartons before recycling them.
2. Take your old clothes and toys to a..... when you no longer want or need them.
3. Buy products that can be.....
4. Avoid buying.....items, that cannot be recycled.

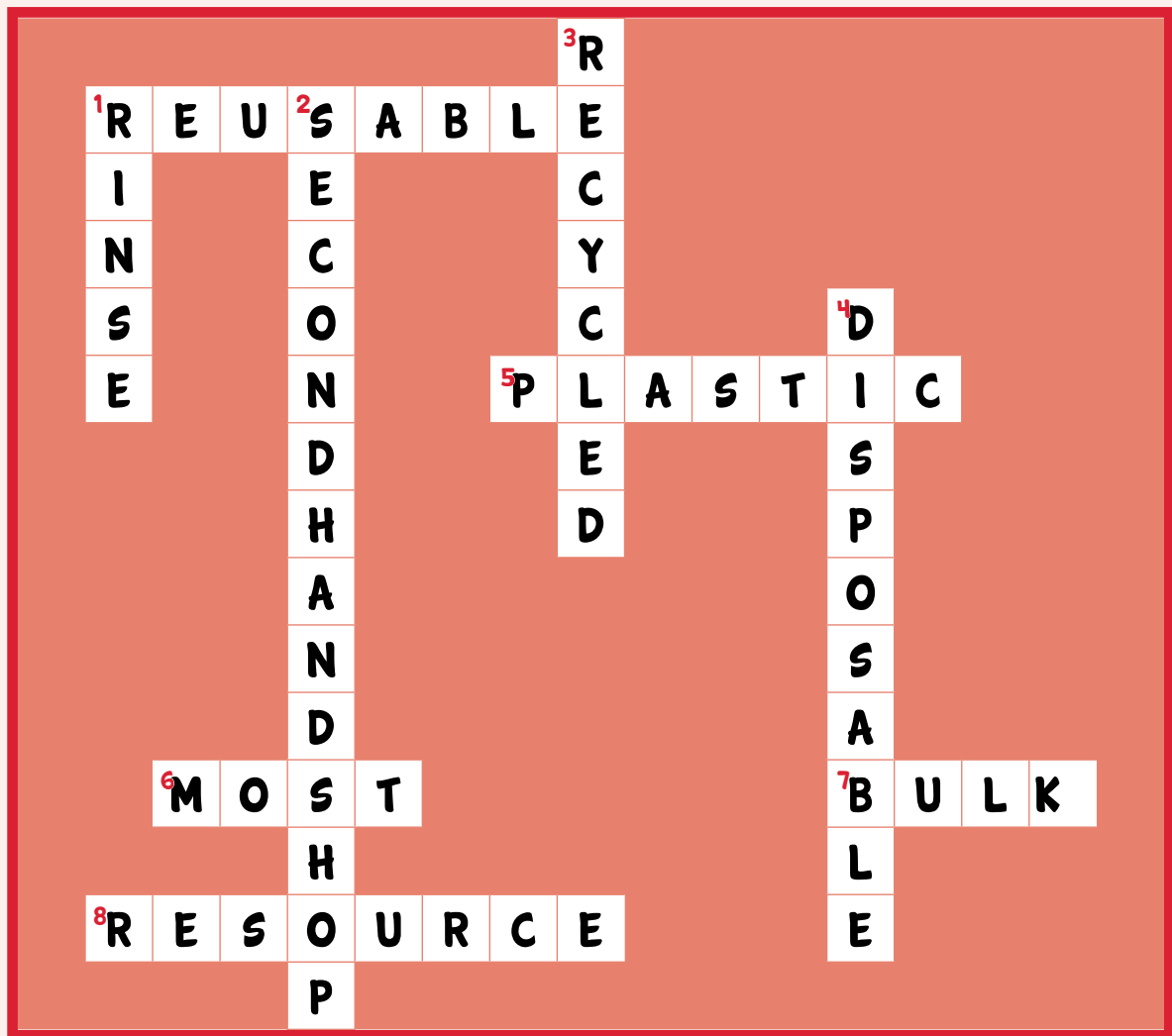
Across

1. Use.....containers and bags to take your lunch to school.
5. Use reusable cloth bags instead of.....ones when you go shopping.
6. Reduce is theimportant thing we can do.
7. Buy things in.....to help reduce your waste'.
8. Waste is a valuable.....



ACTIVITY 1.5.C

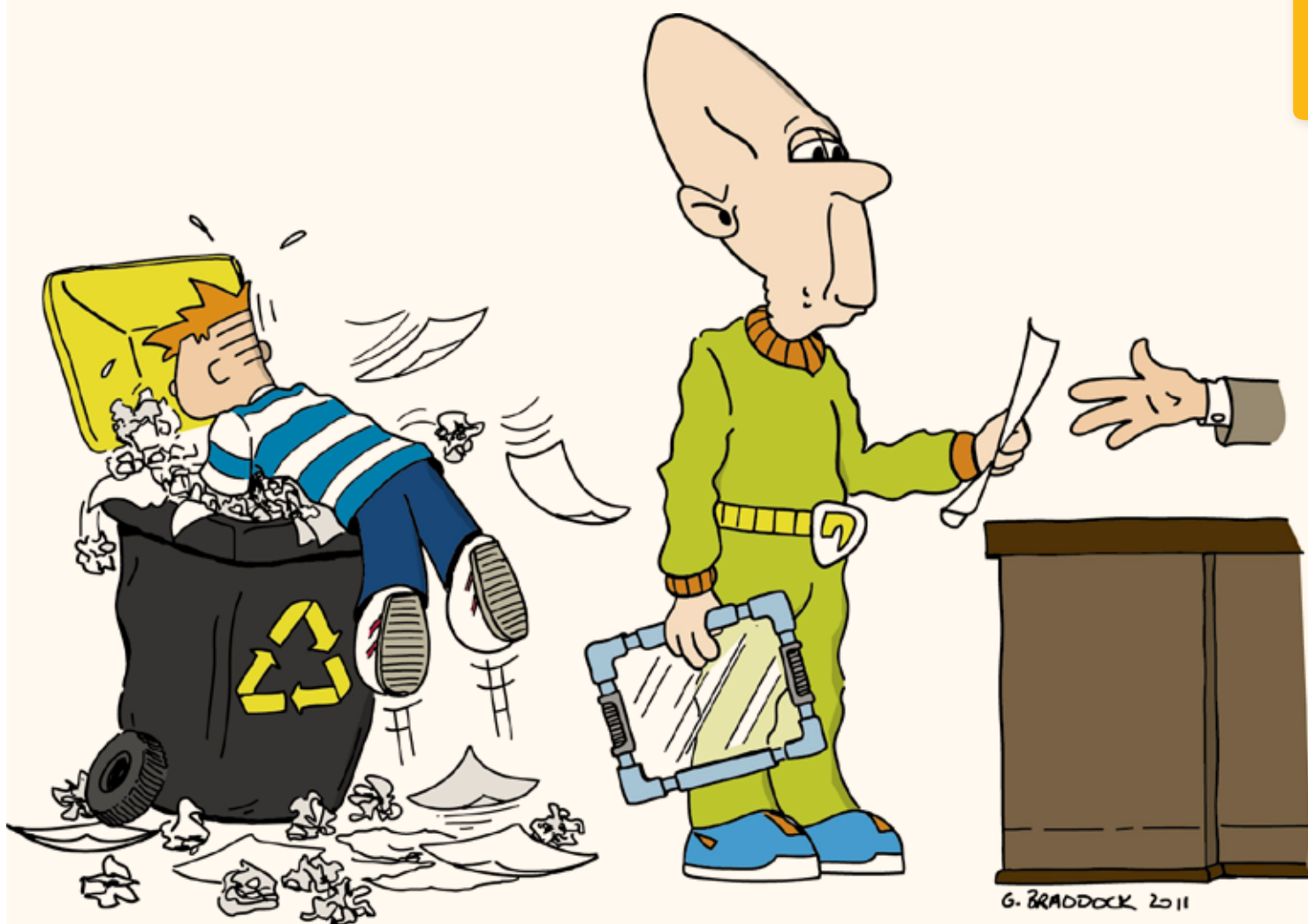
ANSWERS : WASTE WORDS



Notes :

CHAPTER TWO

GET IN THE LOOP



Norton and Wendall discover just how easy it is to recycle in the classroom. This chapter teaches students that there are more than just 3 R's and encourages them to reduce, reuse, recycle and rethink!

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Lesson	Objective	Activity	Page
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We Can Reduce	Students will: <ul style="list-style-type: none"> • Recognise that 'reduce' is the most important of the three R's • Identify wasteful packaging and find alternative solutions / ways to reduce it. 	2.1.a Class Discussion : Reducing 2.1.b The 5 R's 2.1.c Resourcemarket 2.1.d Reduce crossword	44 - 46 47 48 49 - 50
We Can Reuse	Students will: <ul style="list-style-type: none"> • Recognise the benefits of reuse. • Develop ways to reuse a variety of products. 	2.2.a Origami Reuse Quiz 2.2.b Play: "The Funnels" 2.2.c Waste Bingo 2.2.d Making a Wind Sock 2.2.e Repurpose Gallery	52 - 56 57 - 59 60 - 61 62 62
We Can Recycle	Students will: <ul style="list-style-type: none"> • Identify the parts and meaning of the universal recycling symbol. • Learn about recycling in the community and school environment. 	2.3.a The Recycle Symbol 2.3.b The Story of Stuff 2.3.c The process of Recycling vs Rubbish 2.3.d We can recycle in our classroom! 2.3.e Make your own recycled paper	63 - 64 65 66 - 70 71 71
We Can Rethink	Students will: <ul style="list-style-type: none"> • Understand how their community deals with waste. • Identify environmentally friendly features in their own community. 	2.4.a Create a Green Map 2.4.b Create a Radio Ad 2.4.c 3R's Word Search	72 - 73 74 75

CURRICULUM LINKS

VISION (What we want for our young people)

Our vision is for young people to seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic and environmental future for our community.

PRINCIPLES (Foundations of curriculum decision making)

Community Engagement - The curriculum has meaning for students, connects with their wider lives, and engages the support of their families, whanau, and communities.

Suggested learning outcomes for environmental education

Students will develop knowledge and understanding of:

- How our actions can reduce the amount of waste being generated.

Values (to be encouraged, modelled and explored)

Students will be encouraged to value:

- Community and participation for the common good;
- Ecological sustainability, which includes care for the environment;
- Innovation, inquiry and curiosity by thinking critically, creatively and reflectively.

Key competencies (capabilities for living and lifelong learning), such as:

- Thinking - make sense of information, experiences and ideas;
- Using language, symbols and texts representing information;
- Managing self by making plans, managing projects and developing strategies for meeting challenges.

Achievement objectives from selected curriculum statements that could be used as a focus for the environmental education topic 'Where Does Our Waste Go' these include:

- ***English - Speaking, Writing and Presenting: Ideas***

Select, from and communicate ideas on a range of topics.

- ***Technology - Technological Practice: Brief Development***

Describe the nature of an intended outcome, explaining how it addresses the need or opportunity. Describe the key attributes that enable development and evaluation of an outcome.

Suggested learning experiences that could enable students to meet the learning outcomes of environmental education in association with achievement objectives from selected curriculum statements

- We Can Recycle in our classroom – understanding symbols
- We can reuse – Reusing exercise
- The Waste Hierarchy
- Creating a Green Map
- The 5R's.
- Make you own recycled paper
- World of Waste Tour

LESSON ONE :

WE CAN REDUCE

OBJECTIVES

Students will:

- Recognise that 'reduce' is the most important of the three R's.
- Identify wasteful products and packaging and find alternative solutions / ways to reduce it.

BACKGROUND

The most efficient way to stop waste is not to make it. We reduce the amount of waste we create by buying fewer products and by purchasing products that last longer.

Reducing waste is more important than reusing or recycling, which is why it is placed at the top of the 3R's Waste Hierarchy (Chapter 1 Lesson 5 – 'The Waste Hierarchy'). To 'reduce' means, less is consumed, less is needed and less waste is created in the first place - and each person's contribution counts. The amount of waste we make is directly linked to the consumption of goods and services: the greater our wealth, the more we waste.

Did you know that in 2012, on average each Southlander dumped 495 kilograms of rubbish in the Southland Regional Landfill?



ACTIVITY 2.1.A CLASS DISCUSSION : REDUCING

Materials:

- Reducing Question Sheet (Page 45)
- Whiteboard / Paper
- Marker / Pen.

