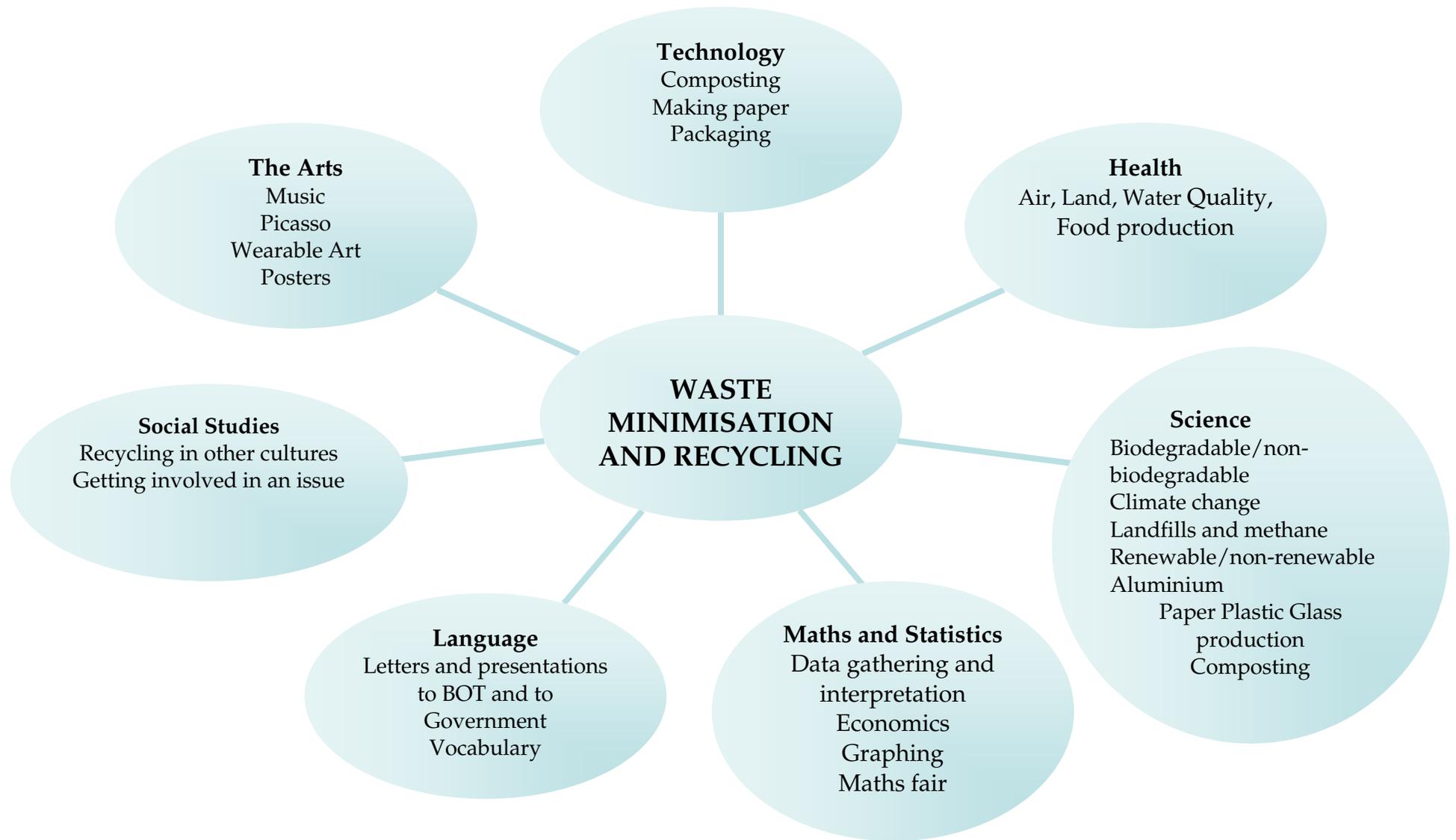


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# **Waste Minimisation and Recycling Links to the New Zealand Curriculum**

Waste minimisation and Recycling has many links to the New Zealand Curriculum. Below are some of the more obvious ones for Science, Social Studies and Technology.

## **SCIENCE CURRICULUM**

### **Making Sense of the Living World**

#### **Achievement Objective Level 4 Number 4**

Use simple food chains to explain the feeding relationships of familiar animals and plants and investigate effects of human intervention on these relationships.

#### **Achievement Objective Level 5 Number 4**

Investigate and understand trophic and nutrient relationships between producers, consumers and decomposers.

#### **Achievement Objective Level 6 Number 1**

Investigate and describe examples of different types of helpful and harmful micro-organisms.

