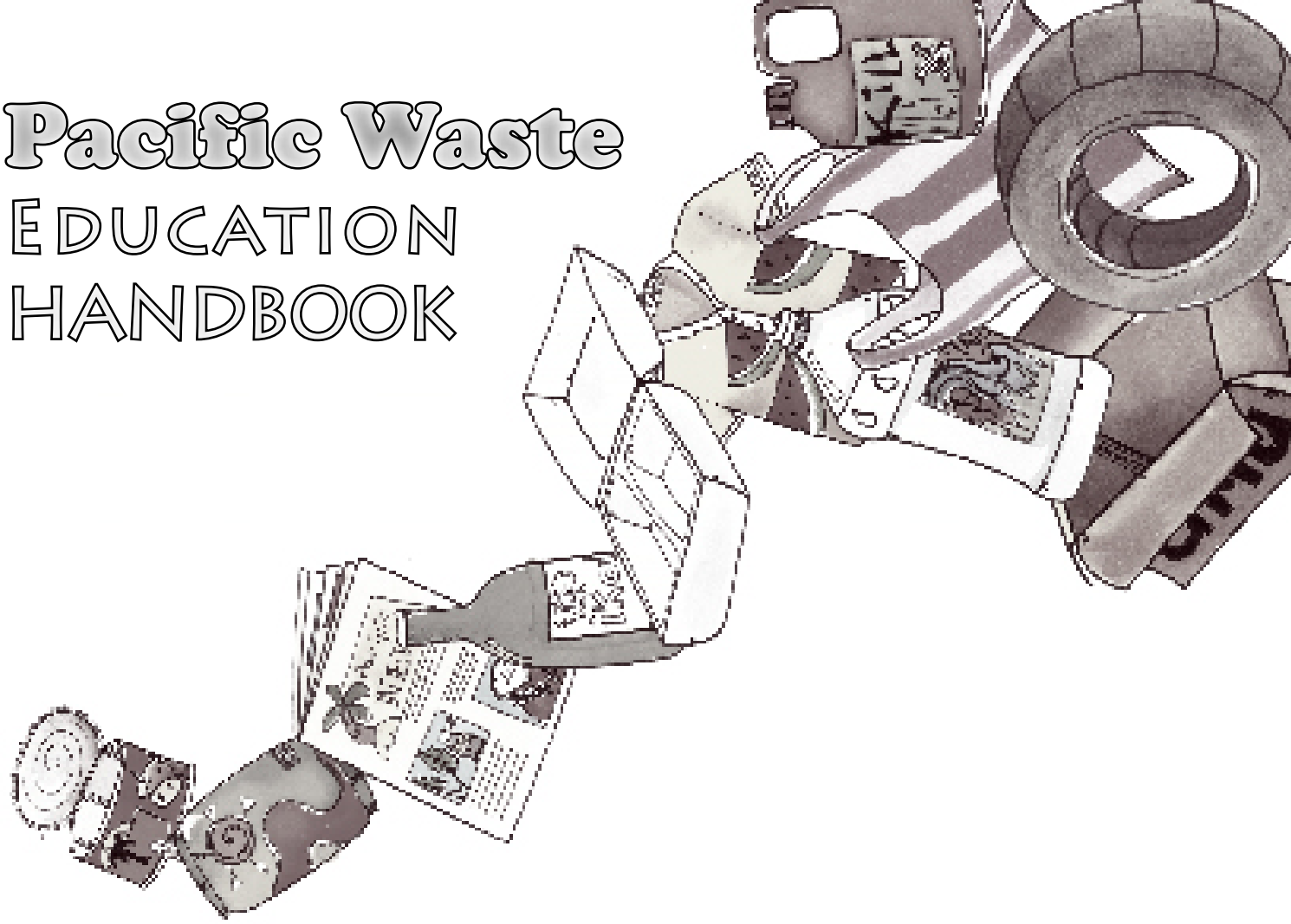
Pacific Waste Education Handbook



A guide for educators and communities

SPREP

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New Zealand's International Aid & Development Agency