Instructions:

- Using the question sheet provided, write the questions on the board and discuss them as a class. Record the students' answers and keep them as they may be helpful to look back on as the chapter progresses. The students may need some assistance with answering the questions at the beginning, so you may wish to use the answers provided on page 46.

REDUCING QUESTION SHEET

Question: *What can I do to reduce my waste?*

Answer:

Question: *What can businesses do to reduce their waste?*

Answer:

Question: *What can our school do to reduce our waste?*

Answer:

**Question: What can I do to reduce my waste?****Answer:**

- We can reduce the amount of waste we create by buying fewer products and by buying products that last longer.
- Mending broken or worn items of clothing or equipment also helps to minimise waste.
- We can use our 'consumer power' to influence manufacturers and retailers by avoiding products that do not have eco-labeling, or by choosing products that minimise the use of packaging.
- Every year 1 billion plastic bags are used in New Zealand. To reduce the number of plastic bags we use, take your own bag with you when you go shopping.

Question: What can businesses do to reduce their waste?**Answer:**

Manufacturers and retailers have a part to play in reducing our waste. Products can be designed, built and used in ways to reduce the amount and nature of the waste produced during their lifetime. For example:

- A dressmaker can arrange pattern pieces on a length of fabric in a way that enables the garment to be cut out from the smallest area of fabric.
- Paper mills can return any damaged rolls of paper to the beginning of the production line (to start again).
- Off-cuts and scraps of plastics can be re-incorporated into the production line of a plastics factory.
- Improving a product's durability can reduce waste. For example, extending a vacuum cleaner's useful life from 10 years to 15 years improves resource efficiency.
- Reducing the number of parts used in a product or making the product easier to take apart can make it easier to repair or recycle at the end of its useful life.
- Products can be packaged with recyclable materials, for example cardboard or glass.

Question: What can our school do to reduce our waste?**Answer:**

- Set the school printer to always print on both sides (halves your paper use).
- Have a box for scrap paper in the office and in all classrooms.
- Use refillable pens.
- Take your lunch to school in a lunchbox instead of plastic wrap.
- Make wise choices when choosing what you want in your lunches at the supermarket. E.g. choose items with the least amount of packaging.



ACTIVITY 2.1.B THE 5 R's!

There are more than just three R's! For this game we add Reject and Rethink to our list of R-words: REDUCE, REUSE, RECYCLE, REJECT, and RETHINK.

Materials:

- Paper and Pencil
- Colouring tools
- Imagination!
- Container/bowl
- A spinner (You can use a drink bottle or other object)

Instructions:

1. Have each student take a piece of paper and carefully tear it into four sections. Ask the students to write down four things they would put into the rubbish bin (one item for each piece of paper). See the container list of potential items.
2. Place the papers into a hat or bowl that will act as the "rubbish bin" for the game.
3. Get students into a circle and take turns spinning the spinner.
When it points to someone, they pull the paper out of the rubbish bin and "remove it" by using one of the 5 R's Reduce, Reuse, Recycle, Reject, Rethink. For example, they might;

- reuse an item for something else (such as, using a jar for holding pencils),
- reject the purchase of an item for a more environmentally friendly one (such as buying in bulk rather than an individual size)
- rethink the purchase of an item that is made for disposal rather than durability (such as a refillable pen instead of non-refillable).

Try to get rid of all the objects in the rubbish bin! Students will probably need suggestions, but encourage them to be creative.

Remind students that waste is a resource that we haven't found a use for yet!

4. [Optional] Older students can use the dictionary to find other "R" words that would apply. A suggested list is to the right. Or, use the list below and have students finish the sentence when you call out a word, for example, RESIST (purchasing a disposable product), REMANUFACTURE (used products into new ones), etc.

Resist	Regrow	Rejuvenate
Remanufacture	Renewable	Retain (our natural resources)
Rebuild	Remake	Revive
Re-sealable	Rent (things not used often)	Reusable
Redo	Renovate	Refurbish
Regenerate	Restore	

Potential Rubbish Items

- Chip packet
- Yoghurt pottle
- Sock
- Aa battery
- Shoe
- A jandal
- String
- Meat tray
- Vegetable peelings
- Chicken bones
- Dirty tin foil
- Plastic food wrap
- Tinfoil plate
- Mussel shells
- McDonald's takeaway container
- Milo packet
- Teaspoon
- Biscuit packet
- Teabag
- Coffee grinds
- Tissues
- Paper towels
- Toothbrush
- Broken plate
- Light bulb
- Toothpaste
- Book
- Junk mail
- Wire
- Toy
- Skate board
- Nappy

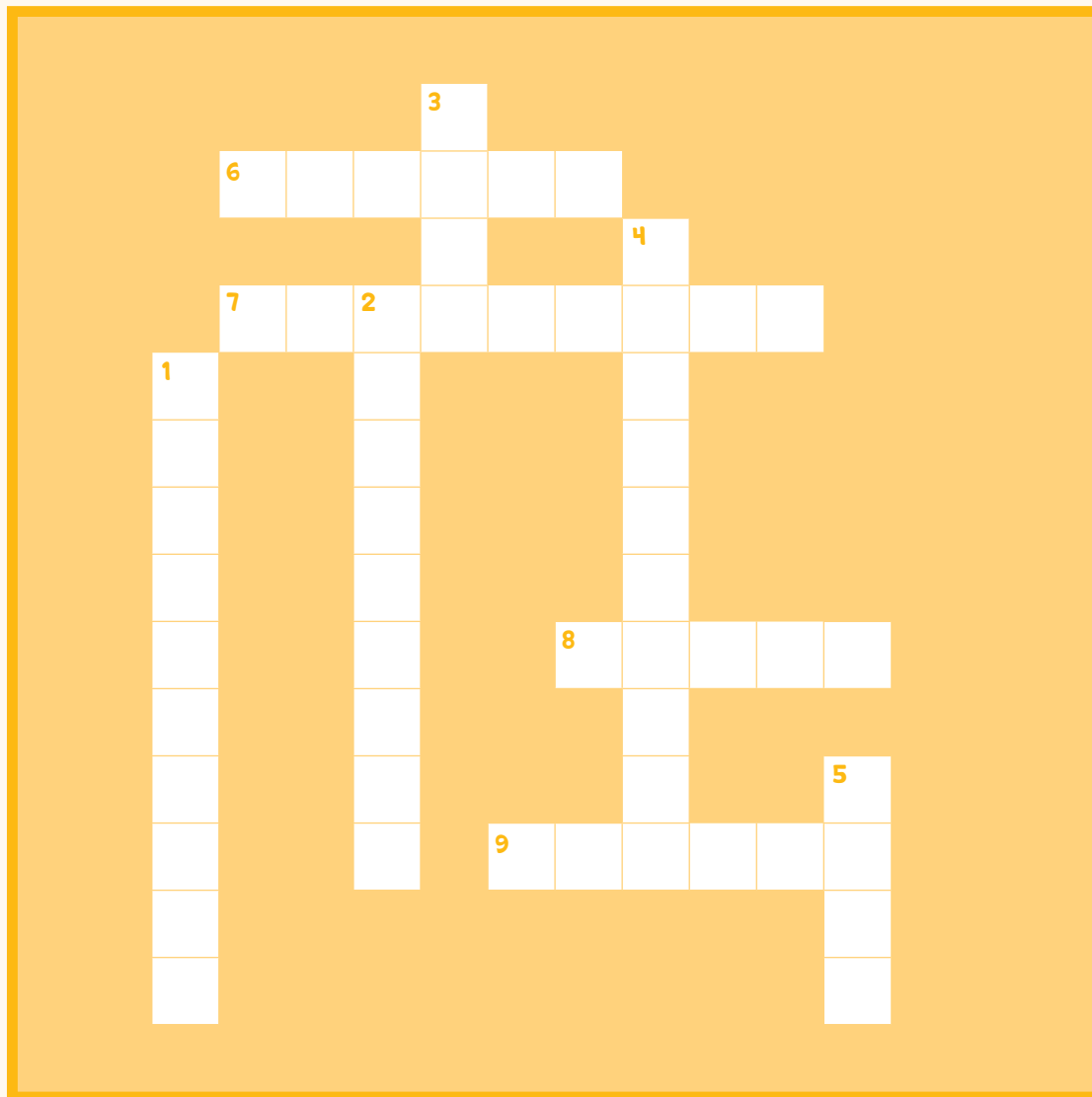


- ### Materials:

- Instructions:**

REDUCE CROSSWORD

Help! Answer the clues below and place the correct letter in each box of the puzzle.



Down

1. Put asticker on your letterbox to save trees and reduce the amount of junkmail you receive.
2. When shopping, useas an alternative to plastic ones.
3. Buy things in.....to reduce packaging.
4. Avoid buying.....items that cannot be recycled.
5. By buying.....you create less waste.

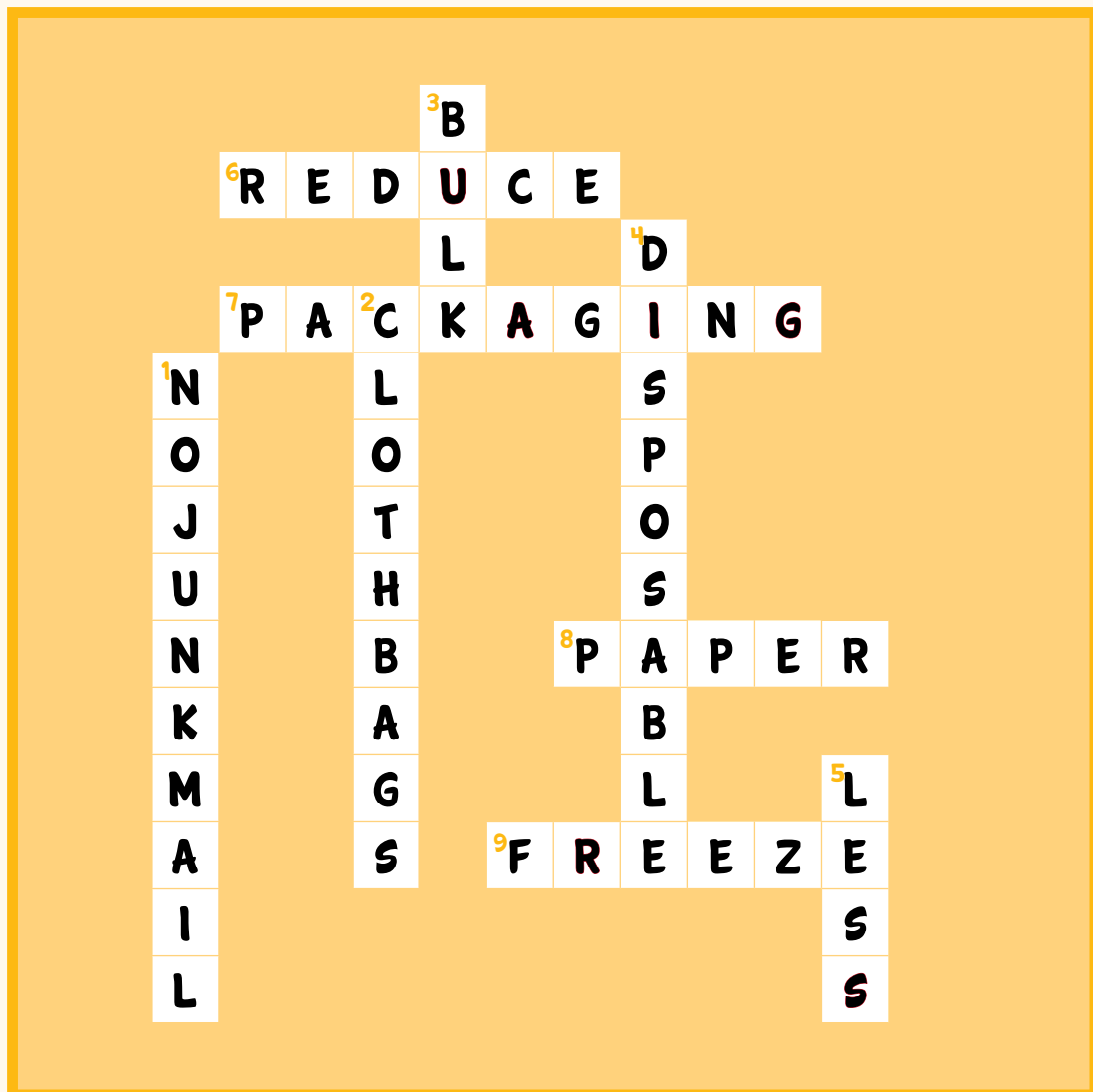
Across

6. The first and most important of the 3R's is to.....
7. Avoid buying things with unnecessary.....
8. Reuse scrap.....that has only been used on one side.
9.your leftovers to reduce the amount of foodwaste thrown away.