#### **Achievement Objective Level 7 Number 4**

Research and develop a defensible position about a selected issue affecting the New Zealand environment.

### **Making Sense of the Material World**

#### **Achievement Objective Level 3 Number 4**

Research the use and purpose of technology in the disposal, or recycling, of some common materials.

#### **Achievement Objective Level 4 Number 4**

Investigate the positive and negative effects of substances on people and on the environment.

#### **Achievement Objective Level 7 Number 4**

Investigate chemical effects of human activity on the environment.

#### **Achievement Objective Level 8 Number 4**

Research the functions and use of selected groups of chemicals and describe some effects of these on people and the environment.

### **Making Sense of Planet Earth and Beyond**

#### **Achievement Objective Level 3 Number 4**

Justify student's personal involvement in a school or class initiated local environmental project.

#### **Achievement Objective Level 4 Number 4**

Investigate a local environmental issue and explain the reason for the community's involvement.

## **SOCIAL STUDIES CURRICULUM**

### **Place and Environment**

#### **Level 4**

Analyse and demonstrate how people's interactions with particular environments have changed over time, and identify trends that indicate how these might change in the future. Suggested learning context 'Caring for the Environment – Recycling in the local area'.

#### **Level 6**

Investigate the ways in which interactions between people and their environments have been regulated and explain the implications of this on people and the environment now and in the future.

### **Technology Curriculum**

Suggested learning and assessment examples for Levels 1 and 2.

Example 6 Recycling and Waste Disposal gives an excellent example of how recycling fits into the Technology curriculum.

Other examples include:

Levels 1 and 2	Paper and paper products
Levels 3 and 4	Food containers and packaging
Levels 5 and 6	Renewable and Non-renewable energy
Levels 7 and 8	Waste Disposal Systems

## Introduction

Every year the average person throws away 45 kg of plastic, 107 bottles, 160 cans and two trees (equivalent) of cardboard and paper.

Waste disposal is a hot environmental issue in New Zealand and throughout the world. People are concerned about depletion of natural resources to produce products, and pollution to air, land and water in their production. There is also the question of the energy required to keep producing new products and the effects of energy use on the environment. After the products are no longer used, the problem of what to do with them crops up. Landfills take up valuable land and can produce harmful leachate (contaminated liquid) and gases, for example methane which can harm the environment. Avoiding this environmental damage can be expensive.

Rubbish in the environment is not only unsightly but sometimes dangerous. This is especially so in the marine environment where creatures can become entangled in and choke on rubbish.

There are definite environmental benefits with natural resources being conserved through waste minimisation and the effects of energy use on the environment. The Taranaki Regional Council is committed to helping schools improve their environmental performance through the implementation of school wide waste minimisation programmes.

As well as making good environmental sense, waste minimisation, including recycling involves people taking action for the environment and this has spin-offs for other aspects of the environment. This unit of work provides information and activities on various aspects of waste minimisation and recycling with the objective being to raise awareness and encourage people to become involved in reducing the waste they produce.

## Reduce Reuse Recycle

You may have heard of the “3Rs”: Reduce, Reuse and Recycle.

These words are deliberately put in this order as we should first try to reduce the amount of waste by using less.

Next we should try to reuse material if we can by looking for ways of using things again, either for their intended purpose or for some other use.

### Activity

Children are asked to find an example of an object within the classroom which is now being used in a way that it was not originally made for. Eg a glass jar that originally contained jam is now being used as a paint container or clothes hangers now being used to hold art displays.

### Activity

Take a piece of paper that has been used on one side with the other side completely unused. Give children (depending on age level) two minutes to come up with twenty activities that the blank side could be used for.

If something has no further use then the next option is to recycle. This usually involves sending away to a recycling plant where it is broken down and reproduced into the same product or something else.

Here are some ideas for reducing waste:

- Choose goods with little packaging, this encourages manufacturers to produce less packaging.
- Buy products you use often in economy size.
- Consider buying concentrated products.
- Take your own shopping bags to the supermarket.
- Avoid disposable items and buy durable.
- Ask yourself if you really need the item.

Here are some ways to reuse materials and products:

- **Use it again** – don’t just throw it away, think of other ways it could be used.
- **Borrow, hire, share** – this allows for maximum use of products, eg tools, lawnmowers, etc
- **Sell or donate** – donate items to charities or sell them to secondhand shops when you have finished with them
- Look after things.
- **Maintain and repair items** so that you can get maximum use from them.
- **Buy second hand from opportunity shops.**
- **Join the ‘freecycle’ website**

**Activity**

Make three lists headed Reduce – Reuse - Recycle. Look at items you usually throw away and see if they can fit into one of these categories.



