Environmental Education Programme

Brought to You By
The Napier City Council Waste Minimisation Team

Waste Aware half-day programme and pre-visit activities

Produced by Dr Amelia McQueen

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How to use the pre-visit activities…

Schools participating in the Waste Aware half-day programme are expected to complete pre-visit activities before the session at the Marineland Environmental Education Centre. 'Did you know' facts and suggested pre-visit activities will assist in the extension of the 'waste topic' learning within the school during the full term.

Select any of the pre-visit activities and templates provided below and if need be develop them further to suit the level of learning of the class or use them to help focus student driven inquiry. Pre-visit activities or ideas can also be used as a 'spring board' for own ideas for activities.

The 'Did you know' facts and suggested pre-visit activities by no means cover all topics on solid waste; rather they give a selection of ideas that can be used while teaching the Waste Aware topic. Web sites and other resources that provide extra ideas are listed at the end of this resource.

Pre–visit activities:
A chance to assess attitudes and values before the programme and to 'set the scene' for the school Waste Aware project.

- *Brainstorm 'waste' – what does it mean to the children.*
- *Discuss 'what is the problem'? List the problems with waste. To get you started refer to the 'Did you know facts'. Ask the children to write down 3 facts, 2 interesting things they know about and 1 question that they have about the waste topic. See below for the 321 template sheet.*
- *Take newspaper clippings about solid waste issues and other issues relating to rubbish. Paste clippings onto a classroom poster.*
- *Ask the children to create a school 'solid waste' questionnaire and test it on target groups within the school. Suggested questions: How do you feel about waste? Would you pick up dropped rubbish and put it in the bin? What happens to the waste after it goes in the school bin? Whose responsibility is it to reduce waste in the school? Whose responsibility is it to take rubbish away from the school? The questionnaire can be used again after the programme is completed to assess changes in attitudes. See below for sample questionnaire.*
- *Fill in the 'what would you put in a landfill?' sheet or have a discussion/debate about what items should go in a landfill (e.g. old shoes, gladwrap, plastic bottles, tin cans, an old Christmas tree and food scraps). The quiz sheet below can also be used after the programme visit.*
- *Investigate the local landfill. Make a small scale model of the landfill – note on the model where garden rubbish, whiteware, and general rubbish goes. Are there areas within the landfill which are set aside for rubbish in the future? Are there any special liners on the bottom of the landfill to stop leakage? Why do landfills cost so much money to operate? Hint: Check out the websites about Omarunui landfill and 'how to make a landfill model' at the back of the pre and post programme activities.*
- *Ask the children to research about the life-cycles or foodwebs of marine creatures e.g. seals or little blue penguins – how long does it take these animals to reach maturity? How many babies do they have per year? How does rubbish/pollution affect the populations of animals. Hint: check out Marineland of New Zealand website below. See life-cycle templates for little blues and fur seals.*
- *Make mobiles and posters using the foodweb concept. Hint: see the* "Did you know..." *facts below for information and diagram of a simple marine foodweb.*

- *3R's- Create word tower posters using the words Reduce, Reuse, Recycle. Discuss why the 3R's are in this order. See suggested activity sheet below for ideas.*

- *Where does our recycled rubbish go? Ask the class to research about recycling in Hawke's Bay (check out the* 'Did you know' *fact box and AllBrite website below). The students could link their findings to the class world map. Extension of the activity: Have a class discussion to determine if transporting waste is feasible in the long-run.*

- *Bag grab – create a game where children pull a picture of rubbish out of the bag. The children could either individually talk about the rubbish or have a group discussion about the item of rubbish. For example questions that could be asked/answered – Is the item organic/inorganic? Is it biodegradable? Should the rubbish item go to the landfill? How could we reduce the packaging? Could the item be reused or recycled? Is the item made in New Zealand? See pictures of 'rubbish' that could be used for this game below.*

Did you know…

What is the problem?

Solid Waste; items such as metal, wood, food scraps, paper and plastic that *we have decided* are no longer needed. Many of the products we consume today are disposable and we have easily fallen into the trap of being a 'throw away' society. This mentality has lead to other problems with our solid waste and particularly landfills where the solid waste is disposed of.