ACTIVITY 2.1.D

ANSWERS : REDUCE CROSSWORD



Notes :

LESSON TWO :

WE CAN REUSE

OBJECTIVES

Students will:

- Recognise the benefits of reuse.
- Develop ways to reuse a variety of products.

BACKGROUND

The practice of reusing goods has been carried out for centuries, in the form of clothing, toys, cutlery, crockery and heirlooms handed down through the generations.

Reuse is using an item more than once. For example, refilling your drink bottle or storing baking in an ice-cream container, even using your plastic supermarket bag as a rubbish bin liner is a form of reusing.

Making things uses up a lot of energy and natural resources. By reusing things, we reduce (use less) of these resources. The more we reuse and exchange goods, the fewer new things need to be made.

BENEFITS OF REUSING WASTE

- Savings made in energy and raw materials reduce the number of products that need to be made.
- Reduces the amount of waste going to landfill (and you do not pay a disposal fee).
- Repairing and refurbishing goods creates jobs.
- Some older items are very well made and highly valued (antiques).
- Reuse saves money, as you do not need to purchase a new item.
- Reuse can be achieved by trading in items at second-hand stores, having garage sales, donating pre-loved items to charity and by repairing items where possible rather than discarding them when they break.

TRADITIONAL REUSE

This is where the item is used again for the same function. For example:

- Repairing and overhauling products (i.e. engine blocks, toner cartridges) to meet the same standards as new products.
- Refilling your drink bottle.
- Second-hand shops and trade-in centers offer pre-loved goods i.e. clothing, toys, appliances, whiteware etc.
- Second-hand cars: it is far cheaper to buy a second hand car then a new one.

NEW-LIFE REUSE

- This is where the item is used for a new function. For example:
- Car tyres tied to docks and wharfs to reduce damage to boats.
- Steel drums converted into animal feeding troughs.
- Plastic supermarket bags used as rubbish bin liners.
- Woollen jersey re-knitted into socks.
- Old newspapers used to wrap up last night's takeaways.

Notes :



ACTIVITY 2.3.A

ORIGAMI REUSE GAME

Materials:

- A4 Scrap Paper
- Scissors
- Colouring pencils / pens
- Reuse question and answer sheets.



Instructions:

1. Make the origami finger cube using the outlined materials and instruction sheet provided on page ...
2. Once the cubes have been made, hand out Quiz One to one half of the class and Quiz Two to the other half of the class.
3. Get the students that have Quiz One to pair up with the students that have Quiz Two and take turns to quiz each other.



ACTIVITY 2.2.A

EXTENSION

- As an extension or homework activity, ask the students to come up with their own quiz based around the four R's; reduce, reuse, recycle, re-think.

ORIGAMI REUSE GAME

Step 1.

Place an A4 piece of scrap paper lengthways on the table in front of you with the used side facing up.

Please note the used side is facing downwards for the purpose of this activity to see the folded lines.



Step 2.

Fold the bottom edge towards the side of the piece of paper to form a triangle. Make sure both edges line up.



Step 3.

Fold the bottom edge towards the side of the piece of paper to form a triangle. Make sure both edges line up.

Cut along the top of the triangle with a pair of scissors.



Step 4.

Unfold the piece of paper to reveal a square.

Place the piece of paper so it looks like a diamond with the fold running vertically down the page.



Step 5.

Fold the bottom corner of the diamond to meet the top corner.

Open the piece of paper. There should be a fold running vertically and horizontally from each corner of the diamond.



Step 6.

Fold the bottom corner of the diamond to meet the middle centre point – do this with all four corners.

You should be left with a smaller square.



Step 7.

Turn the piece of paper over so the folded bits face the table and the smooth side faces up.

Fold the bottom corner to meet the center point once again - do this with all four corners as you did in step 6.



Step 8.

You will be left with an even smaller square with folded bits on both sides. Leave the side with the 8 small triangles facing upwards for the next step.



Step 9.

Fold the square in half so the bottom edge meets the top edge.

Press along the folded edge to crease the paper.

Unfold the square again so it looks like step 8.



Step 10.

Turn the piece of paper around and repeat step 13, folding the bottom edge of the piece of paper to meet the top edge.

This time, leave the paper folded.



Step 11.

Stand the folded piece of paper upside down as pictured.

Place your index finger and thumb in the corners of the holes (do this with both hands).



Step 12.

Bring your fingers and thumbs together so the tips meet in the centre – it should form a cube like this one.



Step 13.

Label each of the four square faces with one of the following words; reduce, reuse, recycle, rethink.



Step 14.

Open the cube and lay it flat to reveal the 8 small triangles.

Number each of the triangles with the numbers 1 – 8.



Congratulations!

You have successfully reused scrap paper to make an origami finger cube – now it is time to play!



REUSE QUIZ ONE



1. Reuse is the second of the 3 R's. True or False?
2. Can I recycle my chip packet?
3. Can I recycle my book?
4. Can I reuse my yoghurt pottle before it gets recycled?
What are three examples of ways it can be reused?
.....
5. Can I recycle my food scraps?
Give an example.
6. Can I recycle my plastic shopping bag?
7. Does my dirty tissue go in the recycle bin?
8. Where can I take my unwanted toys?

REUSE QUIZ TWO

1. Can I recycle my clean plastic bottle?
2. 'Recycle' is the third of the 3R's. True or false?
3. Where can I take my old clothes when I don't want them anymore?
4. Refilling my water bottle is an example of reuse. True or false?
5. Putting my fizzy can in the rubbish bin is an example of reuse. True or false?
6. Can I recycle my cardboard cereal box?
7. Can I recycle my ice cream container?
8. Can I recycle my old school books?



ACTIVITY 2.2.A ANSWERS : REUSE QUIZ ONE

1. Reuse is the second of the 3 R's. True or False? **True – Reduce, REUSE, Recycle.**
2. Can I recycle my chip packet?
No – Chip packets cannot be recycled because they are made from both foil and plastic (but did you know you can reuse them for cool art and craft activities?).
3. Can I recycle my book? **Yes – You can recycle your book.**
4. Can I reuse my yoghurt pottle before it gets recycled? **Yes.**
What are three examples of ways it can be reused?
You can reuse it to plant seedlings, hold paint and make things with it.
5. Can I recycle my food scraps? Give an example.
Yes – You can recycle your food scraps by compost, worm farm or bokashi.
6. Can I recycle my plastic shopping bag?
Yes – You can recycle your plastic shopping bag (but did you know it can be reused in lots of ways first).
7. Does my dirty tissue go in the recycle bin?
No – But did you know you can put your dirty tissue in the compost bin?
8. Where can I take my unwanted toys?
You can take your unwanted toys to second hand shop, the SPCA for animals to play with, or you could give them to a friend.



ACTIVITY 2.2.A ANSWERS : REUSE QUIZ TWO

1. Can I recycle my clean plastic bottle?
Yes – you can recycle your plastic water bottle (but did you know you can refill it and reuse it first?).
2. 'Recycle' is the third of the 3R's. True or false? **True – Reduce, Reuse, RECYCLE**
3. Where can I take my old clothes when I don't want them anymore?
You can take your clothes to a second hand store, clothing bin or give them away to a friend or family member. You can also reuse the really old ones for cleaning rags.
4. Refilling my water bottle is an example of reuse. True or false?
True – Refilling your water bottle is an example of reuse.
5. Putting my fizzy can in the rubbish bin is an example of reuse. True or false?
False – Putting your fizzy can in the rubbish bin is not an example of reuse.
6. Can I recycle my cardboard cereal box?
Yes – you can recycle your cardboard cereal box. (Did you know that you can also rip it up and compost it? Or reuse it for cool art and craft activities?).
7. Can I recycle my ice cream container?
Yes – You can recycle your ice-cream container (did you know you can also reuse them as a lunch box or for building sandcastles?).
8. Can I recycle my old school books? **Yes - you can recycle your old school books.**



ACTIVITY 2.2.B

PLAY : THE FUNNELS

Characters:

- Wendall
- Maria
- Bill
- Kathy
- Mark
- Leann
- Bruce
- John
- Kim

Props:

- Two funnels (funnels can be made by cutting the ends off two plastic bottles)
- Rubbish bin
- Chair

SCENE I

WENDALL walks out carrying two funnels.

He tosses them into the bin and sits down on a bench near the bin and observes the surroundings.

SCENE II

BILL, and **MARIA** walk up and stand next to the rubbish bin.

MARIA says in a normal voice, "Why did the chicken cross the road on a bicycle again?"

BILL, holding a hand up to his ear replies, "Eh, what did you say?"

MARIA repeats the question louder, "Why did the chicken cross the road on a bicycle again?"

BILL, holding a hand up to his ear replies, "Huh, I can't hear you."

MARIA reaches into the rubbish bin and pulls out a funnel and hands it to Bill. **BILL** puts it up to his ear.

MARIA "Why did the chicken cross the road on a bicycle again?"

BILL "I don't know. Why did the chicken cross the road on a bicycle again?"

MARIA "Because he wanted to RECYCLE."

The two put the funnel in the rubbish bin and walk off laughing. **WENDALL** laughs.

SCENE III

KATHY and MARK walk out laughing and dancing. They look in the rubbish bin and pull out the funnels.

KATHY and MARK place a funnel on their heads and begin counting down, "five, four, three, two, one - Happy New Year!"

KATHY and MARK take the funnels off their heads and turn them over and yell through them, "Happy New Year!"

They put the funnels in the rubbish bin and walk off.

WENDALL smiles

SCENE IV

LEANN AND BRUCE walk out. Bruce is coughing. Leann reaches into the rubbish bin and pulls out a funnel.

LEANN "You really need to take your medicine." Then holds the funnel up to Bruce's mouth and pretends to pour medicine into it.

BRUCE "Wow, my cough is gone. Thank you, Leann."

LEANN "You are welcome."

They put the funnel back in the rubbish bin and walk off.

WENDALL is watching closely.

SCENE V

JOHN and KIM walk up and pick up the funnels.

JOHN holds the pointed ends up to his eyes like binoculars and looks all around as if looking at birds. He hands the funnels to Kim, who looks through them.

KIM then places the funnels back in the rubbish bin. Both walk off.

WENDALL stands up and walks over to pick up the funnels. He looks them over.

"Wow, these have so many uses. I didn't need to throw them away!" He walks off admiring the funnels.

THE END



Assign students to work in teams or groups. Have each group develop a suggestion list for ways to reuse items around their classroom, at school, or at home. For each item that is being reused, identify the natural resource that is being conserved with each reuse.



- Ask students to write additional scenes to the play 'The Funnel', or they can write their own skit. Present the skit to another class or at a school assembly.
- Create a school resource box, if you don't already have one, for items that could be used in art/drama classes.
- Ask students to bring in items from home to donate and host a school-wide swap meet or clothing drive.
- Using a donated item that would have been thrown away, make something out of the item so that it can be reused. Write a description of the item and bring the item to class to share. For example, make a toy or costume out of reused materials or artwork from discarded materials.



ACTIVITY 2.2.C WASTE BINGO

Materials:

- Copies of Waste Bingo activity sheet (page 61)
- Waste Bingo questions
- Bottle top and glue (optional)
- Scissors

Instructions:

1. Each student gets a copy of a blank bingo board found on page 61, or alternatively (and to save trees), students can draw their own pyramid on a piece of scrap paper that has only been used on one side and divide it into 10 sections (see template).
2. Each student fills in their pyramid with 10 'waste words' from the list provided below.
3. Each student gets 10 'recycle tokens' each (to make the tokens, cut out a symbol and glue it onto a bottle top).
4. Teacher reads out the questions provided on page...and students place a token on the correct answer on their pyramid. The first student to fill their pyramid with the correct answers says "Bingo!" and they win the game.
5. Students can then swap their pyramids with each other and play again.