## Closing the Loop

The recycling of goods requires four main steps.

### Collection

This involves people having their recyclables collected at the kerbside or taking their recyclables to a collection point.

### Separation

This is done partly by people at home and by people and machines at recycling plants.

### Reprocessing

This involves taking the recyclable material and remelting it or repulping it or changing it in some way so it can be made into new products.

### Marketing

This involves selling the recycled product to a customer (the consumer). Marketing is probably the most important step in the recycling process. If we buy recycled products we are encouraging manufacturers to use recycled material. So buy recycled if you want recycling to happen, this is called closing the loop.

#### Activity

Design a poster encouraging people to buy recycled goods.

#### Activity

Write a story about two families. One family reduces, reuses and recycles and is generally friendly to the environment. The other is careless with its use of products and is not very friendly to the environment. Include things such as composting, buying using minimal packaging and recycling.

## Waste in Taranaki

In 1992 and 1994 the Taranaki Regional Council and New Plymouth District Council undertook surveys to find out what types of solid waste are being put out for regular rubbish and recycling.

The rubbish was measured by weight. In 1992 the average weight of household kerbside waste was 7 kg; in 1994 it was 7.6 kg.

### Contents of kerbside waste 1992

Organics	49%
Paper	27%
Plastic	9%
Metals	6%
Glass	4%
Other	4%
Hazardous items	1%

### Contents of kerbside waste 1994

Organics	44%
Paper	29%
Plastic	7%
Metals	5%
Glass	8%
Other	6%
Hazardous items	1%

Total weekly kerbside waste per household 7 kg

Total weekly kerbside waste per household 7.6 kg

Annual weight of household kerbside waste:

New Plymouth	338 kg
Napier-Hastings	326 kg
Tauranga	280 kg
New Zealand average	315 kg

New Zealand's average is similar to many OECD countries.

### Activity

Present the kerbside waste contents on pie graphs to visually show the difference between 1992 and 1994. Present the annual weight figures on a bar graph.

### Discussion

Discuss possible reasons for the differences in household waste content between 1992 and 1994

- Why is there less organics in 1994? (maybe more home composting)
- Why is there more glass and less plastic? (maybe a change in packaging from plastic to glass)
- What rubbish may be included in other?
- Why does New Plymouth produce more kerbside waste annually than Tauranga? (maybe Tauranga has more recycling centres, eg, bottle banks or perhaps Tauranga has smaller rubbish bags offered for collection. Perhaps average household size is smaller in Tauranga.)

## Landfills

In the 1970s landfills were largely uncontrolled and were causing some environmental damage.

In 1983 twenty landfills were operating in Taranaki. The number is now down to three, with each of these being monitored to avoid environmental harm. The major landfill is at Colson Rd in New Plymouth, there is a small one at Okato designed primarily for local use and one at Inglewood which is used for emergency purposes.

The landfills that have been closed are monitored and have been rehabilitated (filled in and planted).

### Colson Road Landfill

In New Plymouth 45 000 tonnes of rubbish go into the Colson Road landfill each year.

- 8 500 tonnes from street collections
- 15 000 tonnes from private vans and trailers
- 21 200 tonnes from industry

#### Activity

Make a pie graph showing rubbish going into the landfill.

### Recycling

Taranaki's largest recycling plant is located at Katere Road in New Plymouth. Each month 400 tonnes of recyclable waste from around the region are delivered to the site. Of that 300 tonnes are successfully recycled but 80 tonnes ends up in the landfill. Other recycling goes on in Taranaki including waste oil and battery collection, large scrap metal depots, clothing bins, etc.

#### Activity

Conduct a survey in your class to find out how many families use kerbside recycling, composting and other recycling. Present your information on a bar graph.

## **Recycling News from Around the World**

### **New York**

The world's largest landfill site is near New York City. It is 25 times the volume of one of the great Egyptian pyramids at Giza.

### **Reverse Vending in Britain**

A supermarket in Wiltshire Britain has installed a machine where you get points for returning cans, plastic and glass bottles. Customers receive one point for each bottle they return and two points for each can. The points can be redeemed in a similar way to 'Fly Buy' points in New Zealand.

### **Landfill Mining in the USA**

The USA Container Recycling Institute (CRI) calculates that 11 million tonnes of aluminium cans were not recycled but landfilled over the last twenty years. This is worth more than US \$12 billion at current prices. This raises the possibility of landfill mining to recover some of the enormous lost value.

### **Australia**

In Brunswick, Melbourne people can load up their car with prunings and cuttings and take them to the council depot. In return they receive a load of chipped mulch for their garden. The council mulches the loads that have been left so they are ready for the next month's collection. This saves the council on local garbage collection and provides residents with a valuable mulch to inhibit weed growth and lessen water loss from soil.

