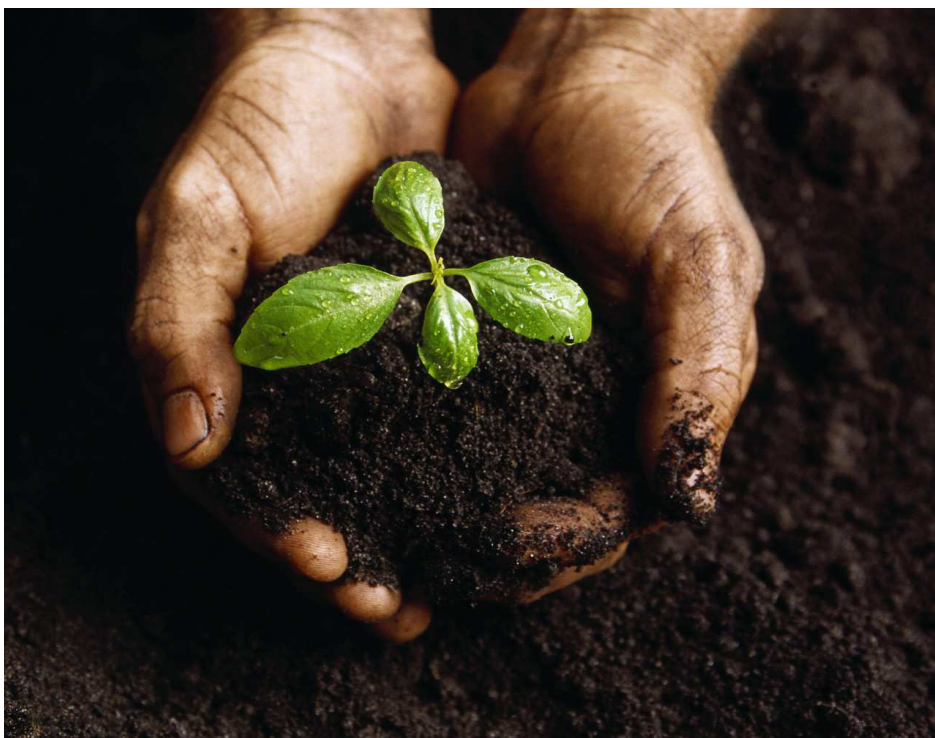


Making Waste Wonderful

A Guide For Teachers



Helping schools and communities reduce waste



Forward

MFE Funding and Expected Outcomes

The West Coast Regional Council over the last two years has developed a good working relationship with MFE in relation to waste issues in the region. Approximately two years ago, MFE representatives attended a West Coast Working Waste Group meeting, which led to the development of the Regional Waste Strategy document for the West Coast. and have recently contributed to the current Waste Minimisation objectives for the Region.

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

- Report on the current situation of waste minimisation on the West Coast.
- Financial and economic report on waste for the region.
- SWAP analysis to be completed at Westport and Greymouth landfills.
- Waste exchange and waste directory implemented.
- Farm plastic and Agricultural chemical waste investigated.
- Regional education programme implemented.

Introduction

Welcome to Making Waste Wonderful a West Coast Working Waste Group teaching resource for the West Coast funded by the Ministry of the Environment Sustainable Management Fund.

This teaching resource can be used in conjunction with The Reusable Bag Challenge and contains additional and complimentary material. Making Waste Wonderful can be downloaded from the West Coast Regional web site and from your local West Coast District council web site.

Answer pages are included in this booklet with a Glossary at the back.

The booklet is suited for children from the ages of nine to twelve years and is divided into three sections

- *All about Waste*
- *All about Composting*
- *All about spreading the word*

Most sections contain a range of activities at a mix of levels, so that you will be able to find something in each section for a class working at any level.

It is possible to do one or two self-contained activities from each section.

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: Compare the effects of composting, recycling and landfill. Composting process, and establishment and recording of composting unit. Research into other composting processes and microorganisms. Setting up and observation of trials.

Contents overview of this education resource

Section 1 All about waste

An overview of all the different types and sources of waste in N.Z. and how they are dealt with. Outline of effects waste has on the environment, simple classroom waste audit.

Specific learning outcomes are to:

- √ Think and develop concepts about generating and reducing waste.
- √ Appreciate that the waste problem starts with each one of us – as do the solutions.