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Environmental Education

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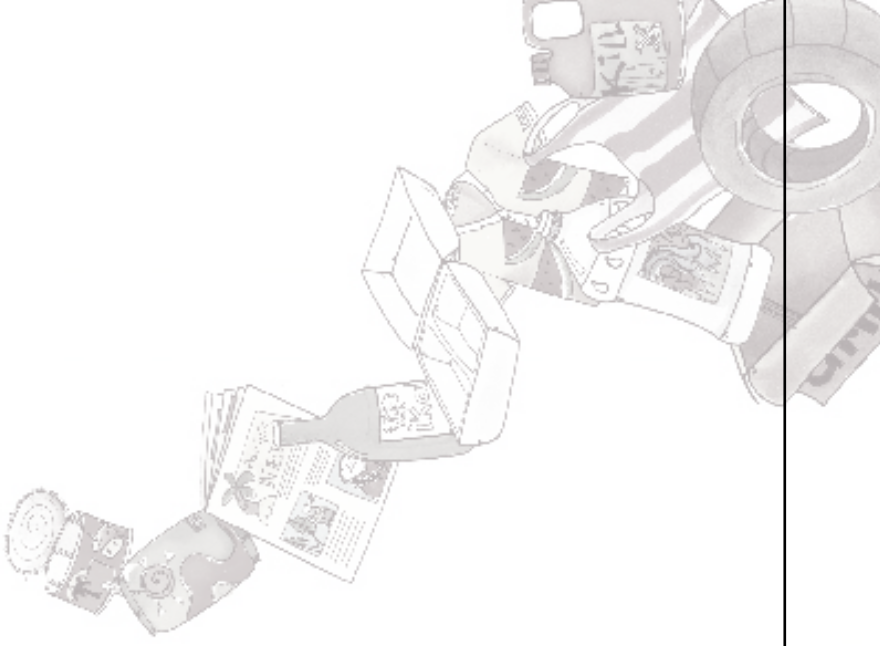

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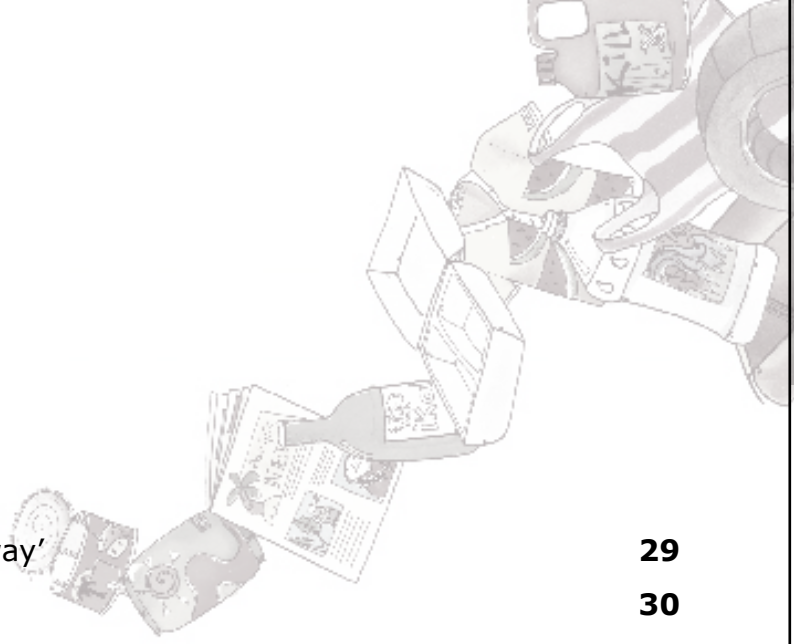
Contents



Message to educators

Welcome to **the Pacific Waste Education Handbook,** created for educators and community facilitators to reduce waste in the Pacific.