### **Germany**

In Germany manufacturers must take back the packaging they produce. People take their packaging back to the supermarket where they got it from.

This has the effect of making people who produce packaging responsible for it. Obviously they would try to produce less packaging as possible so they have the least to deal with.

### **Scandinavia**

In Sweden and Norway manufacturers must pay a special tax on containers they produce that can't be recycled.

### **Activity**

Think of some good waste minimisation and recycling ideas that would help save the environment by decreasing pressure on raw materials and landfills.

## Landfills in general

Society has always had places to dispose of its rubbish. Archaeologists can tell a lot about ancient cultures by unearthing landfills.

In the middle ages households had a midden or refuse heap which often contained human and kitchen waste. These heaps were unhygienic and a breeding ground for diseases.

More recently landfills or dumps and tips as they were known were often not managed properly. Because of the poor management, the groundwater streams and coastlines were sometimes contaminated as a result of the untreated leachate being discharged into the natural environment.

How can a landfill damage the environment?

### 1. Leachate

This is a black poisonous liquid. As the waste breaks down and decomposes it produces organic and inorganic chemicals which can contaminate the water in the landfill.

This leachate can enter rivers and groundwater and pollute it if the landfill is not properly controlled.

### 2. Landfill gas

Decomposing refuse can also produce gas. Bacteria digest large amounts of organic waste in the landfill and this produces gas which is composed of methane and carbon dioxide. Carbon dioxide and methane are greenhouse gases which contribute to global warming. These gases can also cause explosions. In New Zealand some landfills collect the methane and generate electricity from it.

These days, landfills are properly managed by users. However they do take up valuable space that could be used for other purposes. Regional Councils monitor landfills closely to ensure they do not harm the environment. Landfills continue to be monitored after they have been closed to ensure they are not harming the environment. At present in New Zealand landfilling is the best way to dispose of refuse providing they are properly managed in an environmentally acceptable way.

### Activity

Landfills are going to be around in New Zealand for a while. The more we can reduce waste, the longer the landfill can operate.

List all the ways that we can save landfill space, eg, composting rubbish, recycling, using both sides of paper, buying less, compacting rubbish so it takes up less space.

## Renewable and Non Renewable Resources

A resource such as coal or oil takes millions of years to form and can't be replaced as we use it.

Every time we make a product from a non-renewable resource we must consider that there is less of that resource left. For example, many geologists now say that we have used half of all the oil in the earth.

A renewable resource is one that can be replaced as we use it. The wind is a good example of a renewable resource.

Plants and animals are also considered to be renewable resources so when we make a product from them we know that the resource can be replaced. For example if we cut down trees to make paper we know we can grow more trees to replace the resource.

Some resources are mixed, because we use both renewable and non-renewable resources

### **Activity**

Divide a piece of paper into three columns headed **Renewable, Non Renewable, Mixed**. List products appropriately under each heading.

## **Biodegradable vs Non-Biodegradable**

Biodegradable means able to be broken down by natural processes in the environment.

Non-Biodegradable – a substance that can't be broken down in the environment.

Some products break down well in the environment and cause little damage and lend themselves well to being composted, eg, food and vegetation.

Some products are biodegradable but take a longer time to break down, eg, paper, untreated wood.

Some products take hundreds of years to break down and are not considered biodegradable, eg, plastic, glass.

### **Discussion**

List household and school waste into lists

Biodegradable and	Non-biodegradable
eg, an apple core	eg, aluminium can

### **Experiment**

Bury three items, eg, an apple core, a piece of paper, a plastic bottle – dig them up in a few weeks time to see what has happened to them.

## **Composting**

Composting is one of the best recycling efforts we can make, and we can do it at home and at school. Organic recycling or composting has been used for hundreds of years as a way of replenishing nutrients in the soil.

Plants use up the minerals and chemicals that occur naturally in the earth to form the vitamins and minerals in fruit and vegetables which are needed for the healthy development of living creatures.

### **What is compost?**

Compost is a natural, nutrient rich soil conditioner made from organic wastes.

### **Benefits to the Environment**

- Saves landfill space and reduces the possibility of leachate created from organic matter in the landfill. The leachate, a toxic liquid, can contaminate the surrounding groundwater. Organics do not break down well in landfills as they are starved of oxygen.
- Improves soil structure and texture. Compost loosens heavy clay soils allowing moisture and air to enter and gives sandy soils more density, helping to retain water.
- Helps prevent soil erosion.
- Improves aeration of the soil.
- Promotes soil fertility, stimulating healthy root development and increasing plant growth.
- Reduces the need for chemical fertilisers and pesticides.
- Attracts and feeds earthworms.