Section 2 All about Composting

Kitchen and garden waste are the biggest components going to our landfill. Although it is a problem in landfills it is also a valuable resource that is not being used.

Composting methods, conditions, microorganisms / insects involved and setting up a bin are outlined. Students opinions are identified and expressed.

Specific learning outcomes are to:

- √ Encourage students to think of waste as a resource.
- √ Familiarise students with the composting process and composting methods that can be used.
- √ Set up a working composting bin and evaluate the resource produced.

Part 3 All about spreading the world

Changing people behaviours and attitudes towards waste and understanding barriers to change. Brainstorming different ways of dealing with waste issues

Specific learning outcomes are to:

- √ Understand community concerns about waste disposal.
- √ Developing listening and communication skills.

How long will it take?

The extended nature of some projects make it difficult to design a 45 minute lesson so the information has been presented under topic headings which can be selected and extended over several lessons.

Background Information on Waste Reduction

Waste is a failure to think. It's not only the amount of waste we produce but also what sort of waste it is. A great deal of what goes into our rubbish bin is not useless at all and is in fact a valuable resource. As a society we tend to use things once and then throw them away. We throw waste away, but where is away. Usually "away" means into our bins that then it goes to the local landfill. There is really no such thing as waste until we as a society decide to throw it away.

Over the last 20 years the waste we generate has been steadily increasing. This suggests that we are using more and more energy and resources. This impacts on the environment in many ways – the destruction of wildlife habitats, air and water pollution, and deforestation. It also means we are disposing of more and more materials most of which ends up in landfills where it contaminates ground water and creates leachate. Up to sixty five percent of waste in our landfill is made up of biodegradable/green material, which causes leachate and in fact can be composted. Most of what enters our landfills can in fact be recycled in some form or another.

We all create waste when:

- We go shopping and accept plastic bags
- We put fruit and vegetables into a plastic bag that is not necessary
- We throw something into the bin rather than thinking about whether it could be reused, recycled or composted.

The big question is "whose responsibility is the waste that is produced?" The answer is we are all responsible for the waste that we as individuals produce.

All sectors of society; governments, communities, industry, businesses and individuals must rethink their actions so that they no longer base their actions and viability on wasting the earth's limited resources.

It is important for each student to be actively involved and for each student to be aware of the impact of both neglecting and addressing waste issues. Student involvement and participation should not just be in their schools but also in their communities. Young people are a powerful force and their enthusiasm and involvement is underutilised in community decision-making.

Answers and Ideas

General Ideas

Provide references for additional materials to complete activity pages. Suggestions include: A dictionary, a thesaurus, and copies of the Making Waste Wonderful glossary.

With or without a compost bin

Not all activities require a compost bin. You can purchase compost bins from any Garden Centre or hardware store. A recommended bin that has proven performance on the West Coast is available by mail order from Composting for Shore

Email: Louise@compostingforshore.co.nz

Web site: www.compostingforshore.co.nz

Ph 09 445 9392

Answers

Answers for most activity pages are included. Post answers in the classroom so students may evaluate their own work.

Vocabulary

Technical terms specifically relating to waste and composting are defined in the Glossary. Present difficult words and their definitions to students on introduction of each activity.

Background information and content

The background information needed to complete the activities is included in the wasteformation and compostformation section with the activity page

