

Making Waste Wonderful Part 11

A Guide For Teachers



Helping schools and communities reduce waste

Making Waste Wonderful Teachers Resource Part 11 Teachers Notes

This booklet is designed for use in conjunction with Making Waste Wonderful Teachers Resource (Compost and Waste) issue.

Each of the units can be taught individually or as part of a series of lessons on waste issues. This series of booklets has been produced specifically for the West Coast Region and is designed as an introduction only to waste issues and their solutions. They are suitable for age nine years upwards and contain individual and group class exercises.

Others in the series

Making Waste Wonderful contains information and exercises on

- An introduction to waste.
- Composting.
- Spreading the world.

Copies are available for free download on

http://www.wcrc.govt.nz/environmental_management/waste/publications.htm
<http://www.westlanddc.govt.nz/main/Publications/>

Curriculum Coverage

The material targets the environment curriculum with some related topics fitting into the science curriculum.

- English Language: written stories, reading information, developing vocabulary and opinions introducing brainstorming.
- Maths: Compiling information on quantities of materials used. Analyse waste patterns at school. Introducing a waste minimisation programme and monitoring.
- Science: Manufacturing methods of materials such as steel, glass and aluminium

In this booklet

- Information on Steel Cans
- Information on Aluminium
- Information on Glass
- Information on Packaging
- Information on Plastic

Metals

The booklets on Aluminium and Steel Cans can be used either individually or together to highlight the difference in the two materials.

Key Concepts

Steel and aluminium cans are both used to package food items. Both types of metals are recyclable and can be used over and over again. Magnets can be used to sort aluminium from steel cans.

Learning Outcomes

Students will learn all about how steel and aluminium cans are made, the natural resources used and how they can identify and recycle them.

Materials

Magnets

Washed samples of aluminium and steel cans

Useful web site: <http://www.cansmart.org/>
<http://www.canzbac.co.nz/>

Background information

Steel Cans

Although steel cans have a very low dollar value for recycling many common household items are made from steel. Steel is mostly made from iron that is found in the earth's crust. Five percent of the earth's crust is made up of iron. Steel is made by melting naturally occurring iron ore found in rocks or sands and mixing it with coal and lime prior to smelting. The steel that is produced can be rolled very thinly or curved to make all sorts of shapes.

Steel was one of the first metals to be recycled and almost anything from cars, washing machines, and tin food cans, can be recycled. Each year, New Zealanders use more than 400 million steel cans. The average family uses six steel cans each week. We recycle less than half of these.

Steel is one of the easiest materials to recycle and is easy to recognize as it has magnetic qualities and the bottom of a steel can has a rim. Steel cans are commonly coated with tin to prevent corrosion.

Scrap metal is another financially viable activity. Steel and Iron can be reclaimed from cars, railway lines, appliances etc.

Lesson ideas

Review what recycling means and list some common recyclables

Demonstrate to students how they can tell the difference between steel and aluminum

Magnets

Demonstrate how a magnet attracts steel cans not aluminum. Experiment with other objects to show some of the materials that magnets will attract or repel. Show how cans are prepared for recycling i.e. wash and lightly squash.

Pass out cans and compare for weight, colour, texture etc.

Extra activities

How many different cans can the class collect with different labels, types of cans use newspaper ads if space or collection is a problem or a combination of both. Display them in the classroom.

Make your own musical instruments by filling various size cans with different quantities of water, encourage innovation and experimentation.

Answers to questions in the Workbooks

Metals Steel

Page 2

coal and lime

Page 3

- 1 400 million cans
- 2 48 cans 312 cans
- 3 Magnet

Page 6

1. Opinion
2. Fact
3. Fact
4. Opinion
5. Fact
6. Opinion

Aluminium Cans

Aluminium accounts for 8% of the earth's crust and is one of the most abundant minerals in nature. It comes from a clay like material called **Bauxite** which contains **Alumina**. New Zealand uses alumina that is mined in Australia.