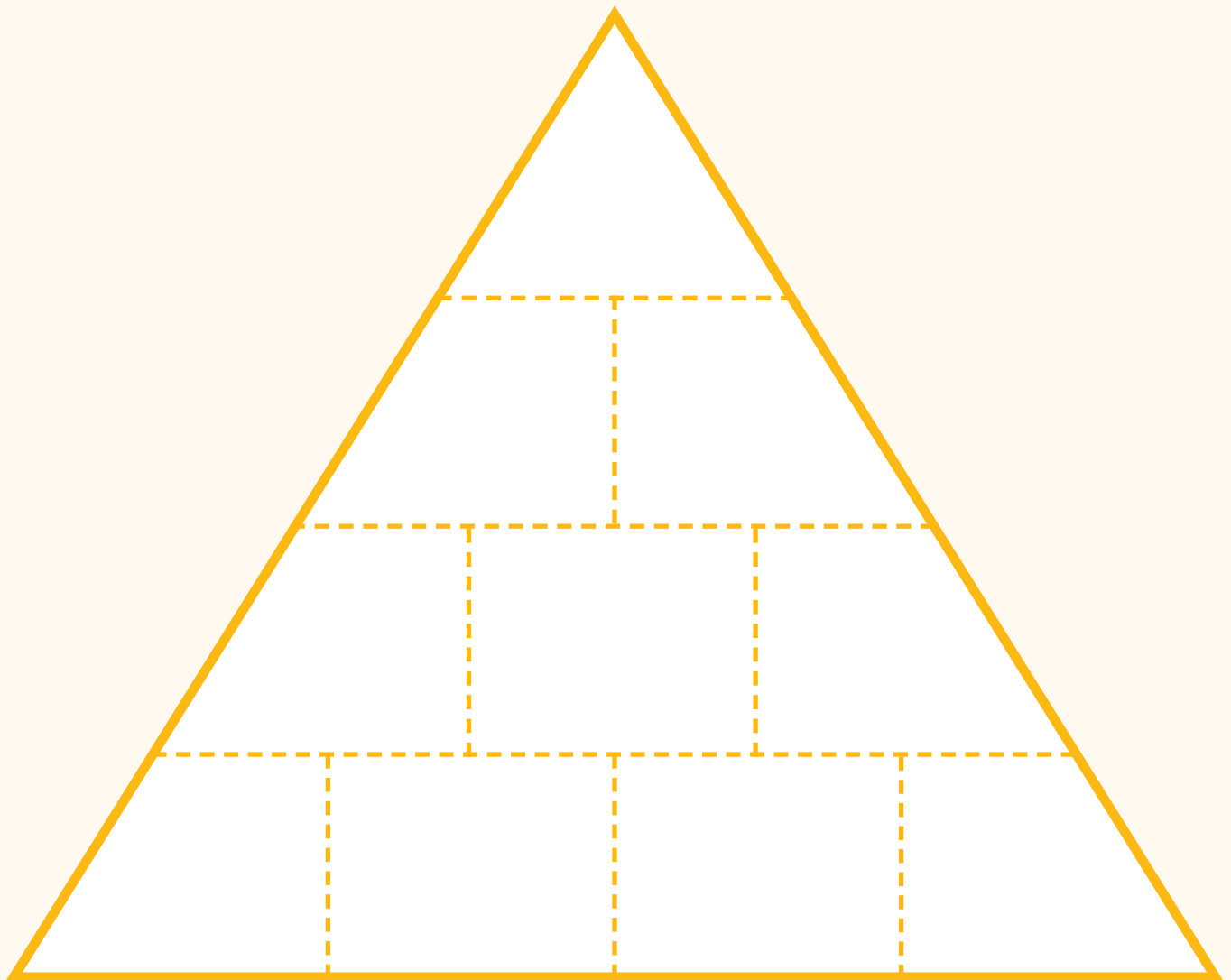
"Waste Words"

Students can use any combination of these words to complete their blank bingo board.

Reduce	Bruce C Gull	Minerals
Wheelie bin	Garden waste	Oil
3 R's	Worm farm	Styrofoam meat tray
False	Organic material	Clothing bin
Landfill	Recycle	Cycle
Reuse	Transfer Station	A to Z Waste Guide
Sand	True	
Paper	Arrows	
Trees		

Question	Answer
What is the first 'R' of the 3 R's?	Reduce
What do people in many towns put their waste into?	Wheelie bin
Reduce reuse and recycle are known as the three what?	3 R's
True or false. Once we have used a glass bottle it is not useful anymore?	False
What is the modern word for a place called "the dump"?	Landfill
What is the second of the 3 R's?	Reuse
Glass is made from this.	Sand
Trees are made into this.	Paper
The natural resource that makes paper.	Trees
The famous bird that likes to reduce, reuse and recycle.	Bruce C Gull
This is not allowed in wheelie bins.	Garden waste
Uses special composting worms to eat organic waste from our kitchens.	Worm Farm
It can be composted to create a nutrient rich garden fertiliser.	Organic Material
What is the third of the 3 R's?	Recycle
Where does our rubbish go before it gets transferred to the landfill?	Transfer Station
True or false. I can compost my banana skin.	True
What is the recycle symbol made up of?	Arrows
The natural resource that makes aluminium cans.	Minerals
The natural resource that makes plastic.	Oil
An item that cannot be recycled.	Styrofoam meat tray
A place to take your clothes when you don't want them any more.	Clothing Bin
The recycle symbol represents a...	Cycle
Where I can find out what things can be recycled.	WasteNet Website

WASTE BINGO





ACTIVITY 2.2.D MAKING A WIND SOCK

For hygiene reasons we will be using new paper cups for this activity. Children can repeat this activity at home by washing out an old takeaway cup or plastic bottle and reusing old ribbon instead of string.

Materials:

- Paper cup or plastic bottle (with the bottom cut out and a hole punched on either side)
- 1m piece of string
- Strips of plastic bags (approximately 4cm x 30cm)
- Sticky tape
- Colouring pencils / pens

Instructions:

1. Each person receives one paper cup
2. Using tape, stick strips of plastic bags around the inside wider rim of the cup (opposite end to the punched out holes).
3. Thread the string through the punched out holes at the narrower end and tie ends of string together
4. Decorate your wind sock with colouring pencils / pens
5. You can either hold your windsock or hang it from a tree or fence post to observe which way the wind is blowing.



ACTIVITY 2.2.E REPURPOSE GALLERY

Materials:

- Access to internet for viewing WasteNet's 'Repurpose Gallery'
- Example of an everyday item found around home or school
- Your imagination!

Instructions:

Pause before you throw - By reusing a product you are preventing another of those products from being created, and therefore reducing the volume of natural resources used for its production.

The next time you go to put something in the bin, stop and let your imagination run wild and think about a way to reuse the product:

- Reuse glass jars and bottles for preserving fruit and vegetables
- Ice-cream containers and take away dishes make great lunch boxes, and saves you buying lunch wrap or a new lunch box
- Use old clothing for cleaning cloths rather than buying new cleaning cloths
- Broken crockery can be used to promote drainage at the bottom of pot plants
- Use both sides of your paper for writing on
- Transform your old cards and wrapping paper into gift tags.

Take a look at some of the cool ways people have reused items in WasteNet's www.wastenet.org.nz/Gallery

Get students to come up with five different ways to reuse just one item.

Send your examples into www.wastenet.nz and we will upload them onto our repurpose gallery – the most inventive ideas will receive a special prize.



LESSON THREE :

WE CAN RECYCLE

OBJECTIVES

Students will:

- Identify the parts and meaning of the universal recycling symbol.
- Learn about recycling in the Southland community and school environment.

BACKGROUND

Recycling saves resources and saving resources saves the world. Recycling turns waste materials into new products and reduces the amount of waste disposed to landfill.

Recycling involves processing materials so that they can be used as raw materials for another industry. They may end up in the same product (such as cardboard boxes recycled into new cardboard boxes) or they may be very different for example, steel cans and cars are re-made into scaffolding poles or reinforcing bars for strengthening concrete. An old car tyre can be made into a wallet; a mobile phone can be broken down into its several parts and made into copper piping, road cones and jewellery.

By recycling we are preventing the 'waste' of useful materials and resources as well as saving raw resources from having to be used.

BENEFITS OF RECYCLING WASTE

- Reduce the amount of waste going to landfill
- Materials you recycle are reprocessed into new products
- Using recycled materials to manufacture new items can be cheaper than using raw materials and can mean less energy is used
- Recycling helps preserve natural resources and protects the environment for you and future generations
- Recycling creates jobs
- Reduces water pollution - making goods from recycled materials generates far less water pollution than manufacturing from virgin materials
- Waste disposal contributes to global warming. Industrial processes and waste account for 8% of New Zealand's greenhouse gas emissions
- Protects our wildlife. Using recycled materials reduces the need to damage forest, wetlands, rivers and other places essential to wildlife.

This lesson will introduce recycling as part of a man-made cycle and will discuss the importance of buying products with recycled content in order to support recycling markets.

Remind students of the natural cycles that were discussed in Chapter One - Lesson Four "Natural Cycles". People often ask why certain types of materials are not recyclable in their community. Whether or not a city or the district recycles certain materials depends on a mix of factors like the ability to reasonably resell the materials to an end user, the total distance to that market, the technology available and associated costs.

If you do not already thoroughly understand what can and can't be recycled in your community, contact the team at WasteNet or check out their website (www.wastenet.org.nz)

**This is a great opportunity to invite a guest speaker to speak about recycling and solid waste management in your community or to go on the World of Waste tour (contact the team at WasteNet www.wastenet.org.nz for more information).*

Notes :



ACTIVITY 2.3.A

THE RECYCLE SYMBOL

Who knows what a 'symbol' is?

Symbol: something that represents something else by association, resemblance or convention; especially, a material object used to represent something invisible.

Can you name some symbols that are common in our lives?

Students should know that a symbol is a visible sign that often stands for something, even if that thing is invisible. Examples include: the flag – our country, a peace sign – peace, a lion – courage, and advertising logos – a manufacturer.

Can somebody come up to the board and draw the symbol for recycling?

Point out that the arrows form a cycle or a loop, it has no end.



ACTIVITY 2.3.A

EXTENSION

CLASS DISCUSSION : Revisit the 'Natural Cycles' Activity 1.4 and discuss the similarities of the recycling loop and a natural cycle.



GET IN THE LOOP

Materials:

- Instructions:**

- 

ACTIVITY 2.3.B

EXTENSION

Could they make a permanent change?

Notes :

THE PROCESS OF RECYCLING

Cut around the dotted lines. Match the images to the words and make a flow diagram of what happens to our **RECYCLING** in the correct order.



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Bales of Recycling

The recycling is baled into different types of materials before it is used to make new products.



Car

People who do not have a kerbside collection take their recycling to the Recycle Centre.



Recycle Centre

The recycling from the yellow bins is taken to the recycle centre where it is hand sorted by staff at Southland disAbility Enterprises.



Recyclable Item

Aluminium can – once this can has been emptied, it can be recycled in the yellow recycling bin.



Yellow Recycling Bin

Items that can be recycled such as plastic, glass, tins, cans, paper and cardboard can be recycled in this bin.



THE PROCESS OF RUBBISH

Cut around the dotted lines. Match the images to the words and make a flow diagram of what happens to our **RUBBISH** in the correct order.



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Transfer Station

The collection truck takes the rubbish to the waste transfer station where it is compacted into trucking containers.



Car

People who do not have a kerbside collection take their rubbish to the Transfer Station.



Regional Landfill

Trucks empty the rubbish in to the regional sanitary landfill.



Non-Recyclable Item

Chip packet – an item that cannot be recycled or composted.



Red Rubbish Bin

Items that cannot be recycled or composted go in the red rubbish bin.



ACTIVITY 2.3.C

ANSWERS : THE PROCESS OF RUBBISH



Non-Recyclable Item

Chip packet – an item that cannot be recycled or composted.



Car

People who do not have a kerbside collection take their rubbish to the Transfer Station.



Transfer Station

The collection truck takes the rubbish to the waste transfer station where it is compacted into trucking containers.



Red Rubbish Bin

Items that cannot be recycled or composted go in the red rubbish bin.

RUBBISH



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Transfer Station

The collection truck takes the rubbish to the waste transfer station where it is compacted into trucking containers.



Regional Landfill

Trucks empty the rubbish in to the regional sanitary landfill.



ACTIVITY 2.3.C

ANSWERS : THE PROCESS OF RECYCLING



Recyclable Item

Aluminium can – once this can has been emptied, it can be recycled in the yellow recycling bin.



Car

People who do not have a kerbside collection take their recycling to the Recycle Centre.



Yellow Recycling Bin

Items that can be recycled such as plastic, glass, tins, cans, paper and cardboard can be recycled in this bin.