### **How does it work?**

Organic waste is broken down by organisms that live in the compost.

## Nature's Helpers

Bacteria –micro organisms that cannot be seen with the naked eye, and that secrete enzymes to digest food.

Fungi and Enzymes –help to break down the cellulose and liquid inside woody matter.

These organisms, which eat the contents of your compost bin, are helped by:

Insects, mites and nematodes – macro - organisms that you can see.

1. Earthworms – great recyclers of decomposing matter. Their castings are nutrient rich and improve soil fertility and structure.

All of these need oxygen, water and food to live.

*Source: Auckland Regional Council; 'A word on waste'*

### **Activity**

Give composting a go.

Composting will work for anyone if you follow a few guidelines.

You can make a bin at home or school. You can use a commercial bin or make your own bin from wire and stakes or boards.

Site your bin in a sheltered level area of your section where there is good drainage and access

### **Method**

- Fork the soil over; make sure there is ventilation so air can get into the bin.
- Start with a layer of coarse twiggy materials at the bottom to ensure aeration and drainage.
- Put in quantities of leaves, grass, food scraps, coffee grounds, tea bags, paper towels, fish bones, seaweed.
- Mix these with layers of dried leaves, sawdust, wood shavings, hay, vacuum cleaner dust, shredded paper, newspaper, egg shells and wood ash.
- Add some chook manure or blood and bone fertiliser.
- Keep layering your compost ensuring that it has a cover to keep warmth in.
- Occasionally turn your compost heap. This makes things happen faster and helps eliminate odours.

When the compost is dark and smells like earth it is ready to use. This may take from six weeks to six months.

**Classroom Activity**

Draw a diagram and instructions on making compost. You can use School Journal 1986 Part 3 No 1 to help you.

# Aluminium

Aluminium is a great product which can be recycled using far less energy than it takes to mine, extract and smelt it.

## Advantages of Aluminium

- Aluminium
- is easily shaped
  - resists corrosion
  - is lighter than most metals
  - conducts electricity and transfers heat
  - is not attracted by a magnet
  - is easily recycled

The aluminium can is the simplest and most efficient beverage container to recycle.

## Aluminium Production

### 1. Mining

The mining of bauxite ore.

### 2. Refining

The refining of bauxite to extract its alumina. The bauxite is crushed and mixed with caustic soda which removes impurities. This leaves a fine white powder which is heated to remove any moisture, leaving pure aluminium oxide (alumina) which is made up of aluminium and oxygen.

### 3. Smelting

To make aluminium it is necessary to separate the two elements in alumina. Electricity is passed through the alumina (electrolysis) separating the oxygen and leaving the pure aluminium. Following this, small amounts of other elements (such as magnesium, silicon or manganese) are added to the molten aluminium to give it added strength, increased resistance to corrosion or better casting properties. Different elements give different alloys.

It is poured into moulds to solidify into shapes such as ingots, blocks or logs and is known as primary aluminium. From here it is exported to the manufacturers.

### 4. Manufacturing

Aluminium can be made into many different shapes using different processes.

### 5. Rolling

The aluminium is squashed between rollers into thin sheets, plate or foil. Plate is 6 mm or thicker; sheet is from 0.15 mm to 6 mm; and foil is less than 0.15 mm thick.

## 6. Extruding

Aluminium is extruded by forcing hot round logs of metal through a pattern cut in a steel die. The main uses of extruded aluminium are in the building trade, door and window frames, shop fronts and security screens, road and rail applications, and in engineering where it is made into machinery components.

## 7. Casting

Aluminium is cast into wheel rims in Australia. These are sold all over the world.

## How Aluminium is used

Building and construction	55%
Electrical cables	10%
Transport	10%
Consumer goods	5%
Containers for packaging	15%
Industry	5%

*Source: Auckland Regional Council 'A word on waste'*

### Activities

Present the information about aluminium production and manufacturing on a flow diagram, eg, bauxite → alumina → oxide → smelting.

Present the information on how aluminium is used on a pie graph.

List as many things as you can that are made of aluminium, eg lawnmower, foil, cans.

## Kerbside Collection

### What happens?

In Taranaki we can put out a variety of material for recycling. Research the following to see if you can find out what actually happens to the following materials after they have been collected at the kerbside.?

- Aluminium cans
- Plastic milk containers
- Plastic drink containers
- Glass bottles and jars
- Tin cans
- Paper
- Cardboard

## Paper

Paper is a commodity we use almost every day at home, school and offices.

Paper usage continues to rise.

Paper is a renewable resource as long as forests are replanted and are managed sustainably.