It takes 4 tonnes of bauxite to produce 2 tonnes of alumina, which after further processing makes 1 tonne of aluminium. It takes a huge amount of energy to produce aluminium from Bauxite. Once aluminium is in a metal form it can be re-melted repeatedly with very little metal loss in the process. Of all the packaging material aluminium cans are probably the simplest and most efficient to recycle.

Aluminium is used in many industries. In the list below you can see how aluminium is used in New Zealand

- 55% in building and construction
- 15% in containers and cans
- 10% in things such as airplanes
- 10% in electrical cables that carry the power to our homes
- 5% in fridges, cookers and other household goods

Answers

Page 2

55 % building and construction
5% fridges cookers and other household goods
15% containers and cans
10% airplanes etc.
10% electrical cables

Vocabulary

Alloy
Aluminium
Bauxite
Furnace
Iron
Landfill
Magnetic
Metal
Scrap dealer
Steel cans
Smelting
Tin
Transfer Station

Glass

Key Concepts

Glass is 100% recyclable

Recycling glass saves energy and natural resources. On the West Coast glass is only separated from the waste stream and crushed. Only certain types of glass can be sorted.

Learning Outcomes

Students learn glass can be reused and recycled

On the West Coast glass is not sent away for recycling it is only sorted for crushing purposes to save space in the landfill.

Background Information

Every year we throw away thousands of tonnes of glass, which is both reusable, and 100% recyclable.

Household bottles and jars are made from a melted mixture of silica (sand), soda ash and limestone. Used glass or "cullet" is a raw material used in the recycling process. Window glass, mirror glass, crystal glass, and lightbulbs are not recycled due to their lead content.

On the West Coast due to transport issues and the fact that little to no glass is recycled from the South Island - glass is stored and crushed at a later date for landfill cover. So it is best to promote and find ways of reusing glass items and encourage the sorting of glass from the waste stream to help save landfill space

Useful web site: <http://www.recycleglass.co.nz/>

Vocabulary

Cullet

Furnace

Glass

Gob

Limestone

Molten

Pallets

Reusable

Rejected

Silica

Soda ash

Temperature

Packaging

Key Concepts

Packaging is part of our lifestyle and it can be made from glass, bottles, aluminium, cans, plastics, tins, paper and cardboard.

Packaging is used to preserve, store, move and sell goods.

Learning Outcomes

Packaging is used to transport items usually for a single trip A waste issue for the West Coast.

Advantages and disadvantages of packaging

Thinks we can do to reduce packaging

Background Information

For excellent information and further resource kits see the following web site

<http://www.packaging.org.nz/educate.php>

<http://www.pac-it.org.nz/>

Packaging represents up to 30% of the waste stream on the West Coast. Most of the goods that arrive on the Coast do so in cardboard boxes on pallets, covered in plastic wrap. Inside the boxes goods are packed in glass jars, plastics more paper and cardboard, aluminium and steel cans. Most modern packaging usually involves a single trip, reflecting changes in production techniques. Many products are over packaged. Various government departments regulate packaging as well as the packaging accord which is a voluntary organisation made up of business involved in the packaging industry.

Manufacturers and retailers only produce commercially successful products. By accepting or rejecting goods for sale, customers give messages to manufactures and retailers. From the environmental point of view the best packaging uses minimum energy and resources and is reusable and recyclable. From the producers point of view the best packaging is one that ensures the product arrives in a perfect state with the least cost. By reducing packaging we save landfill space, reduce the use of energy and resources and help preserve the environment.

Vocabulary

Carbon dioxide

Containers

Dangerous

Energy

Manufacturers

Pollutants

Packaging

Reusable

Refillable

Recycling Centre

Transport

Plastic

Key Concept

Plastics are a non-renewable resource are an inert material, and do not decompose in a landfill.

Learning outcomes

Students will be able to identify plastic items that can be recycled on the West Coast. They will understand the impact of plastics on the environment and research different ways or reusing plastics.