The Handbook provides innovative material for teaching and learning how we can all help to keep our islands clean of waste.

The activities incorporate principles of Education for Sustainable Development, which seeks to focus on changing behaviours to achieve a more sustainable future.

We hope you enjoy using this Kit and that through your efforts and good example other people throughout the Pacific islands will take action to help manage our waste and keep our islands safe and healthy for years to come.

David Sheppard

Director
Secretariat of Pacific Regional Environment Programme (SPREP)

How to use this resource

The Pacific Waste Education Handbook aims to provide fun and educational activities to encourage people to take action to keep their islands clean and free from waste. Developed for reading age levels 12 and above, the Handbook can be used in various school subject areas to help students learn about what they can do to reduce the impact of the waste they create. Through this Handbook, teachers can aim to incorporate waste related issues into science, social studies, health and home economics curriculum. Communities can also benefit from a range of subjects, including how rubbish is a useful resource, and how to develop an action plan to minimize waste in towns and villages.

The Handbook is comprised of eight units and 15 activities. The activities aim to increase knowledge and prompt critical thinking, as well as develop values and new skills. The units can either be taught in sequence, or selected to suit your teaching or community training priorities. The activities are designed to complement the units, however, may also be undertaken separately.

Throughout the resource, you will see this little mascot who will highlight the activities, discussion points or facts that you can share with the group.

Highlights activities

Discussion points

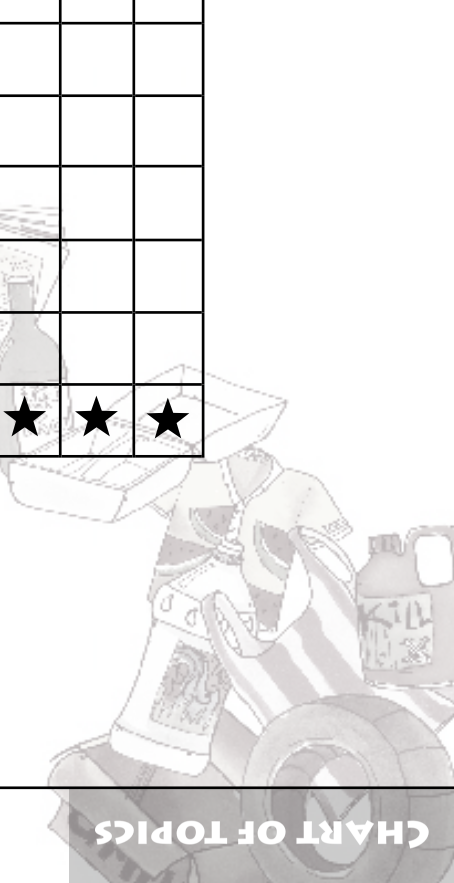
The Chart of Topics and Activity Guide provides support to educators or facilitators to identify and link the Units to related activities. The activities are written with the resource constraints of Pacific island schools and communities in mind. Ideas for extension activities are suggested at the end of each activity.

At the end of this Handbook there is a Glossary to provide clear and precise information on a range of waste related topics. When a word appears in *italics*, its definition or meaning can be found in the Glossary.

Additional information about waste management in the Pacific and relevant contact details are included at the end of this resource.

Chart of Topics and Activity Guide

	UNIT	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	Focusing on values	★	★													
2	Changing lifestyles			★												
3	What is 'waste'?				★	★										
4	Why should we care about waste?						★	★								
5	Where does waste go?								★							
6	Rubbish as a resource!									★	★					
7	Campaigning and advocacy for change											★	★			
8	Reduce your waste – take the 4Rs Challenge													★	★	★



Unit 1
Focusing on Values

What are values?

Values are the priorities we attach to certain beliefs, experiences, and objects. Values guide how we live, and what we treasure. What we value defines who we are, shape our thoughts, feelings and actions. Values act as a guide to how we act, how we behave. When we like something we say that we 'value' it.