Specific Answers

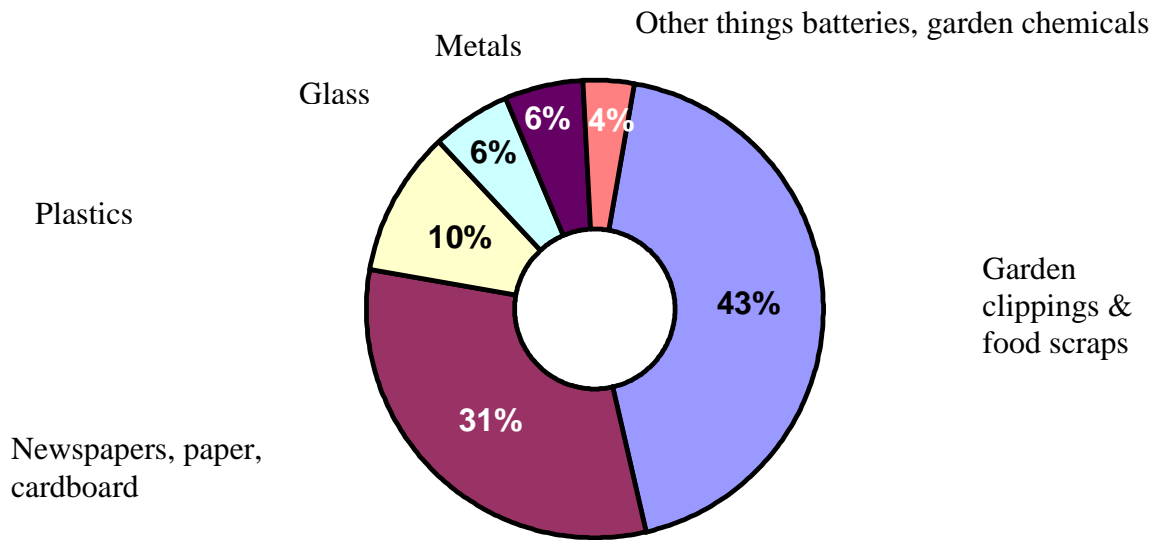
Page 5

What is my group 1. Animal 2. Mineral 3. Plant 4. Mineral 5. Animal

Bonus activity: 1. Shark 2. Sand (silica) 3. Trees 4. Aluminium 5. Duck

Page 6

Pie Chart



Page 7

Observations should show that organic materials such as paper and food scraps have started to break down albeit very slowly. Plastic and metal will be as at the start of the trial. Discuss the implications of this in a landfill, as materials like these will remain buried for many years and will have to be looked after by future generations. Materials do not decompose in a landfill as there is no air and landfills that have been opened after 50 years, have shown that even food does not always decompose, as a hot dog with teeth marks could be clearly seen.

Page 8.

Categories of waste listed may include

- Paper
- Aluminium
- Steel
- Glass
- Plastic (note types)
- Food waste

Discussion

- ❖ What waste items did the class generate the most of?

- ❖ What kinds of resources were used to make these items? (animal, plant mineral)
- ❖ How much of the waste is packaging?
- ❖ What are some alternatives to this kind of packaging?
- ❖ How can you reduce the amount of waste you produce every day?
- ❖ Which of the items can be Reduced? Reused? Recycled?
- ❖ How easy is it to recycle at your school? What might help? E.g. Decorate a box or container to be placed in each classroom for different items for reuse or recycling.

Results

- ❖ What percentage of your sample was material that could be recycled or reused.
- ❖ Have students develop a pie chart that shows what's in your classroom waste stream.

Page 9

Get the students to read out their story and discuss some of the ideas

The discussion can be around the following

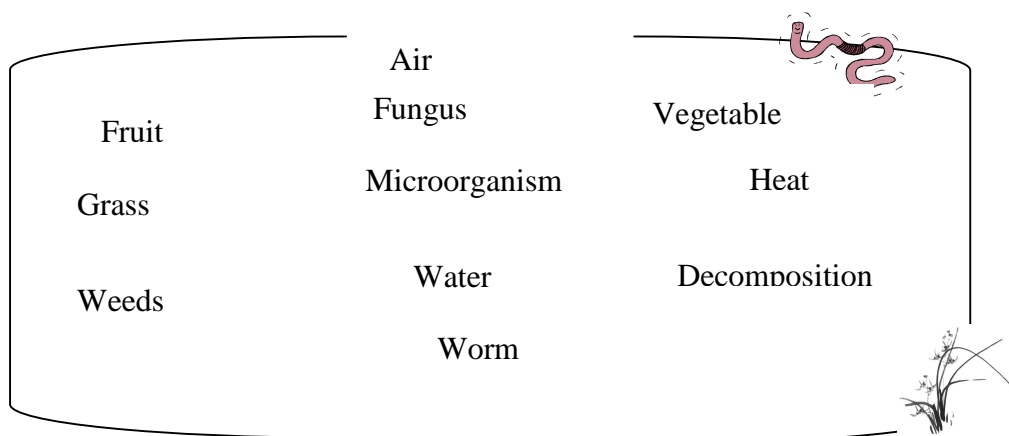
- ❑ Analyse advertisements – discuss the need for all the ‘junk’ advertising mail.
- ❑ Spend money thoughtfully i.e. do I really need that product or just want it as it's the latest “cool “ thing to have.
- ❑ Do you think young people shop a lot? Is this okay?
- ❑ What impact does the products you buy have on other people and the environment?
- ❑ Do you think people know and understand about these issues?
- ❑ Do opinions change with education? Has your opinion changed now you have studied waste?