Finding suitable landfill sites is often difficult (No-one wants a landfill in their backyard!) and even the very best, state of the art landfills have the potential to pollute our soils, air, rivers and oceans.

Many solid waste items such as plastic, steel, aluminium, paper and cardboard can take 100 years to break down and others such as polystyrene may never break down. As well as looking unsightly and smelling bad, solid waste can have serious impacts on our environment and wildlife.

As solid waste breaks down in a landfill, leachate and methane gas is generated. Leachate is a combination of rainwater, organic compounds (e.g. garden rubbish and food scraps) and heavy metals (e.g. tin, batteries and steel). Leachates are bad news especially once they leak into soils and streams. The heavy metals in leachates are toxic to most soil and freshwater invertebrates (e.g. fungi, insects, worms and snails) as well as to plant life. Therefore, leachates can have wide-spread effects on food webs in many different environments. Leachates leaking into groundwater can cause serious health problems to humans as well. Methane gas is a by-product of decomposition of dead material and is one of the 'greenhouse' gases that may lead to an increase in global temperatures.

Furthermore, solid waste such as plastic not going in the right place can also cause serious harm to wildlife. For example, plastic bags floating on the surface of the sea, to a dolphin or a seal can resemble a jellyfish. The dolphin or seal that mistakenly swallows the bag may suffocate or starve to death because the plastic bag stops digestion.

A modern, well–designed and operated landfill is the best option for managing our rubbish. It is up to us to ensure that only the right types of solid waste end up in the landfill.

So what can we do?

Being conscious about what happens to our rubbish is a good beginning…

Start acting… REDUCE the rubbish we create, reuse and set up recycling at our work places, use compost and worm farms to dispose of our food scraps, be a discerning consumer (e.g. select foods with less packaging). You can make a difference by writing letters and letting government and manufacturers know what changes you think are required.

Did you know…

Average person in Napier produces 9.6kg of rubbish per week. All of Napier residents rubbish combined is the same weight as 9 city buses, every day! Each year around 120,000 tonnes of waste goes into Omarunui landfill (the equivalent of 13,300 city buses!).

The break down of rubbish can take 100s of years… Here are some estimates on how long rubbish items take to decompose (under ideal conditions):

Food scraps (orange peels, banana and avocado skins, apple cores) 2weeks –6months
Loose paper 2-4 weeks
Plastic bags 10-20yrs
Plastic bottles 10-20yrs with UV light or maybe longer …100yrs
Chip packets 20-30yrs
Nappies 75yrs
Tin Cans 100yrs
Aluminium cans 100-500yrs
Glass bottles 1 million years
Polystyrene - NEVER!