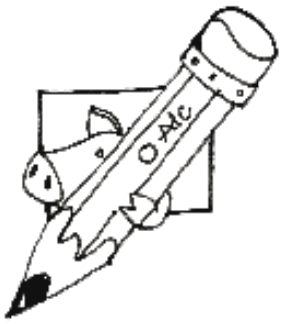
Tapping into values

One of the best ways to engage people in an issue, is to connect it to something that people value in their lives. Although environment issues may be very important to us, others may not think the same way. We have to remember that everyone is different and the best way we can teach about an issue is to capture people's attention or imagination. We will be more successful in increasing awareness and understanding of an issue if we can tie it to a topic that's close to people's hearts.

Now would be a good time to try Activity 1:
To the heart of the matter

What do you value?

What are the key things you value in life? What we value may differ to that of our family, friends, our school friends, and other members of the community. What are the things that you think you should value? We might have two sets of values: those we think we should have, and the real values that we often do not show or let on. The real ones are those that shape our behaviour.



Now would be a good time to try Activity 2:
Hot seat

Placing a value on waste

Most people don't value waste – that's why they throw it away.

When we teach about waste, or any other topic, we have to start with what people value, what they treasure. One way that we can engage people in the issue of waste is to connect it with the key things that drive them, the key motivators in their lives. This could be family, the church, spending time with friends, singing or dancing.

Draw the connection between how people manage their waste and the effects that it's having on what they value! They may not think that recycling is important, however, if you highlight that they may be able to make money through recycling, people might be interested. If you highlight that composting can lead to more food, this may encourage people to compost their green waste. Sometimes what you don't want is wanted by someone else like the clothes that don't fit you anymore.

What values do poor waste management affect?

Fun: Broken bottles on the ground cut our feet when we play!

Wealth: More waste means more money is spent to run trucks, clean up or operate the dump.

Happiness: Dirty, smelly places make us unhappy.

Health: Litter catches rain and allows mosquitos to breed and cause diseases like malaria and dengue fever.

A region of riches

The Pacific is a unique area in the world, with many plants and animals found nowhere else. It's our birthplace, our home, our culture and most importantly, our future.

If well managed, much of our waste can be recycled back into a resource, from a negative impact to a positive impact.

We have to decide – each one of us – whether we want a clean, healthy and rich Pacific as our future or one clogged with rubbish and dying *ecosystems*.

Unit 2
Changing lifestyles

The Pacific Way is changing

Once upon a time, we could throw our plants, scraps, and other material into the bush, or sea for nature to recycle it back into soil and water nutrients. Pacific society is changing fast. In the past, everything used in the Pacific was *organic*, made from natural fibres, vegetable or animal products that would break down over time and enrich the soil.

Now there is much *inorganic* waste in our islands which is made from modern materials such as plastic, metals and chemicals. This waste takes a long time to break down and pollutes our soil and lagoons. Sometimes the waste even breaks down into poisons, killing the *organisms* that we need to recycle our waste.

Changes in lifestyles and society have resulted in increased volumes and types of waste we produce. More plastic packaging and materials are being sold in the Pacific islands, meaning more waste is ending up around our homes, schools, villages, and where we fish for food.

Unfortunately, the waste we produce today could take hundreds, even thousands of years to break down. Humans are the only species on Earth that cannot rely on natural processes for managing our waste. This is because about half or our waste is *inorganic*. We have to think about, and carefully manage, the waste we create.

Now would be a good time to try Activity 3:
Past, present and future

Consuming more

As the Pacific islands develop economically, they produce more waste. This is common around the world. As people have more money, they buy more manufactured goods and they have less time to spend managing their waste.

What can you do? Try composting to grow vegetables or Banana Circles for more fruit and vegetables. See Activities 9 and 10.

Unit 3
What is 'waste'?