Background Information

Plastics now come in 60 synthetic versions Petroleum is the most important raw material for plastic. To be recycled plastics need to be collected and sorted from the waste stream then reprocessed into another product.

Different types of plastics are identified by a coding system, which assigns a number in a triangle for each of the different resin material used The numbers and identification are listed below.

On the West Coast only certain plastic items can be recycled due to lack of infrastructure and sorting facilities. The items that can be recycled in most Districts are

Milk bottles	HDPE	
Soft drink fizzy bottles such as coke, sprite		PET
Juice bottles		PET
Water bottles		PET

It is important: that recycling is done correctly with the lids discarded as rubbish and all containers washed, squashed and then sorted into the correct labelled bags Sorting may vary from one district to another and with waste minimisation services increasing all the time - check at the local council for what is currently being done throughout the coast and in your district.

Each year the average person in NZ throws away approx. 20kgs of plastic packaging. Burning of plastic household items is not recommended as plastic releases dangerous gases which are pollutants unless burning take place in controlled conditions.








Plastics are an inert material that does not breakdown in landfill conditions. We can reduce the amount of plastics we use by buying groceries in bulk using less wrap taking cloth bags to the supermarket reusing bottles and containers etc.

Useful Web site : <http://www.plastics.org.nz/>

Vocabulary

Hazard
HDPE
PET
Packaging
Marine
Reusable
Renewable
Resources

The Plastic Identification Code- 6 most common plastics

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 bottles, salad domes, biscuit trays, salad dressing and peanut butter containers	Pillow and sleeping bag filling, clothing, soft drink bottles, carpet
 PE-HD	HDPE High density Polyethylene	Hard to semi-flexible, resistant to chemicals & 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 & detergent bottles	Recycling bins, compost bins, buckets, detergent containers, posts, fencing, pipes
 PVC	PVC Unplasticised 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 & fittings, blister packs, wall cladding, roof sheeting, bottles. Garden hose, shoe soles, blood bags & tubing, watch straps.	Flooring, film & sheets, cables, speed bumps, packaging binders, mud flaps & mats
 PE-LD	LDPE Low density Polyethylene	Soft, flexible, waxy surface, translucent, softens at 70°C, scratches easily	Plastic food wrap, rubbish bags, squeeze bottles, black irrigation tube, rubbish 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 & 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-E	PS Polystyrene PS-E Expanded Polystyrene	Clear, glassy, rigid, brittle, opaque, semi-tough, softens at 95°C. Affected by fats & solvents. Foamed, light weight, energy absorbing, heat insulating	CD cases, plastic cutlery, low cost brittle toys, video cases Foamed polystyrene hot drink cups, hamburger takeaway clamshells, foamed meat trays, protective packaging for fragile items	Coast hangers, coasters, white ware components, stationery trays & accessories

NOTES

For wanted or unwanted school items check out the listings which also includes the West Coast on www.terranovalog.org.nz or contact Jim Forsman 03 336 0080 for further information. This service is free and all goods are exchanged free, many that are excess to manufacture production requirements and brand new.

Other useful links: <http://www.zerowaste.co.nz/>
<http://www.reducerubbish.govt.nz/>

West Coast Waste Management Group MFE Funding and Expected Outcomes

The West Coast Regional Council over the last three years has developed a good working relationship with MFE in relation to waste issues in the region. Approximately three years ago, MFE representatives attended a WCWMWG meeting, which lead to the development of the Regional Waste Strategy document for the West Coast. MFE also assisted in the implementation of the Hazardous Waste collection and have recently contributed to the current Waste Minimisation objectives for the Region.

The proposed MFE funding outcomes for the Waste Minimisation Project are:

- Aid in the development of waste minimisation in the Westland District
- Develop and implement a waste minimisation plan for the Wildfoods festival.
- SWAP analysis to be completed at Westport, Hokitika and Greymouth landfills.
- Expand the West Coast Waste exchange services.
- Develop the education material required for kerbside recycling in the Buller District.
- Regional education programme expanded and delivered