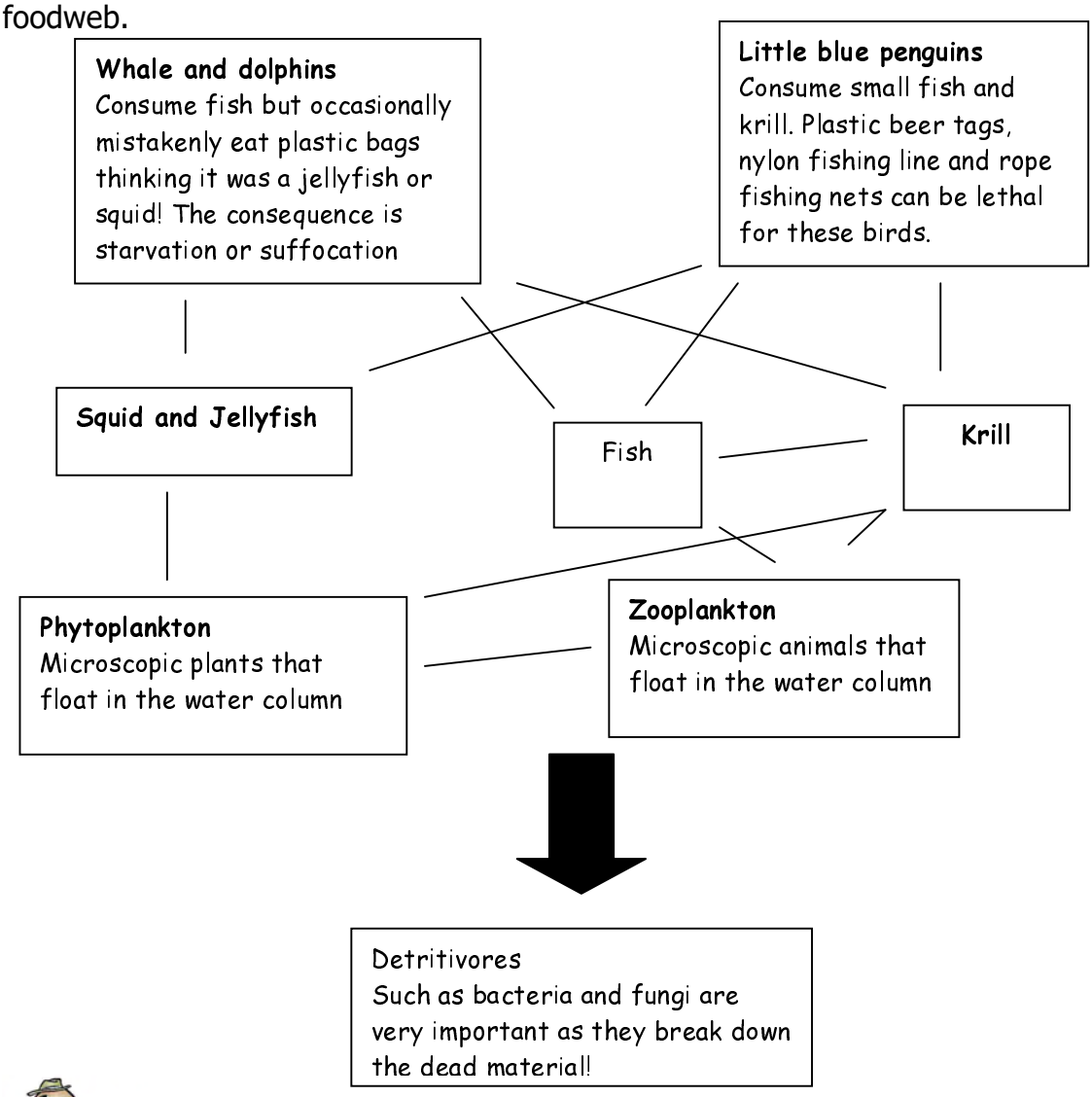
Information source from National Aquarium of New Zealand, Marineland of New Zealand, Te papa Museum display material and New York Times.

Leachate is a slimely slurry that is produced by the break down of organic material combined with rainwater, various minerals and other contaminants. Leachates generally have high concentrations of organic carbon, nitrogen, chloride, iron, manganese, phenols and heavy metals. Leachates have the potential to contaminate soils, water systems and their associated foodwebs. To stop the leakage of leachate many landfills have liners and in some cases leachates are extracted from landfill for recycling (flushed back over landfill to aid in further solid waste decomposition) or taken away for treatment.

Methane gas is a potent greenhouse gas and must be captured and burned. Methane is typically captured via a network of pipes called wells. The gas is then burned and may be used to generate electricity.

Did you know…

Marine foodwebs are incredibly complex and can easily be affected by human pollution and over-consumption. The diagram below shows a very simple marine foodweb.



Marineland housing policy – Marine animals are not taken from the wild and intervention with injured animals is kept to a minimum e.g. removal of nets, rope etc, treatment of oiled animals, euthanasia if necessary. Some rescued animals are released if they recover well enough but long term residents are not released back into the wild as they are no longer able to fend for themselves.

Did you know…

The three R's stand for REDUCE, REUSE and RECYCLE. Reducing the rubbish we create and thinking carefully about what rubbish goes into a landfill is important. We can reduce the rubbish created by assessing what we buy, reusing items – the old saying 'one man's junk is another man's treasure' and recycling…

In Hawke's Bay we can recycle; paper, newspaper, cardboard, tin cans, glass (clear, green and brown glass), aluminium and plastic (all types) (see 'AllBrite' website for more details). Hazardous chemicals, petrol, cleaning chemicals and paint can also recycled by the Hawke's Bay HazMobile Collection (see Napier City Council and Hawke's Bay Regional Council websites for more details). Foodscraps and garden rubbish can be used for compost or worm farms. For more details check out the following websites:
www.ccc.govt.nz/Waste/Composting/MakeYourOwnWormFarm.pdf.
www.zerowaste.co.nz (look under what you can do)

Recycling at home and school is easy. It only takes few steps! Here's how it can be done:

1) Get some large cardboard boxes (supermarkets usually give them away). Kids can paint them funky colours.
2) Assign a box to each of the recyclable items.
3) During the week rinse out the recyclable items, squash and place in the boxes. Once the boxes are full, place items in used plastic bags or boxes (or in the case of paper and cardboard tie string around it) and put out for kerbside recycling.