Collection Truck

The bin is placed at the kerbside and is emptied by the collection truck.



Recycle Centre

The recycling from the yellow bins is taken to the recycle centre where it is hand sorted by staff at Southland disAbility Enterprises.



Recycle Centre

The recycling from the yellow bins is taken to the recycle centre where it is hand sorted by staff at Southland disAbility Enterprises.



Bales of Recycling

The recycling is baled into different types of materials before it is used to make new products.

RECYCLING



It is buried and the natural resources used to make it are lost.

Generally not, there is very little air and no sunlight that allows decomposition to take place.

To conserve natural resources for future generations.

Always recycling whatever we can, buying recycled-content products, composting, practicing waste reducing behaviours, etc.



- Ask students to find five items in their homes that are made from recycled-content materials. For example, they can examine cereal boxes or other cardboard boxes that contain dry food and look for the label that indicates that the box is made from recycled materials, other products would be paper egg cartons, newspapers, aluminium cans, and some types of plastic bottles.
- Go on the World of Waste Tour - A behind the scenes tour of a second hand shop, waste transfer station, recycle centre and closed landfill. Contact the team at WasteNet for more information (www.wastenet.org.nz).



ACTIVITY 2.3.D WE CAN RECYCLE IN OUR CLASSROOM!

This activity helps students to establish a routine of recycling and sorting their waste within the classroom / school environment.

Once a recycling system is established within the classroom the students will be able to participate in the 'Waste Free Lunch Challenge'.

If a recycling system is already established within your school / classroom you can use this activity to help reinforce this system and measure its success.

Materials:

- Bin Labels; rubbish, recycling, compost, foodwaste, goosbox (Downloadable from WasteNet website)
- Sticker Chart (Downloadable from WasteNet website)
- Bins
- Whiteboard marker
- Velcro dots

Instructions:

1. As a class, decide on what you are going to sort and recycle.
2. Allocate a label and sticker chart to each bin.
3. Fill in the students names. Each time a student puts something in one of the bins they are to put a point beside their name.
4. The purpose of the chart is to help make the students accountable for their waste. The charts are designed to be completed weekly. The student who has the least amount of points at the end of the week has created the least amount of waste and they are the winners for that week.



ACTIVITY 2.3.E MAKE YOUR OWN RECYCLED PAPER

Materials:

- Bucket
- Sponge
- Blender or hand beater
- Water
- Lots of waste paper (different colours)
- Mesh screen
- Tub (big enough to fit screen)

Optional Extras:

- Glitter
- Dried pressed flowers
- Leaves
- Herbs
- Spices
- Oil
- Potpourri perfume

Instructions:

1. Fill blender 1/3 full of water
2. Shred paper into a 4 cup container. Tear paper into small pieces.
3. Add shredded paper to blender by small handfuls. Lid on. Push pulse button – count to five. Use pulse button to blend each addition of torn paper.
4. Stop when paper pulp is like thick gravy.
5. Pour paper pulp into screen tub.
6. Swirl water to suspend paper pulp then lift screen straight up and out of water.
7. Gently sponge the paper pulp on screen to remove excess water.
8. Carefully lift at corner. Lift paper off screen and place on newsprint or sheet to dry. (You can speed up the drying process by using a hairdryer).
9. Extras can be added at step 2 or step 5.

NB: A bucket and an eggbeater or whisk can be used instead of a blender. (If using this method it is easier to soak the paper overnight).

LESSON FOUR :

RETHINK

OBJECTIVES

Students will:

- Understand how waste is dealt with in the Southland community.
- Identify environmentally friendly features in the Southland Community.
- Develop innovative ways to promote waste as a resource.
- Take action to improve the use of resources.

BACKGROUND

"One man's waste is another man's treasure".

Sustainability is a predominant issue facing New Zealanders. In today's 'throwaway' society, it is our overarching vision at WasteNet for the Southland community to regard waste as a resource.

Waste is a resource that can be reused and recycled into valuable products. We need to reduce our impact on the environment to protect our natural resources for generations to come. One way we can do this is to "rethink" the way we live and make wise choices to reduce, reuse and recycle as much as we can.

Notes :



ACTIVITY 2.4.A CREATE A GREEN MAP

We can find out more about our communities and how environmentally-friendly they are by taking a few minutes to consider where eco-resources such as bike and walking paths, recycling depots, and composting facilities are located.

Once we have thought about this, we can draw a map of our community indicating where such resources are located. This is called a Green Map. If you take a few minutes to draw a Green Map of your own neighbourhood, you will probably be surprised to discover just how green it is!

Once students become aware of what environmental services are available in their own community, they could be encouraged to participate in these programs and become better environmental citizens.

Materials:

- Paper
- Pencil
- Colouring tools
- Imagination!

Instructions:

1. Ask students to think about whether or not their community includes any of the eco-resources from the list below and where they might be located:
 - Parks and green spaces
 - Pathways for walking, roller-blading, bike-riding
 - Public transport e.g. Bus stops, bike stands etc.
 - Composting facilities
 - Cultural/historical sites
 - Recycling depots
 - Second-hand stores
 - Landfill, Transfer Station, Recycle Centre
 - Wildlife habitat
 - Nature education sites/ facilities

2. Have students draw a map of their neighbourhood indicating where any of these services/places can be found. These maps do not need to be geographically accurate.
3. Tell the students to be creative and to estimate where these things are located in relation to their home or their school.
4. When the students have completed their maps, lead them in a discussion about how often they visit their local park, educational sites, or second-hand stores. If they do not visit these places often, maybe you can arrange a field trip to one or more of them.
5. Ask the students to find out what sorts of items can be taken to their recycling depots and household hazardous waste drop-off sites. What items are not accepted for recycling in their community? (*See the WasteNet website for more details www.wastenet.org.nz*)



ACTIVITY 2.4.A EXTENSION

- If recycling is not a priority in your community, encourage students to conduct a survey to find out why.
- What could be done to change this?
- Go on the World of Waste Tour – A behind the scenes tour of a second-hand shop, Invercargill waste transfer station, recycle centre and closed landfill. (*see www.wastenet.org.nz for more information*)



Materials:

- Instructions:**

3 R'S WORD SEARCH

Help! Some very valuable things are on their way to the landfill.
Save them from being thrown away. Be sure to look for:

ALUMINIUM
BATTERIES
BOOKS
BOTTLES
CLOTHES

FURNITURE
GLASS
MOBILE PHONE
PAPER
PLASTIC

REAL NAPPIES
RECYCLE
REDUCE
REUSE
WASTE

E	H	C	Z	Y	W	V	G	S	R	R	Z	J	E	H
E	R	D	L	A	P	C	G	A	E	E	F	X	B	W
M	A	U	S	O	Y	R	L	L	A	D	V	Q	G	M
F	O	P	T	Q	T	U	E	B	L	U	K	E	L	G
I	N	B	R	I	M	H	C	P	N	C	D	F	D	R
Z	S	G	I	I	N	I	E	F	A	E	H	I	E	X
Y	G	D	N	L	T	R	S	S	P	P	R	U	J	E
F	E	I	E	S	E	K	U	D	P	H	S	C	K	T
Y	U	V	A	V	O	P	D	F	I	E	U	B	E	S
M	X	L	Y	O	V	Y	H	M	E	X	G	G	L	A
D	P	B	B	K	E	S	X	O	S	K	P	F	C	W
E	T	B	O	T	T	L	E	S	N	L	G	S	Y	I
S	S	A	L	G	J	R	X	N	N	E	G	F	C	T
Y	Y	R	D	S	E	I	R	E	T	T	A	B	E	O
Z	G	N	H	Q	Y	M	L	B	G	C	J	G	R	A

Give an example of an item from the word search that you can:

Reduce:

Reuse:

Recycle:

CHAPTER THREE

WRAP IT UP



Join Norton and Wendall as they explore different options for reducing unnecessary packaging in the lunch box. This chapter helps students to identify how people are influenced to buy products through advertising and looks at the negative aspects of over purchasing or buying over packaged products.

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CURRICULUM LINKS

VISION (What we want for our young people)

Our vision is for young people who will seize the opportunities offered by new knowledge and technologies to secure a sustainable social, cultural, economic and environmental future for our community.

PRINCIPLES (Foundations of curriculum decision making)

Community Engagement - The curriculum has meaning for students, connects with their wider lives, and engages the support of their families, whanau, and communities.

Suggested learning outcomes for environmental education - Students will develop knowledge and understanding of:

- the purpose of advertising
- how people are influenced by advertising
- the different natural resources used in packaging
- the purpose of packaging.

Values (to be encouraged, modelled and explored) - Students will be encouraged to value:

- Community and participation for the common good;
- Ecological sustainability, which includes care for the environment;
- Innovation, inquiry and curiosity by thinking critically, creatively and reflectively.

Key competencies (capabilities for living and lifelong learning), such as:

- Thinking - make sense of information, experiences and ideas;
- Using language, symbols and texts representing information;
- Manage self by making plans, managing projects and developing strategies for meeting challenges.

Achievement objectives from selected curriculum statements that could be used as a focus for the environmental education topic 'Where Does Our Waste Go' these include:

- **English - Speaking, Writing and Presenting: Ideas**
Select, form and communicate ideas on a range of topics.
- **English - Speaking, Writing and Presenting: Purposes and Audiences**
Show an increasing understanding of how to shape texts for different purposes and audiences.
- **English - Listening, Reading and Viewing**
Show an increasing understanding of how language features are used for effect within and across texts. Identifies oral, written, and visual features used and recognises and describes their effects.
- **Mathematics - Statistical Investigation**
Conduct investigations using the statistical enquiry cycle.

- **Social Sciences - Social Studies**

Understand that events have causes and effects.

- **Technology - Technological Practice: Brief development**

Describe the nature of an intended outcome, explaining how it addresses the need or opportunity. Describe the key attributes that enable development and evaluation of an outcome.

Suggested learning experiences that could enable students to meet the learning outcomes of environmental education in association with achievement objectives from selected curriculum statements

- Advertising Activity – Ads Add Up
- So Many Biscuits - So Much Packaging
- Non-Recyclable Packaging - waste audit
- Make Your Own Sandwich Wrapper
- Plastic Wrap Snails
- Making and Moulding Glass.

For a more intensive packaging study it is recommended that you order a copy of the PAC-IT education resource from www.pac-it.org.nz The Packaging Council of New Zealand "PACIT" resource contains an abundance of information on developing packaging; functions of packaging; packaging materials (papers, polymers, glass, metal and wood); closures; adhesives; active packaging; packaging and the environment and graphic design and printing.

Notes :

LESSON ONE :

ADS ADD UP

OBJECTIVES

Students will:

- Identify the purpose of advertising and the messages conveyed by advertising;
- Identify the ways people are influenced to buy products and the negative aspects of over-purchasing or buying over-packaged products.

BACKGROUND

Advertising and packaging influences what people buy. More and more, advertisers are finding savvy ways to reach the youth audience. Research has shown that children as young as 5 years old can understand and recognize commercials that are trying to sell them products.

The following is a quote from a Direct Marketing Association brochure, "Power brands attract new customers more easily and then convert

them into loyal, long-term 'brand demanders'. Brands are not products. It is the personality that animates a product that brings it to a life in a thousand ways for the consumer."

Of course, there is nothing wrong with this type of marketing philosophy, except that these strategies often lead consumers into buying things they don't really need; that may be hard to dispose of properly; or that only have a onetime use, etc.

Our society has been called the "Throw-Away Society" because so many of the products we consume now are disposable, or have a short life expectancy.

This lesson is designed to help students understand that people have choices when buying products that can affect their personal health, the environment, and can also reduce the amount of rubbish they generate. Learning to analyse and evaluate information and to make wise choices when shopping is a valuable lifelong skill for students.



ACTIVITY 3.1.A ADVERTISING

Materials:

- Two apples
- attractive ribbon
- magazine ads (i.e. cereal boxes, beverage containers, snack cakes - things that kids use).