## Activities

- Find out what percentage of NZ's paper is imported and from where.
- Find out what percentage is produced from our sustainably managed forests.
- Find out how much paper use has increased over the last 10 years.
- In recent years school have received considerably more paper from various sources eg The Ministry of Education. Can you think of ways reduce the amount of paper being sent to your school.

## Why recycle?

Making paper from waste instead of virgin pulp:

- reduces energy consumption by 40%
- reduces water use by 64%
- reduces air pollution by 74%
- reduces water pollution by 35%

*Source: Auckland Regional Council 'A word on waste'*

## The Paper Recycling Process

Recycled paper is sorted at the recycling plant and baled to make it easier to handle and transport.

Once at the recycling factory, which might be overseas the paper and water are mixed at high speed in a hydrapulper to break the paper into separate fibres.

Contaminants such as wire, plastic and string are removed before the pulp is passed through cleaning and screening equipment to remove smaller items such as paper clips, staples and grit.

The pulp is then further heated to remove any sticky substances such as glue.

The pulp is then diluted to a mixture which is 99 per cent water. Chemicals are added to strengthen the paper. This water pulp is sprayed on to a large moving belt and then dried in a drying machine.

The pulp then turns back into paper which is stored on large rolls. Much of this is used for packaging materials such as cardboard and egg cartons. Some recycled paper is used to make writing paper, envelopes, etc.

## **Activity**

### **Making recycled paper**

Equipment

bucket

sponge

blender, electric mixer or egg beater

hot water

waste paper of different colours (not glossy)

piece of fine metal mesh which will fit into a plastic tub or sink

**Extras** glitter, dried pressed flower, herbs, spices, fragrant oils (these can be added at step 2)

### **Method**

Shred paper into bucket (or blender) with hot water and whisk (or blend) until paper is pulped like a thick gravy.

Pour paper pulp into plastic tub or sink half filled with cold water.

Place fine mesh screen in tub of pulp, immerse and swirl, then lift screen straight up and out of the water.

Gently sponge the paper pulp to remove excess water.

Carefully lift corners of paper and place on a card to dry.

*Source: Water wise – Recycling Operators Forum*

## **Activities**

List all of the ways that you can save paper at school and home,

eg, using both sides of your paper

using used paper for wrapping parcels

re-using paper bags

Ask yourself if you really need to print it or can you just read it through the computer.

Discuss in groups whether computers have reduced paper use.

## **Plastic**

### **Plastic is a wonderful product**

It is inexpensive, light, versatile, durable and resistant to moisture and corrosion.

Plastic makes lightweight, durable, clean containers to protect products before sale.

Plastic makes products look attractive.

Plastic hygienically seals and preserves food.

Many plastic containers can be reused eg ice cream containers to hold crayons.

## **Activities**

Construct a chart showing the positives and negatives of plastic use.

Currently in Taranaki, only plastics with plastics codes 1 and 2 are recycled. See if you can find out why this is so and why other areas eg Kaitaia can recycle both of those numbered plastics plus others.

### **What's it made of?**

The main raw materials for making plastic are oil and gas.

But 4% of oil produced goes towards making plastic.

Plastic is also made from natural products such as cellulose (found in wood, cotton and flax), casein (from skim milk), organic acid (from coal tar), potatoes, corn, peanuts and soybeans. These types of plastics are biodegradable.

### **Recycling Plastic**

In Taranaki and most parts of New Zealand only PET (Polyethylene terephthalate) soft drink bottles (plastic code 1) and HDPE (high density polyethylene) milk containers(plastic code 2) are recycled. PET containers can be recycled into polar fleece for clothing. These are recycled into plastic pots, buckets and packing sheets. Some of this plastic is exported for recycling in Australia and China.

Ice-cream containers are thinner than they used to be, using less plastic.

Manufacturers also use the scrap plastic they produce and put it back into the manufacturing process.

### **Environmental considerations**

Plastic, because it is so durable, takes hundreds of years to break down in the environment and can look very unsightly and provide a hazard to many animals, especially marine life eg Some marine mammals mistake plastic bags for jellyfish and eat them, and can starve as a result. Animals can also be caught in plastic rings from tops of bottles so it is a good idea to cut them before discarding.

Although plastics make up only 7% of waste by weight they make up much more by volume, up to 20%.

This provides a problem for landfill operators because of the space taken up by plastic. However, it doesn't degrade and contaminate the environment.

Burning plastic waste is not good for the environment because if it is burned incorrectly it releases gaseous pollution that is harmful to people and the environment.