So where does it go?

- Paper and cardboard are recycled in national and international places and are made into a range of items e.g. writing and toilet paper, magazines, insulation, egg cartons.
- Tin cans are recycled in Auckland where they are made into fencing wire and reinforcing bars for the building industry.
- Glass is recycled in Auckland and is made into bottles and jam jars. Recycled glass can also be used for sandblasting, water filtration and tile manufacturing.
- Aluminium is recycled in Australian smelters and is made into office chairs or new aluminium cans.
- Plastic is recycled in national (e.g. Christchurch and Otaki) and international places and is made into recycling bins, carpets and polar fleece clothing.

Note: A lot of New Zealand recycling is shipped overseas! Plastic is sent to international markets where it is recycled into plastic lumber or used in road construction. Paper is sent to Indonesia and Aluminium is sent to Australia and Asian markets for recycling.

Waste Aware 3 2 1 - what do you know?

Write 3 facts that you know about waste:

Write 2 interesting things that you know about waste:

Write 1 question that you have about waste:

WASTE AWARE SOLID WASTE QUESTIONNAIRE

Test this questionnaire on target groups within the school (e.g. teachers, groups of students).

- *How do you feel about waste?*
- *Would you pick up dropped rubbish and put it in the bin?*
- *What happens to the waste after it goes in the school bin?*
- *Whose responsibility is it to reduce waste in the school?*
- *Whose responsibility is it to take rubbish away from the school?*
- *What do you know about wormfarms?*
- *How you can reduce the rubbish you create?*
- *Do you recycle more rubbish at your home or at the school?*

Add some of your own questions here:

What would you put in the landfill??

Paper

Should./should not go in the landfill because...

Nappies

Should./should not go in the landfill because...

Old toaster

Should./should not go in the landfill because...

Tin cans

Should./should not go in the landfill because...

LANDFILL

Old shoes

Should./should not go in the landfill because...

Polystyrene

Should./should not go in the landfill because...

Plastic bottles

Should./should not go in the landfill because...

Old Christmas tree

Should./should not go in the landfill because...

Gladwrap

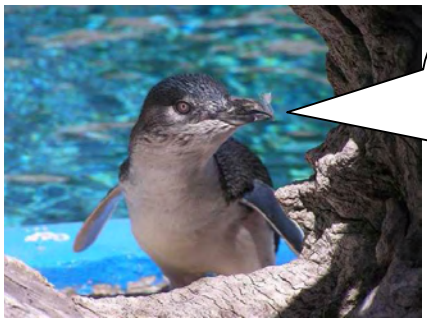
Should./should not go in the landfill because...

Foodscraps

Should./should not go in the landfill because...

WASTE AWARE - Little Blue penguin life-cycle

Fill in the gaps...



Hi, I'm an adult Little Blue
I live for ___ years.
In a good year I lay ___eggs
and look after ____chicks.

Hi, Juvenile Penguin here!
It takes me _____ years to reach maturity. Things I have to watch out for in the meantime are_____
_____

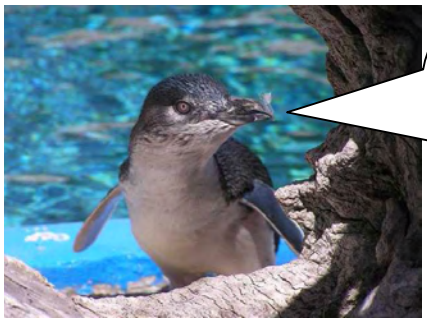
Hi there,
I stay in my nest for 6-8 weeks and then I set off on my own. My parents feed me on
_____

Hey guys! *How could rubbish/pollution affect the little blue penguin population? What can we do to help out?*

_____
_____
_____
_____
_____
_____
_____

WASTE AWARE - Little Blue penguin life-cycle

TEACHERS COPY



Hi, I'm an adult Little Blue
I live for 8-10 years.
In a good year I lay 2 eggs
and look after 2 chicks.