Instructions:

1. Bring two apples to class and a fancy bow ribbon. *Show the apples to the children, placing the bow on one of them.*
2. **Discuss:**
Which one of these apples would you like to buy? *Many will answer the one with the bow.*
What made you want one apple over the other?
What material is the ribbon made of? *Let the class know that the ribbon originated from a petroleum-based material at a natural resource that had to be taken from the Earth's crust. Discuss with the class how packaging eventually ends up in our landfills and uses up our natural resources.*
3. **How are products packaged to make you want to buy them?** *Show a magazine ad that would appeal to the students.*
4. **Discuss:**
What are the people in this ad doing? Would you like to be one of these people? Why or Why not? Why was this picture taken?
How does advertising try to get you to buy a product? *Make the connection that radio, television and print ads are similar to packaging - all are designed to get you to the store and to buy the product once you are there.*
How does the ad convince you that this item is a "Need" when perhaps it is really just a "Want"? Have you ever wanted something you saw on television, purchased the item and were disappointed with it because it wasn't as good as promised? *Continue to evaluate magazine ads, or have students find ads in newspapers or magazines to discuss with the class. Explore with the class how the advertisement makes them feel and what it seems to be saying or promising.*



ACTIVITY 3.1.A OBSERVATION

Play a TV commercial advertising a product that targets kids.

Discuss the methods that advertisers use to make their product seem "cool" or "necessary" or "fun". Ask the students to decide whether or not they feel these products would live up to the claims in the ad.



ACTIVITY 3.1.A EXTENSION

- Because packaging winds up in our landfills, have students consider ways to reduce the amount of packaging in their garbage can. For example; Buy items with less packaging and packaging that can be recycled, buy packaging that can be reused, consider if the item is a want or a need, and avoid onetime use items.
- Discuss the concept of durable vs. disposable. Help students think of alternatives to disposable products that they might use.
- Ask students to create an ad that encourages people to buy a product that lasts.
- Have older students write a persuasive essay to convince others to consider carefully before buying an item.

LESSON TWO :

SO MANY BISCUITS, SO MUCH PACKAGING

OBJECTIVES

Students will:

- Discuss the purpose of packaging.
- Compare the different natural resources used in packaging.
- Determine that some packaging is easier to recycle than others.
- Judge if packaging is necessary and appropriate.

BACKGROUND

At an early age children need to understand that when they buy something, they also buy the packaging. Packaging has many important purposes, such as: safety, marketing, protecting and transporting the product. However, children have the responsibility as good citizens to see that the packaging is minimal, and that it is reused or recycled, where possible.



ACTIVITY 3.2.A ANALYSING PACKAGING

Materials:

- Four to five packets of biscuits with various types of packaging e.g. bulk freshly baked; bulk pre-packaged biscuits, biscuits in a tray, single wrap, etc.
- 'Packaging Analysis' Worksheet (page 84).

Instructions:

1. Have the children sitting in a circle to look at the packaging and participate in the discussion questions.
2. The worksheet can be completed in the circle, or back at their desks.

Discussion Questions:

- Do you ever have biscuits as a snack at home? What type of packaging do the biscuits come in? *Show the packets of biscuits to the class.*
- Why do you think the makers package the biscuits that way? *Students should suggest things like, "so the biscuits are not crumbs when they get them home, to make the biscuits more appealing, etc." (List the reasons on the board).*
- Which biscuits do you think will produce the least amount of waste and which will produce the most? *Use the "Packaging of Biscuits Chart" worksheet to compare and record the information.*



ACTIVITY 3.2.A EXTENSION

- Have students write a letter to the local grocery store manager asking them to reduce the amount of over packaged items they stock and to offer products that are designed to be more environmentally friendly (e.g. reduce fat wrappers and styrofoam meat trays).
- Have students write a letter to their favourite biscuit manufacturer letting them know their concerns about packaging and the environment.
- Have students design a packet for biscuits that will protect the biscuit, but will not have "excessive" packaging.
- Use packaging materials to create art projects. You might do this in teams of students and have award-winning categories, such as "most creative idea," "funniest idea," and "prettiest idea," etc.).

PACKAGING ANALYSIS

1. Which brand of biscuit had the least amount of packaging?

2. Which brand of biscuit had the most packaging?

3. Did you discover any brand or brands that you would no longer buy because you found a substitute brand of biscuits that had less packaging?

4. a) Did you discover any brands that were better for the environment but were more expensive?

b) What about less expensive?

5. Do you think that it is important to choose products that you like to use, but have less impact on the environment? Why or why not?



Explain to students that part of what you pay for when you buy a product is the packaging. About \$1 out of every \$10 spent on food and beverages is the cost of the packaging.



Explain to the students that trees are an example of a “renewable resource” from the earth because we can replant trees and grow more. On the other hand, oil comes from deep within the ground and takes thousands and thousands of years to form, so we consider this a “non-renewable resource.” People don’t really know exactly how much oil exists around the world, and someday we might run out of oil completely. We could also run out of trees if we don’t use paper wisely and give the forests time to regrow.

- Students should note that they can reuse lunch box containers, and re-sealable plastic bags instead of throwing them away. Also, things that we buy in bulk can be carried in small containers like Tupperware or used yogurt containers. Emphasize that by carefully choosing the products we buy, we are helping prevent waste and preserve the environment.

NON-RECYCLABLE PACKAGING

If you can find a good lunchbox, you'll rarely need to wrap anything. Un-waxed paper can be composted or fed to worms so it's a good alternative to plastic food wrap. Please remember that paper contaminated with food cannot go in your regular paper recycling system.



ACTIVITY 3.3.A NON-RECYCLABLE PACKAGING

Materials:

Examples of packaging:

- 5 recyclable items - eg; clean yoghurt pottles, glass bottles, cardboard boxes, plastic drink bottles.
- 5 non-recyclable items - foil chip packets, muesli bar wrappers, Styrofoam takeaway containers or meat trays, foil coffee satchets, dirty gladwrap.

Instructions:

1. Discuss with students what non-recyclable packaging is and why it is considered a sustainability issue. For instance, it is not a sustainable use of resources, such as oil and water used to make plastic, when valuable non-renewable resources are being used to create packaging and then thrown away after one use! Non-recyclable packaging in schools can include chip packets, plastic wrap, muesli wrappers, and juice cartons.
2. Out of the examples of packaging provided, what is recyclable? What is not recyclable?



ACTIVITY 3.3.A OBSERVATION

- Do you think non-recyclable packaging is an issue in our school or not?
- How could we find out if it is a problem?
- Why should we be concerned?

One way to determine if this is a problem in your school is to separate and count the non-recyclable packaging during a waste audit.

This data will then be useful to inform and encourage your school community to make more sustainable food packaging choices. You can monitor this data over time to see if the action you are taking is making a difference.

- What barriers would stop individuals from making better choices about packaging?
- Are there sustainable packaging options?
- What could we do differently?
- How can we educate our school community to be more sustainable with their consumer choices i.e. reduce their use of non-recyclable packaging?



ACTIVITY 3.3.A EXTENSION

- Create an action plan to reduce your class/ syndicate/school use of non-recyclable packaging.
- Organise a 'Waste Mountain' day in the school where all the waste from children's lunches can be gathered and displayed in the main hall. The purpose of this was to show the pupils the amount of waste being generated each lunch time and to encourage them to reduce it – you could use this to illustrate to media/parents how much waste is being created at school with lunch waste.



ACTIVITY 3.3.B REUSABLE SANDWICH WRAP

QUICK OPTION

Visit your local haberdashery and purchase a 27cm or 30cm square of vinyl-fabric and about 6cm of velcro. Sew a strip of velcro into two corners. Turn the vinyl over and sew a strip of velcro into the opposite two corners. And that's it, all done! Simply place your sandwich diagonally in the middle, fold up two of the opposite corners and secure, and do the same with the last two corners.

SEWING OPTION

Materials

- 2 lots of 27cm or 30cm squares of pre-washed fabric
- A large ziplock plastic bag
- 4 lots of 2cm strips of velcro
- Needle & thread (or sewing machine)

Instructions

- Cut the large ziplock plastic bag into a 27cm or 30cm square.
- Place the right sides of the fabric facing each other, and place the plastic in between them. Pin together.
- Either hand stitch or using a sewing machine, sew around 3 sides of the square and just 2/3 down the fourth side. Now here is the tricky bit, using the gap, carefully turn the fabric inside out. The plastic will now be on the outside.
- Fold the edges of the open seam inwards and sew up the gap.
- Flatten out the fabric and sew just inside the seam on all four sides (this will help the fabric sit flat).
- Sew the 2cm strips of velcro onto the opposite corners of the wrap, two on inside (plastic side) and two on the outside (fabric side).

To use it

- Simply place sandwich diagonally in the middle (on the plastic side), fold up two of the opposite corners and secure, and do the same with the last two corners. And voila! you have a lovely wrapped sandwich. Under to stick to the opposite Velcro.
- Seal it up and you're good to go!

To use it

- either wipe it off with a dishcloth, or if the fabric is dirty handwash it.



ACTIVITY 3.3.C PLASTIC WRAP SNAILS

Plastic food wrap is an enormous problem in school lunches, but it is easy to avoid if you know how. Swap your plastic wrap for reusable/sealable plastic bags, purchase a good lunch box, or simply change to un-waxed paper that can be composted or fed to worms.

Plastic Wrap Snails are an awesome way to visually show how much plastic food wrap is used in school lunches. Firstly you need to save your glad wrap for a week. Hopefully you can persuade people to clean it before they store it.

You'll need a few volunteers to help.

Materials:

- Plastic food wrap (1 weeks worth)
- Tape measure
- Permanent marker
- Glue/tape
- A board/ large piece of paper

Instructions:

1. Save your plastic food wrap for a week. (Hopefully you can persuade people to clean it before they give it to you).
2. Twist all the pieces into little ropes which you tie together.
3. Once you have an enormous length of plastic wrap, measure it and attach it to the board/ paper in the shape of a snail's shell.
4. Draw on the snail body and there you go.



ACTIVITY 3.3.C EXTENSION

Now is the time to promote packaging free lunches in school. At the end of the term, make another snail and compare it to your first one - have you reduced your plastic food wrap?

WASTE FACTS

SOUTHLAND WASTE STATISTICS

- Southlanders throw out 4,500 bus-loads of rubbish each year on average.
- Almost half (42 %) of the waste to landfill in Southland is compostable i.e. foods scraps, organic material, garden waste, kitchen waste.
- Timber is the second largest material in the landfill at 11%.
- Paper and Plastic make up 21 % of the materials found in the site.
- Over 48 tonnes of glass is dumped in the landfill each week.

Source: Southland Waste Analysis Study November 2007

THE LIFE OF LITTER

How long does it take for rubbish to breakdown?

Paper	2.5 months
Orange Peel	6 months
Milk Carton	5 years
Cigarette Butt	10 -12 years
Plastic Bag	10 - 20 years
Disposable Nappy	75 years
Tin Can	100 years
Beer Can	200 - 500 years
Styrofoam	Never (immortal)

Source: NZ Zero Waste Trust

GLASS FACTS

- Glass is one of the earliest man-made materials. In 4000BC glass was used in the Middle East as decorative beads.
- Glass is made from four main ingredients - sand, soda ash, limestone, and other additives for colouring or special treatment.
- In the glass manufacturing process, extra raw materials can be added to give it a particular colour or quality. For example iron is added for a brown or green colour, cobalt for blue, alumina for durability and boron to improve resistance to heat or cold.

Source: Recycle Now

PACKAGING FACTS

- Packaging makes up less than 12 % by weight of the NZ household waste stream.
- Over 50 % of packaging waste is imported into NZ
- Over 95 % of New Zealanders have access to facilities to recycle paper, glass, cans and plastics 1 and 2 and 77 % of NZ Councils offer households a kerbside recycling service.

Source: Packaging Council of NZ

STEEL FACTS

- Steel is the worlds most recycled material.
- Steel packaging is used for drink cans, food and pet food cans, paint cans, aerosols and containers of many other household and industrial products.
- The average NZ family uses 6 steel cans per week.
- Today's steel can weighs 40 % less than it did 30 years ago - saving raw materials and making lighter work of the weekly shopping basket.

Source: CANBAC - Steel Can Recycling Campaign NZ

NAPPY FACTS

- A baby will need up to 6,000 nappy changes for the first two and a half years. At 50cents per nappy that equals \$3,000 being thrown into the landfill (and excludes the refuse cost).
- Modern cloth nappies cost less than half that of disposables and there are further savings if you reuse them on your second or third child.
- Most parents save \$500-\$1,000 in the first year of the baby's life. Scaled up over the nappy wearing life of two children and you can save over \$5,000!
- An estimated 1 million nappies are landfilled every day in New Zealand - this is based on 145,000 children under 2 and half using 6-7 disposables per day.