Page 10

Just the facts 1. False 2.True 3.True 4.False 5. True 6. True

Additional activity Rewrite the sentences so all sentence are true and then false

Page 12



Page 14

Ask students to discuss their opinions and feeling about composting in general
Students will vary in their views about which statements are facts and which are opinions. Allow students to present rationales for their choice
Discuss compost heaps at home and if they have problems and if so why do they think that is?

- T A compost heap needs living organisms to break down the materials
- O Every classroom should have a compost heap
- O Compost is “yucky”
- T Compost needs air
- O All compost heaps smell
- T A compost heap needs lots of different ingredients

Page 14

Use the glossary for answers 1-3 Have dictionaries available for students to look the words up in.

Actinomycetes are also known as Actinobacteria

Page 20

Other composting methods would include worm farming and EM bucket fermentation
Use of web sites is a good research tool some suggested sites www.bokashi.co.nz
then click on useful information.

www.globalnet.org.nz/schools_projects/resources/Wormlinks. This is not a good connection as it brings up another page Click on Global net – School Projects and your on the worm section This web site also has waste links and other projects

Recycled containers could include old pallets, tin sheets, plastic drums, old buckets, old baths, stainless steel sinks etc.

Page 24

From the top of the page 1. False 2. False 3. True 4.True 5.True 6.False

Another source of local information is Christchurch City Council waste education site

Glossary

Actinomycetes: Fungi- like bacteria involved in the composting process. New name for this group is Actinobacteria

Aeration: Exposure of a medium to air to allow the exchange of gases.

Air: Mixture of atmospheric gases, including nitrogen, oxygen carbon dioxide, and other similar gases in smaller quantities.

Animal: A living being capable of sensing its environment and moving about. Animals live by eating the bodies of other organisms, whether plant or animal.

Bacteria: A single celled organism that can only be seen with a microscope. Bacteria may be shaped like spheres, or rods. Some bacteria cause decay whilst other may cause disease. Most bacteria are beneficial because they help recycle nutrients.

Cellulose (Brown Stuff): Cellulose is found in wood, leaves, prunings and paper fibres, and is an inert compound containing carbon, hydrogen, and oxygen.

Compost: Biological reduction of organic waste to a soil like material. Used to refer to both the end product and the process.

Decompose: To decay, to rot, to break down into smaller particles

Decomposition: The process of breaking down complex materials into simpler substances.

Environment: surroundings, habitat.

Experiment: To conduct research by changing variables to answer a specific question.

Fungi: A large group of having no green colour and reproduce by spores. The group includes mushrooms, toadstools and microscopic plants such as moulds and mildews. *Fungus:* a member of the plant group fungi. The plural of fungus is fungi.

Leach: To run water through a medium, causing soluble materials to dissolve and drain off.

Leachate: A liquid waste from landfill formed when water and other liquids pass through layers of waste. It is usually toxic and must be treated before it can be disposed off.

Microorganism: Organism requiring magnification to see.

Mineral: A naturally occurring substance found on the earth, which is not an animal or a plant. Minerals have distinct properties such as colour or hardness.

Mould: A downy or furry growth on the surface of organic matter, caused by fungi, especially in the presence of damp conditions.

Nitrogen: An odourless colourless tasteless gas, which make up to four fifths of the earth's atmosphere.

Organic: Made from living plants and animals.

Organic matter: Material, which comes from something, which was once alive.

Organism: Any individual living thing.

Oxygen: Gaseous element in the earth's atmosphere, what we breathe to stay alive.

Plant: An organism, which is green at some stage of its life and use the energy from the sunlight to produce its own food. Plants do not move about on their own. A cabbage tree is a plant.

Useful terms:

Commercial and Industrial waste: Waste from offices factories, shops and hospitals

Green waste: Waste from the garden and food scraps.

Household waste: Waste created at home

Landfill: Land where waste is dumped and later buried. Also known as the dump, or rubbish tip.

Recycle: To process and old product into a new one

Reduce: To create less waste

Re-use: To use a product again for the same use or a different one without going through any process.

Resources: Raw materials to make new products.

Transfer Station: A place where waste can be taken and is transferred to a truck that takes it to the landfill. Most transfer stations have places where you can take items for recycling or reuse.

Acknowledgements:

Worms Eat Our Garbage Mary Appelhof

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