Hi, Juvenile Penguin here!
It takes me 2-3 years to reach maturity. Things I have to watch out for in the meantime are_people, pollution, orcas, sharks, seals and leopard seals.

Hi there,
I stay in my nest for 6-8 weeks and then I set off on my own. My parents feed me on regurgitated fish and little squid.

Hey guys! *How could rubbish/pollution affect the little blue penguin population? What can we do to help out?*

WASTE AWARE – Fur seal life-cycle

Fill in the gaps…

Hi,
I live for ___ years. I eat _____
In a good year I have _____pup.

Hi! Juvenile seal here!
It takes me _____ years to reach maturity. Things I have to watch out for in the meantime are_____

Hi there,
Mum feeds me on milk for up to ____months. During this time, I learn to swim and catch fish. After this, I'm on my own!

Hey guys! *How could rubbish/pollution affect the fur seal population? What can we do to help out?*

_____
_____
_____
_____
_____
_____
_____

WASTE AWARE – Fur seal life-cycle

TEACHERS COPY

Hi,
I live for 12-14(male), 14-16 (female) years. I eat fish, squid and odd penguin.
In a good year I have 1 pup (have pup every year from year 5 onwards!).

Hi! Juvenile seal here!
It takes me 5yrs (female), 6-7yrs (male) years to reach maturity. Things I have to watch out for in the meantime are people, fishing nets, pollution, sharks, leopard seals and orcas.

Hi there,
Mum feeds me on milk for up to 10 months. During this time, I learn to swim and catch fish. After this, I'm on my own!

Hey guys! *How could rubbish/pollution affect the fur seal population? What can we do to help out?*

How many times can you write Reduce, Reuse, Recycle in the word tower???

Waste Aware - Environmental Education Programme. Bag Grab pictures of rubbish. *Have a group discussion about these pictures – should the rubbish go in the landfill?*

References and other useful resources and links…

Napier City Council – information about kerb side rubbish collection (FAQs), what can be recycled, composting and Omarunui landfill.
www.napier.govt.nz

Hastings District Council – information about rubbish, recycling and wormfarms, the history of Omarunui landfill and parts of the land fill (a good diagram).
www.hastingsdc.govt.nz

Hawke's Bay Regional Council – information about the pollution hotline and environmental education.
www.hbrc.govt.nz

AllBrite's recycling – Information about the recycling process (i.e. where the rubbish is recycled) and what recycled products are used for.
www.allbriteonline.com/recycling_know_how

Hawke's Bay Waste Exchange – information about how companies and people exchange and reuse waste. Check out the success stories.
www.nothrow.co.nz

Zero Waste– information about what you can do, definition of what waste is and much much more.
www.zerowaste.co.nz

EnviroSchools – information about the programme and examples of enviroschools and what they have done. Extra resources on the waste topic.
www.enviroschools.org.nz

Making a model landfill – A guide to making a student model landfill.
www.dnr.state.wi.us/org/caer/ce/eek/teacher/pdf/recycle/k3/MakingAModelLandfill.pdf

Christchurch City Council – Loads of great information about waste, recycling and wormfarms.
www.ccc.govt.nz

Auckland Regional Council – Loads of great information about waste, and recycling.
www.arc.govt.nz

Ministry for the Environment – Detailed information about environmental issues effecting New Zealand. Some information about leachates.
www.mfe.govt.nz/issues

Reduce your rubbish – information about 'the problem', recycling, shopping environmentally, making a difference at work.
www.reducerubbish.govt.nz/problem/index.html

What's your next step – information about how to take steps to being more sustainable in your daily life.
www.sustainability.govt.nz

Biodegradable plastic bags – about the plastic bags that degrade even in the open air. Contact details for purchasing biodegradable plastic bags.
www.eco-pal.co.nz or www.degradable.net

Plastic information – information about plastic and useful information for the plastic debate
www.plastics.org.nz