For more nappy facts visit NZ Zero Waste Trust

PLASTIC BAG FACTS




- Every year 4 million New Zealanders use 1 billion plastic shopping bags.
- A person's use of a plastic check-out bag can be counted in minutes - however long it takes to get from the shops to their homes.
- In the marine environment plastic bag litter is lethal, killing at least 100,000 birds, whales, seals and turtles every year.
- Over 40,000 plastic check-out bags are dumped in landfills every hour in NZ.






Source: Plastic Bag-Free NZ

PLASTIC FACTS

PLASTIC IDENTIFICATION CODE

Visit <http://www.plastics.org.nz/default.asp> for more information

SYMBOL				
	Type of Plastic	Properties	Common Uses	Recycled In
 PET	PET Polyethylene Terephthalate	Clear, tough Solvent resistant, barrier to gas and moisture, softens at 80°C	Soft drink and water bottles, salad domes, biscuit trays, salad dressing and peanut butter containers	Pillow and sleeping bag filling, clothing, soft drink bottles, carpet
 PVC	PE-HD High Density Polyethylene	Hard to semi- flexible, resistant to chemicals and moisture, waxy surface, opaque, softens at 75°C, easily coloured, processed and formed	Crinkly shopping bags, freezer bags, milk bottles, ice cream containers, juice bottles, shampoo, chemical and detergent bottles, buckets, rigid agricultural pipe, milk crates	Recycling bins, compost bins, buckets, detergent containers, posts, fencing, pipes
 PVC	PVC Un-plasticised Polyvinyl Chloride PVC-U Plasticised Polyvinyl Chloride PCV-P	Strong, tough, can be clear, can be solvent welded, softens at 80°C Flexible, clear, elastic, can be solvent welded	Cosmetic containers, Electrical conduit, plumbing pipes and fittings, blister packs, wall cladding, roof sheeting, bottles garden hose, shoe soles, cable sheathing, blood bags and tubing, watch straps	Flooring, film and sheets, cables, speed bumps, packaging, binders, mud flaps and mats

SYMBOL	Type of Plastic	Properties	Common Uses	Recycled In
 PE-LD	PE-LD Low density Polyethylene	Soft, flexible, waxy surface, translucent, softens at 70°C, scratches easily	Plastic food wrap, garbage bags, squeeze bottles, black irrigation tube, garbage bins	Rubbish bin liners, pallet sheets
 PP	PP Polypropylene	Hard but still flexible, waxy surface, softens at 140°C, translucent, withstands solvents, versatile	Dip bottles and ice cream tubs, potato chip bags, straws, microwave dishes, kettles, garden furniture, lunch boxes, blue packing tape	Pegs, bins, pipes, pallet sheets, oil funnels, car battery cases, trays
 PS	PS Polystyrene	Clear, glassy, rigid, brittle, opaque, semi-tough, softens at 95°C. Affected by fats and solvents	CD cases, plastic cutlery, imitation 'crystal glassware', low cost brittle toys, video cases	Coat hangers, coasters, white ware components, stationery trays and accessories
 PS-E	PS-E Expanded Polystyrene	Foamed, light weight, energy absorbing, heat insulating	Foamed polystyrene hot drink cups, hamburger takeaway clamshells, foamed meat trays, protective packaging for fragile items	
 OTHER	OTHER Letters below indicate ISO code for plastic type e.g. SAN, ABS, PC, Nylon	Includes all other resins and multi materials (e.g. laminates). Properties depend on plastic or combination of plastics	Car parts, appliance parts, electronics, water cooler bottles, packaging	Car parts, concrete aggregate, plastic

PLASTICS AT HOME – AN INVESTIGATION

Look around your home for things packaged in plastic (with the symbols numbered 1 – 7) and fill in the chart below.

1. Which plastic code number was the most common (occurred the most frequently)?

.....

2. Which plastic code number(s) were rigid (not bendable)?

.....

3. Which plastic code number(s) were clear in colour?

.....

4. Which plastic code number(s) were squeezable?

.....

WRAP IT UP



ACTIVITY 3.3.G MAKING GLASS

The Making of Glass

The following activity simulates the making of glass, substituting sugar for sand. Glass is manufactured by heating sand, lime and soda until the mixture melts. After it cools, it is poured into moulds and injected with air. By participating in this activity, students will gain an understanding of the heat and energy required to melt and make the glass mixture, and of the process involved in glass manufacturing and recycling.

Materials:

- 1 cup sugar
- Electric frying pan or hot plate and pan
- Sheet of glass
- 1/4 cup water.

Instructions:

1. Heat the water. When it boils pour in the sugar. Stir this mixture vigorously over heat until the sugar is dissolved, (about 5 minutes)
2. Carefully pour the mixture onto the sheet of glass. (If the glass is small enough, set it inside a cookie sheet to prevent run over). Allow to cool, about 15 minutes. Then hold up the two sheets of glass so students can see through them. By allowing it to set overnight, the "glass" will become frosted.



ACTIVITY 3.3.H MOULDING GLASS

The Moulding of Glass

The following activity simulates the moulding of glass. All bottles and jars were once made by glass blowers who blew bubbles with the molten glass mixture and formed them into shapes which hardened as they cooled. Injecting air into the molten glass mixture in a mould forms manufactured bottles and jars. By participating in the following activity, students will understand how glass is moulded during the recycling process.

Materials:

- Stiff straw or glass tubing
- Balloon
- Wide-mouthed jar
- Rubber band to hold the balloon to the straw.

Instructions:

1. Fix the balloon onto the end of the tube or straw with the rubber band. Put the balloon into the jar and ask students to blow up the balloon to fill the jar, which acts as a mould.

Notes :

CHAPTER FOUR

CREATE YOUR OWN EDEN



Over half of the waste generated in the school environment is organic. This chapter looks at ways to recycle food and garden waste at school through methods of composting, worm farming and Bokashi.

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Composting	Students will: <ul style="list-style-type: none"> Investigate and understand the processes involved in composting. Learn the benefits of composting at school. Understand the term 'decomposition' and what can and can't be composted. 	3.1 Make a Miniature Composter	104
Worm Farming	Students will: <ul style="list-style-type: none"> Investigate and understand the processes involved in worm farming. Learn the benefits of worm farming at school. 	3.2 Make a Miniature Worm Farm	108
Decomposers	Students will: <ul style="list-style-type: none"> Identify and name the organisms that are known as 'decomposers'. Identify the role of decomposers and explain why they are important in the composting process. 	3.3.a Decomposer Scavenger Hunt 3.3.b 'I have, who has' game.	110 112-113

CURRICULUM LINKS

VISION (What we want for our young people)

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PRINCIPLES (Foundations of curriculum decision making)

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Students will develop knowledge and understanding of:

- How composting works.

Values (to be encouraged, modelled and explored) - Students will be encouraged to value:

- Community and participation for the common good;
- Ecological sustainability, which includes care for the environment;
- Innovation, inquiry and curiosity by thinking critically, creatively and reflectively.

Key competencies (capabilities for living and lifelong learning), such as:

- Thinking - make sense of information, experiences and ideas;
- Using language, symbols and texts representing information;
- Manage self by making plans, managing projects and developing strategies for meeting challenges.

Achievement objectives from selected curriculum statements that could be used as a focus for the environmental education topic 'Where Does Our Waste Go' these include:

- ***English - Speaking, Writing and Presenting: Ideas***
Select, form and communicate ideas on a range of topics.
- ***English - Speaking, Writing and Presenting: Purposes and Audiences***
Show an increasing understanding of how to shape texts for different purposes and audiences.
- ***English - Listening, Reading and Viewing***
Show an increasing understanding of how language features are used for effect within and across texts. Identifies oral, written, and visual features used and recognises and describes their effects.
- ***Nature of Science - Participating and Contributing***
Explore various aspects of an issue and make decisions about possible actions.
- ***Science - Living World: Life Processes***
Recognise that there are life processes common to all living things and that these occur in different ways.
- ***Social Sciences - Social Studies***
Understand that events have causes and effects.
- ***The Arts - Visual Arts: Developing Practical Knowledge***
Explore and use art-making conventions, applying knowledge of elements and selected principles through the use of materials and processes.

Suggested learning experiences that could enable students to meet the learning outcomes of environmental education in association with achievement objectives from selected curriculum statements

- Creating and sustaining a composting system within the school.
- How to build a miniature composter
- How to build a mini worm farm
- Decomposer Scavenger Hunt
- "I have who has" game.

Notes :

CREATE YOUR OWN EDEN



INTRODUCTION

'Create Your Own Eden' provides lessons and activities surrounding methods of Composting, Worm Farming and Bokashi at school. This chapter will enable students to learn the benefits of these composting processes, understand the term 'decomposition' and learn what can and can't be composted.

COMPOSTING

Compost is a mixture of organic material and is used as fertiliser. Generally, the ingredients used to make compost come from our gardens and kitchens (food scraps) although organic material is anything that was once living. Compost results from the eventual decomposition or break down of the ingredients. It can take anywhere between 2 and 18 months before compost is ready to use. The length of time is governed by the method employed, what gets put into the bin, the time of year and how often the material is turned.



WORM FARMING

Compost can also be produced using worms. This is known as worm farming. It is also called 'vermiculture' or vermicomposting. Tiger worms are used for worm farming in NZ, though red worms can also be used. Worm farming uses the same principles as composting, but it does not generate heat, making it cold composting. Value is added to the materials when they are eaten and excreted by the worms. This produces what is called vermicast (soil) and worm tea (liquid) which have high levels of nitrogen, phosphorous and potassium compared to ordinary soil. This makes them valuable for your plants' leaf growth, root and stem strength.



BOKASHI

Bokashi was developed in Japan and literally means 'fermented organic matter'. A fermented wheat bran mixture called Compost-Zing is used in a bucket system where food is literally pickled. The final product has a slight sweet/sour smell.

The Bokashi bucket system consists of a few simple elements. A two-bucket system with one nested on top of the other. The top bucket has a tight fitting lid and holes in its base to drain to the lower bucket. In addition there is a bag of Compost-Zing made from wheat-bran and untreated sawdust that has been mixed with molasses and water and Effective Microorganisms.

You can make your own system as long as it is airtight. Old paint buckets which have been cleaned out work. Drill holes in the base of the top bucket and sit inside the other one. A good seal is very important.

The following activities have been reproduced with permission from the Create Your Own Eden website. This is only a selection of key activities in relation to composting that the Create Your own Eden resource has available.

To find out your local suppliers of compost bins, worm farms, bokashi systems and garden waste disposal sites please contact the team at WasteNet or you're local Council.

TIP : Visit www.wastenet.org.nz and see the 'Composting @ School' resource to use in addition to the information provided in this chapter. The 'Composting @ School' resource provides practical assistance and checklists to ensure schools make the correct choice of composting system and to ensure that the construction, set up, maintenance and monitoring of each school compost system runs smoothly.

Notes :

LESSON ONE :

COMPOSTING

OBJECTIVES

Students will:

- Investigate and understand the composting process
- Learn the benefits of composting at school
- Understand the term 'decomposition' and what can and can't be composted.

BACKGROUND

This lesson is ideal for creating an individual research tool for students. Students can create their own indoor compost unit by adding different types of organic matter that will break down. They can observe the actual composting process in action, especially if a clear container is used (the organic matter will decrease in size and become unrecognisable). Students can compare composter design, the moisture content and nutrient ratios of mixtures to be composted, and the quality of the end compost product. The 'Make Your Own Composter' activity (3.1) may take around 2- 3 weeks to complete.



ACTIVITY 4.1A MAKE A MINIATURE COMPOSTER

Materials:

- Newspaper or cloth to protect surfaces while making the composter
- One container for each group of students (choose one of the following: an ice cream or yogurt container, a large jar or glass, or a soft drink or milk bottle with the top cut off).
- Soil (or finished compost)
- Organic waste material from the kitchen and garden such as food scraps, paper, leaves or grass clippings (see the compost recipe for a detailed list)
- A dark piece of plastic or a small piece of carpet to cover the compost
- Water
- Labels for the containers
- Ruler
- Thermometer
- Magnifying glass
- Gloves
- Camera.



The following diagram shows you how to properly layer materials into the miniature composter:



Compost Recipe:

- **Greens** – these are nitrogen-rich organic waste materials such as kitchen food scraps (with the exception of meat and cooked food), fruit and vegetable peels, ground coffee beans, tea bags, grass and plant clippings, hair, fur, blood and bone, and seaweed.
- **Browns** – these are carbon-rich organic waste materials such as dried leaves, sawdust, wood shavings, hay, vacuum cleaner dust, shredded paper and newspaper, egg shells, crushed sea shells and wood ash.
- Visit www.wastenet.org.nz/HomeAndGarden/Garden for more information and facts on the composting process. You can also download a poster showing the materials that can and cannot go into a compost system.