### **What can we do?**

Use plastics wisely (buy minimally packaged products), dispose of plastics carefully; reuse plastics at home, kindy, playcentre or school; Reuse plastic bags for shopping. Support local recycling initiatives.

#### **Activities**

Think of opportunities to reuse plastic, eg, pot plant containers, glue pots, reuse plastic shopping bags at the supermarket.

Decorate plastic containers to make them attractive.

Make a toy from a plastic container.

If you use glad wrap on your lunch, can you think of another way of keeping your lunch fresh without creating plastic rubbish.

List the ways glad wrap is used in your home and think of alternatives.

## **Glass**

- Glass is a product that enables food to be packaged hygienically.
- It can also be hygienically cleaned and refilled or recycled.
- A glass bottle can be used 100 times and then totally recycled.
- A small number of bottles in New Zealand are washed and refilled. These are called multi-fill bottles.
- Single-fill containers are broken down for recycling.

### **Environmental Benefits from Recycling Glass**

Glass is made from sand, soda ash, limestone and cullet (cullet is broken down glass chips). Using cullet means less energy is needed to make new glass as it melts at a lower temperature and mixes well with the other materials.

Clear glass needs more pure ingredients and cullet content may be as low as 15%

Green glass can have as much as 80% cullet content.

Recycling glass saves on mining silica sand from our beaches and limestone. Less soda ash, which is imported, is also used with recycled glass.

Less dangerous litter and pollution is created.

Landfill space is saved.

Energy is saved as 20% less energy is used for recycling glass.

### **Recycling Glass in Taranaki**

Kerbside recycling of glass is continuing in some parts of the region, despite this being not economically sustainable.

## Activities

Discuss:

- Why is it not economic to recycle glass in Taranaki?
  - eg, expense of delivering it to Auckland
  - imported glass is cheaper
- Why can overseas countries produce glass cheaper?  
eg, maybe a government subsidy or other economic incentives
- What should/could the government do about it?  
eg, perhaps subsidise transport or glass recycling
- How could the government encourage manufacturers to refill bottles?  
eg, make them offer a refund on bottles
- Write a letter to government saying how they should encourage more glass recycling.
- Some schools and scout groups used to hold "bottle drives" to raise money. Find out what a bottle drive is and why they were so successful as fundraisers.
- Why were bottle banks withdrawn in the 1990s?

# Bottle banks withdrawn from service

By KIM BATCHELOR

TARANAKI'S bottle banks have been consigned to the scrap heap.

Waste Management manager Dave Elder said the containers — drums used to collect glass for recycling — were removed from sites around the region at the end of December because it was no longer profitable for the company to run the service.

Bottle banks in other areas of New Zealand, apart from Auckland, were also likely to close as the company in each centre reconsidered the viability of the service, he said.

"The market has taken a big drop and it's no longer viable to operate bottle banks . . . the rate (for recycled glass) has halved in the last two years."

The price the company received for the glass had dropped 46% since 1996, and it was losing \$20 for every tonne of glass it transported for sale in Auckland, he said.

"Basically, they can import the stuff from Australia for a better price. Like most things these days it's cheaper to import it from overseas."

But Mr Elder stressed that while bottle banks had gone, residents could still recycle their glass by putting it out in separate bags with their rubbish every week. "It's really important that people know they can still recycle their glass at the kerbside."

Waste Management sorts and disposes of glass and other waste, like cardboard, paper and plastic, gathered from residential rubbish collections under contract from the New Plymouth and South Taranaki District Councils.

There had been four bottle banks in Taranaki — one on New Plymouth's Vivian St opposite St Mary's Pro Cathedral and the others in Inglewood, Oakura and Urenui — as well as several commercial ones around the region.

Since the bottle banks, which were divided into sections for green, brown

and clear glass, were removed in December there had been few problems — other than people continuing to dump rubbish near where some of the stations used to be, said Mr Elder.

"Unfortunately, people used to use the bottle banks as dumping ground. You would be surprised what we got in them."

Bottle banks were still in place next to Oaonui and Warea Schools for coastal residents who did not have kerbside rubbish recycling, said Mr Elder.

New Plymouth Liquorland manager Paul Stark said that since their bottle bank was removed on Christmas Eve they had not had any problems. "Hopefully we don't get any bottles back . . . people will have to deal with their rubbish themselves."

Liquorland had had a glass recycling station outside its store for at least nine years and had had no luck trying to get another business to provide the service, he said.

Source: Taranaki Daily News 13 Jan 1998

## **Recyclable Art and Craft**

Recycling materials for use in art and craft is a fun activity.

By using recyclable material you can use your imagination and make a good artistic statement.

As well as making an artistic statement you are making an environmentally friendly statement by raising awareness of recycling to help preserve the environment.