Why PVC is bad news – information about the problems with polystyrene.
www.organicdirect.co.nz/resources

Plastic debate – resource notes for junior school project about plastic.
www.calibre.co.nz/plastics.htm

Packaging in New Zealand – information about the principles behind packaging and a teachers resource.
www.pac-it.org.nz

Victoria University School of Architecture – Student designs on ways to use and reuse plastics and polystyrene.
www.victoria.ac.nz/architecture/sustainability/plastics_polystyrene.aspx

The Cell phone debate – Information about the 'life-cycle' of the cell-phone, ideas about reducing and recycling.
www.epa.gov/epaoswer/education/pdfs/life-cell.pdf

Landfill leachate – information about what is leachate? and other useful information about landfills.
www.portfolio.mvm.ed.ac.uk/studentwebs/session4/7Leachate.htm

Trash goes to school – information about landfill leachate and other school activities.
http://cwmi.css.cornell.edu/TrashGoesToSchool/Landfill.html

How to trace leachates from landfills – information about a university students prize winning study.

www.frst.govt.nz/news/2005/MacdiarmidOverallWinner-Jun05.cfm

Lechates and effective waste management – another Christchurch City Council resource.
www.ccc.govt.nz/Publications/EffectiveWasteManagement/Unit4.pdf

Marineland of New Zealand – Amazing facts about marine animals such as common dolphin, NZ fur seal and little blue penguin.
www.marineland.co.nz

National Aquarium of New Zealand – Check out the environmental issues pre and post visit resource.
www.nationalaquarium.co.nz

Rubbish and the marine environment – What your school can do and rubbish collection along the coastline.
www.sirpeterblaketrust.org/environment/care-for-our-coast_results_summary.

Ecology-on-line, tui time – Information about life cycles and decomposition (especially about worms!).
www.tuitime.org.nz

A word on waste – A teaching unit out there on rubbish.
www.arc.govt.nz/albany/fms/main/Documents/Council/Education

Reduce, Reuse, Recycle: Unit plan – A teaching unit on rubbish.
English.unitecnology.ac.nz/resources/units/recycle/home.html

Tidiness – A teaching resource.
www.ccc.govt.nz/KeepChristchurchBeautiful/Resource/TidinessTeachingResorce.pdf

TKI Reduce, Reuse, Recycle: Unit plan – A teaching unit on rubbish.
www.tki.org.nz/socialscience/curriculum/SSOL/recycle/index_e.php

Education world – information about 3R's, taught in five lessons.
www.educationworld.com/a_lesson/lesson308.shtml

Useful books:

City Green. Dyanne Desilvo-Ryan, Harper Collins, 1994.

Creative costumes: recycle material to make fun costumes. Ecocrafts, Kingfisher, London, 2007.

Dealing with waste. Morgan,S. FranklinWatts, London, 2006.

Don't throw it out. Baird and editors of Yankee Magazine, 2007.

Dream bedroom: use recycled materials to make cool crafts. Ecocrafts, Kingfisher, London, 2007.

Earth Day Hooray! Stuart J. Murphy, Harper Collins, 2004.

Guidelines for Environmental Education in N.Z. Schools. MoE, Learning Media. 1999.

How to Succeed with Education for Sustainability. Josephine Lang, Curriculum Corporation, Australia, 2007.

It's True! This book is a load of rubbish. Deborah Burnside, Allen &Unwin, 2005.

Jazzy jewellery: recycled materials to make cool accessories. Ecocrafts, Kingfisher, London, 2007.

Recycle every day! Nancy Elizabeth Wallace, Marshall Cavendish, 2006.

Rubbish! Everything you ever wanted to know about rubbish, landfills, recycling and worms. Goddard, R., Reed, Auckland, 2007.

Rubbish and recycling. Stephanie Turnbull, Usborne, London, 2005.

The great trash bash. Loreen Leedy, Holidayhouse, 2000.

The Lorax. Dr. Suess, Random House, New York. 1999.

The paper bag prince. Colin Thompson, Dragonfly books, 1997.

The stinking story of rubbish. Daynes, Katie, Usborne, London, 2006.

The Three Fishing Brothers Gruff. Ben Galbraith. Hodder Children's Books, London. 2006.