Instructions:

1. Arrange the newspaper over your work areas for protection.
2. Label each container with the names of the materials you will compost in them and/or how you will layer the material.
3. Add the soil along with the green and brown organic wastes into the container in the following way:
 - **Start with:** 3-5cm soil layer dampened with water
 - **Layer:** 2cm of green and brown materials
 - **Add:** 3cm soil (or finished compost)
 - **Layer:** 2cm of green and brown materials
 - **Cover:** with a small piece of carpet or another 3cm soil layer.
4. Enclose the composter in a sheet of dark plastic if a clear container is used.
5. Measure and record the temperature of the composter.
6. Measure and record the height and the temperature of the materials in the composter daily to begin with, then approximately every 4 days. You can also take pictures and record your observations if you are using a clear-sided composter.
7. Check the composter to ensure it is still moist. Add water if it is brittle or dry.
8. You may try mixing the compost once a week to allow air to mix with the ingredients.
9. Use your finished compost on the garden or on pot plants after you have reviewed your results.

(Note: In these small systems the temperature may reach its peak within the first 24 hours.)

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COMPOSTING TIPS:

- Decomposition in a compost bin works best when there are slightly more brown materials than green materials (by volume) present and these materials are moist and aerated.
- Do not use dairy or meat products in your miniature compost.
- Layer compost to get the best results.
- Composting on a small scale will work best if you add materials no larger than 1-2cm.
- Always wear gloves when handling organic waste.

Notes :

Discussion Questions

- Can you predict which organic items will break down quickly?
- Can you predict which organic items will take a long time to break down?
- Can you graph and discuss the temperature and height results?
- How long does it take to compost using this method?
- What does the end compost product look like? Smell like? Feel like?
- How does the temperature vary over time?
- How does the 'lid' (carpet, plastic or soil layer) aid the development of the compost?
- Does mixing aid the development of the compost?
- When and where is the most heat produced?
- Does the type of organic matter used affect the compost product?
- Does the type of organic matter used affect the amount of moisture produced?
- Does the type of organic matter used affect the time it takes to compost?
- What effect does layering have?
- Which of the different sized or shaped composters work best?
- How long does it take for the composter to make compost (compare your results to your initial predictions)?

LESSON TWO :

WORM FARMING

OBJECTIVES

Students will:

- Investigate and understand the processes involved in worm farming
- Learn the benefits of worm farming at school.

BACKGROUND

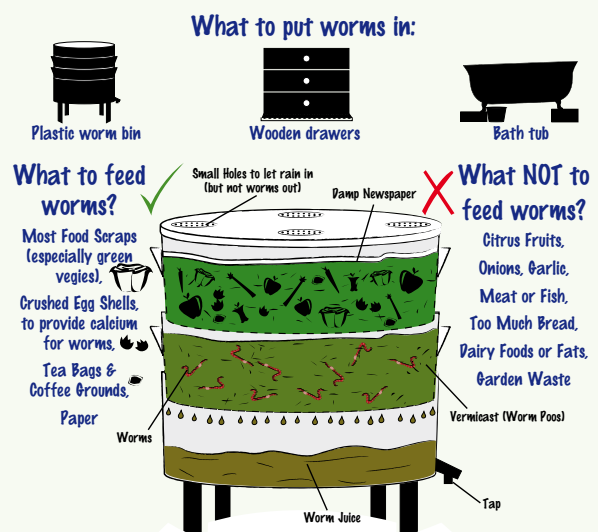
You can create a miniature worm farm inside your classroom (as part of a technology lesson), as worms will live in most containers.

The worms will produce worm castings in the top layer of the soil or bedding in the miniature worm farm. This is their 'poo', which contains many essential nutrients and minerals to enrich the soil.

The worms will produce worm tea in the bottom layer of the worm farm. This is their 'wee', which also contains many essential nutrients and minerals to enrich the soil. Worm tea is used on plants as a liquid fertiliser, diluted 1:10 parts of water.

Although worms are omnivores and will eat both plant and meat products, it's best to feed them only plant-based material to avoid rotting material. Foods that worms like include most fruit and vegetable scraps (with the exception of citrus fruit), tea bags and ground coffee beans (from the school staff room), and even eggshells (which also help to keep the worm farm alkaline and keep pests away). Avoid dairy products and too much bread as this is not readily digested by the worms and may go mouldy.

Visit www.wastenet.org.nz for more information, facts and additional learning activity ideas, as well as a poster showing the materials that can and cannot go into a worm farm.





ACTIVITY 4.2A

MAKE A MINIATURE WORM FARM

Materials:

- Two ice cream or yogurt containers (or similar) and one lid
- Food scraps
- Newspaper and cardboard
- Water
- Worms (collected from another worm farm; or purchased – do not use earthworms)
- Soil or compost
- Weighing scales.

Instructions:

1. Drill or pierce at least 6 holes into the base of one of the containers. This becomes the top layer of the worm farm and is placed into the second container, which will collect the liquid generated by the miniature worm farm.
2. Shred a sheet of newspaper and soak it in water. Squeeze out the excess liquid until it is the texture of a damp sponge. Pull the paper apart and place it into the container with the holes in the bottom. The holes and the entire base need to be covered.
3. Add a small amount of soil or compost to the top container on top of the paper.
4. Weigh the worms and record their weight. Then place the worms into the top container, spreading them in the soil over the newspaper. They will use the newspaper and soil as a bed and a dark place to hide.
5. Weigh out the same amount of food as the weight of worms put into the farm. This is approximately the weight of food they will need every day (don't worry about the weekends).
6. Make holes in the lid for air and place the lid on the top of the container so that the worms have a dark, aerated environment.
7. Place the worm farm in a cool, shady part of the classroom.

8. View the worms regularly and record or discuss how much food they eat, where they are located in the miniature worm farm, or how much worm wee they produce.
9. Remove the liquid or 'worm wee' from the bottom container by removing the top container and tipping out the liquid collected in the bottom container. 'Worm wee' may take several weeks to appear and water can be added to the top container if needed.
10. At the end of the term/unit, the worms can be released into an existing worm farm or the compost bin where they will continue their good work!

Discussion Questions:

- Why are worms important to us?
- Is there a certain type of worm that we should use for a worm farm?
- What actually happens inside a worm farm? What do the worms do and what happens to our food scraps?
- Can you predict what types of organic waste the worms will like best? Why do you think this?
- Can you predict what foods worms won't like? Why do you think this?
- How much food will the worms eat in one day, in one week, and in one term?
- When we open our worm farm, why don't we see any worms on top of the food pile?
- Where are all the worms and why are they there?
- Will we have too many worms if they just keep eating?
- What can we do with the vermi-liquid ('worm wee') produced?
- What can we do with the worm castings produced?
- What types of food should be in our lunch box so that the worms will eat healthily like us? This may lead into a discussion on nutrition.

DECOMPOSERS



ACTIVITY 4.3.A DECOMPOSER SCAVENGER HUNT

Materials:

- Small containers such as yoghurt pots
- Newspaper to spread out the soil
- Toothpicks or tweezers
- Magnifying glasses
- Compost freshly collected from the lower layers of the compost or worm bin
- Decomposer Scavenger Hunt worksheet (page 111).

Instructions:









1. Take about 1/2 cup of material from the compost bin using the container and empty the contents on to newspaper. Move the material around with the toothpick/tweezers to find some decomposers. Use a magnifying glass to help identify what they are.
2. Use the Decomposer Scavenger Hunt worksheet to record how many of each kind of decomposer is found. Alternatively, use the following website to identify the decomposers:
 - www.landcareresearch.co.nz/research/biosystematics/invertebrates/invertid/
3. When finished, please remember to return the insects and other organisms to the worm farm or compost bin so that they can carry on their good work!

Discussion Questions:

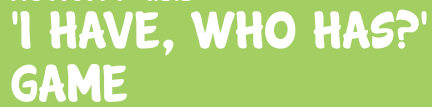
- Can you predict what kinds of insects you will find in compost?
- What insects do you think should not be in compost?
- The insects and animals found in compost are called decomposers. What does this mean and what function do they have in compost?
- Can you find any ants? These shouldn't be in there – what can be done to help get rid of them?
- Do the decomposers appear to like certain kinds of organic waste? You might be able to tell from old uneaten food in the compost.
- Can you identify a particular decomposer and investigate more about its lifecycle?
- Visit www.wastenet.org.nz for more information, facts and additional learning activity ideas, as well as a guide to setting up a school compost bin, worm farm or bokashi system.

Notes :

DECOMPOSER SCAVENGER HUNT

	Type of bug	Number of bugs found	Special features
	Tiger Worm		
	Ant		
	Earwig		
	Centipede		
	Slater		
	Slug		
	Snail		
	Millipede		
	Other		

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'I HAVE, WHO HAS?'



<p>WHO HAS: what is a landfill?</p> 	<p>I HAVE: a place where waste is disposed of.</p> <p>WHO HAS: what is the first of the 3 R's?</p>	<p>I HAVE: reduce.</p> <p>WHO HAS: name three ways we can recycle our food scraps.</p>
<p>I HAVE: put in a compost bin, worm farm or bokashi.</p> <p>WHO HAS: what does biodegradable mean?</p>	<p>I HAVE: able to breakdown.</p> <p>WHO HAS: what does organic material mean?</p>	<p>I HAVE: anything that was once living.</p> <p>WHO HAS: what are three things we can all do to minimise waste?</p>
<p>I HAVE: reduce, reuse and recycle.</p> <p>WHO HAS: What types of worms are commonly used in worm farms?</p>	<p>I HAVE: tiger worms.</p> <p>WHO HAS: how can our school find out how many food scraps we throw away each day?</p>	<p>I HAVE: do a waste audit.</p> <p>WHO HAS: where is the best place to keep a worm farm?</p>
<p>I HAVE: in a warm, sheltered place somewhere away from direct sunlight and rain.</p> <p>WHO HAS: name five things that worms like to eat.</p>	<p>I HAVE: fruit and vegetable scraps, tea bags, coffee grounds and crushed eggshells.</p> <p>WHO HAS: name five things that worms don't like to eat?</p>	<p>I HAVE: meat and milk products, shiny paper, citrus fruit and spicy foods.</p> <p>WHO HAS: name the four things that worms need in order to live.</p>
<p>I HAVE: food, moisture, oxygen and a warm temperature.</p> <p>WHO HAS: does a worm's head grow back if it is cut in two?</p>	<p>I HAVE: no.</p> <p>WHO HAS: how much food do worms eat each day?</p>	<p>I HAVE: their own body weight worth.</p> <p>WHO HAS: where is the best place to keep a compost bin?</p>
<p>I HAVE: in a sunny spot, on the soil.</p> <p>WHO HAS: what are the two types of materials that compost bins like?</p>	<p>I HAVE: green materials (providing nitrogen) and brown materials (providing carbon).</p> <p>WHO HAS: what are two types of green materials?</p>	<p>I HAVE: kitchen scraps and grass clippings.</p> <p>WHO HAS: what are two types of brown materials?</p>
<p>I HAVE: newspaper and sawdust.</p> <p>WHO HAS: how long does compost usually take to make?</p>	<p>I HAVE: anywhere between 2 and 18 months.</p> <p>WHO HAS: what is the name of the compost system developed in Japan?</p>	<p>I HAVE: bokashi.</p> <p>WHO HAS: what is the special mix put in bokashi to help the food to pickle?</p>
<p>I HAVE: compost zing (containing microorganisms).</p> <p>WHO HAS: what can you put in a bokashi that you can't put in a compost bin or worm farm?</p>	<p>I HAVE: cooked and uncooked meat and fish.</p> <p>WHO HAS: what sort of containers is bokashi usually put in?</p>	<p>I HAVE: buckets (one inside another).</p> <p>WHO HAS: since bokashi doesn't smell, where is it OK to keep your buckets?</p>
<p>I HAVE: in the kitchen.</p> <p>WHO HAS: what are four things that compost can be used for?</p>	<p>I HAVE: gardens, forests, orchards and pot plant mix.</p> <p>WHO HAS: what are four benefits of using compost?</p>	<p>I HAVE: happy, healthy people; healthy fruit, vegetables, trees and plants; improved soil structure; and less erosion.</p>