Here are some ideas for art and craft that make use of recycled materials. You may want to try some of them.

### **Faces and masks**

Use polystyrene dishes, or paper bags, buttons, fabric, cotton wool, cereal boxes, corks, pipe cleaners. Attach bits and pieces with glue to make a mask.

### **People and animals**

Use cardboard tubes, egg cartons, coloured wool, scraps of fabric to make people and animals.

### **Metal Collage**

Collect up old pieces of metal such as springs, paper clips, screws, chains, etc. Glue these onto a background of polystyrene or wood using a glue gun or strong glue to make a picture.

### **Model Vehicles**

Using matchboxes, egg boxes, wooden lolly sticks, corks (for wheels), glue, paints and felts make a vehicle. You can even make caterpillar tracks using corrugated cardboard.

### **Musical Instruments**

Using yoghurt pots, dried beans, sand, old jars filled to different levels with water, stretch material, tape, ice block sticks etc, you can make a variety of musical instruments and even have your own orchestra.

There are hundreds of other craft ideas and lots of books with detailed instructions available at libraries and in bookshops.

### **Decoupage**

Old cans, jars, and other containers can be painted, have pictures glued on to them in collage form and then be varnished. These make useful and visually appealing containers.

## **Clothes**

Have a wearable art competition with clothes made from recyclable materials.

## **Tin Can telephones**

Construct a telephone link by

- You will require one reasonably long length of thin string and two clean empty used cans neither containing its lid
- Drill a small hole in each of the cans and thread the string through the hole and tie a knot in the end big enough to prevent the string from coming back through
- One person at each end move away from each other until the string is tight to the point but not quite at breaking point. Trial and error may be needed here.
- Taking turns at talking and listening you should be able to have a conversation but you will need to work out when it is each person's turn to talk.
- Have fun!

## Picasso's Junk Sculptures

Pablo Picasso, one of the world's greatest artists used junk to make some of his famous sculptures or assemblages.

*"He constructed entire statues from junk collected at the Vallauris town dump by pressing pieces directly into plaster. He made The She Goat (1950) using a cropped palm frond for the goat's back, an old wicker basket for her pregnant belly, pieces of knotted wood and metal for her legs, a twisted piece of metal for her tail, grapevine roots for her beard and horns, a tin can for her sternum and two earthenware pots for her udders"*

*The Importance of Pablo Picasso by Clarice Swisher*

Picasso made a lot of other sculptures using

a broken toy car for an ape's face and coffee cup handles for ears

bicycle handle bars and seat for a bull's head

a girl from a chocolate box (for face), corrugated cardboard (for hair), a wicker basket (for body) and newspaper for a skirt and old shoes for her feet.

### **Activity**

Collect some junk as Picasso did and see if you can make a sculpture from it.

Research about Picasso and find out more about his life and art.

## Word match-up

(This could be used as an evaluation exercise before and/or after the unit of work)

Match the letters to the numbers to find out more about some recycling related terms.

a	biodegradable	1	contamination of soil, water, or the air by the discharge of waste gases or chemicals.
b	compost	2	colourless odourless gas produced from decomposing vegetable matter.
c	conservation	3	method of disposing of waste on land.
d	cullet	4	things not made from plants or animals.
e	disposable	5	not durable – designed to be thrown away after use.
f	fossil fuels	6	derived from living organisms.
g	incineration	7	using natural resources so they are available for future generations.
h	inorganic	8	derived from an endless source, able to be made new or restored.
i	landfill	9	burning of waste material.
j	leachate	10	liquid that has percolated through solid waste.
k	methane	11	valuable material – source of wealth.
l	organic	12	fuel from remains of ancient plants and animals.
m	pollution	13	able to decompose through natural activity of micro-organisms.
n	resource	14	decomposed organic matter often used for soil enrichment.
o	renewable	15	crushed glass used in glass making.

Match up – answers a-13 b-14 c-7 d-15 e-5 f-12 g-9 h-4 i-3 j-10 k-2 l-6 m-1 n-11 o-8

## **Additional activities**

The following activity pages are sourced from 'A Word on Waste' produced by the Auckland Regional Council.

They may add some reinforcement to recycling information through practical fun activities.

These may be photocopied and used as teachers wish.

## **Bibliography**

The Great Rubbish Mountain, Lands End Publishing 1992, Colin Walker

The Importance of Pablo Picasso, Lucent Books Inc 1995, Clarice Swisher

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Warmer Bulletin Nov 97-May 98, Journal of the World Resource Foundation

Wildtrack Activity Book Save it, Hodder and Stoughton NZ 1989, Donna Bryant

A Word on Waste, 1993, Auckland Regional Council