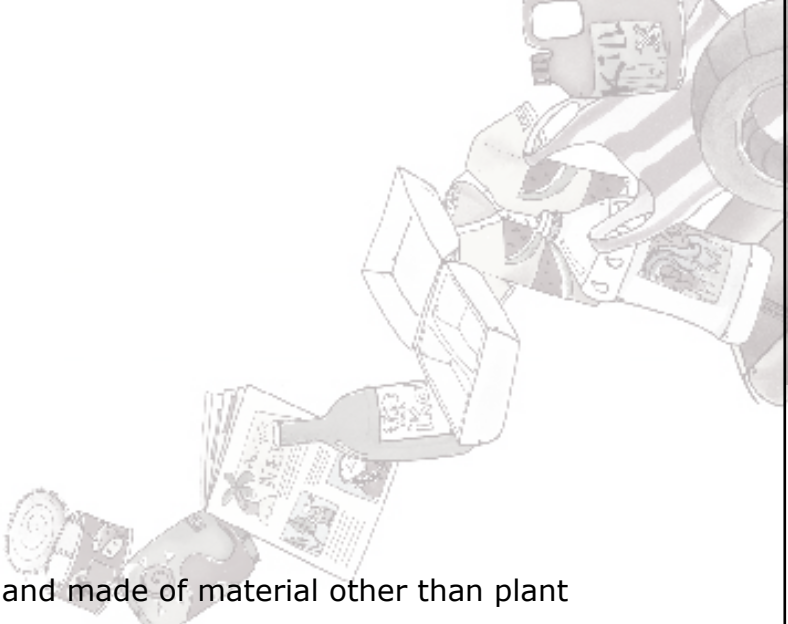
Waste occurs when materials are not or cannot be used again.

Waste doesn't really occur in nature – when an animal or plant dies, it is 'eaten' by thousands of very small animals or *microorganisms* that live on or in the waste. A decaying banana supports a rich variety of insects, bacteria and fungi which returns it to the soil. The "loop" is closed and the natural "cycle" continues.

Three major types of waste

Organic waste: is natural and comes from animal and plant material. This waste will decay or break down into *organic* soil matter through insects, bacteria and *microorganisms*. In most Pacific island countries, *organic* waste makes up over 50% (more than half) of the *solid waste* stream.

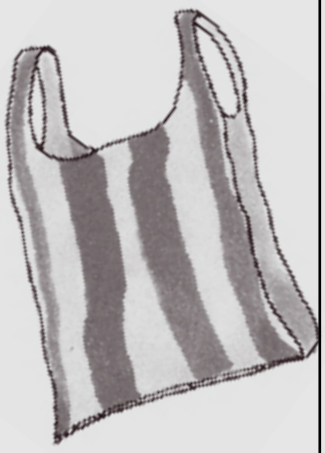
Organic waste includes kitchen scraps, leaves, grass clippings, wood chips, sawdust and left over meat and fish. Some things like bone and hardwood take a long time but others like paper or fruit decay very quickly or become food for other animals before returning to the soil.



Inorganic waste: is man-made and made of material other than plant or animal matter such as glass bottles, plastic, aluminum or steel/tin cans, packaging materials, and building materials such as concrete and metal. Some *inorganic* waste like steel cans will oxidize or rust within a year or two but others like concrete and plastic are designed to last for a very long time. This is great when they are being used but causes a problem when their useful life is finished.

Plastic: not so fantastic

Plastic was invented in the late 19th century and possibly considered one of the world's greatest inventions. Lightweight, durable and produced cheaply from oil, it is used to make everything from cars to computers to plastic bags for our shopping. However, plastic poses a huge threat to the unique Pacific environment because of the long time it takes to *decay* or breakdown. Not only do plastic bags look awful, they can kill sea animals that mistake them for food, and they breed mosquitoes which carry diseases like dengue and malaria. Plastic litter and bags discarded in our environment also cost us money each year to clean up.



Samoa has taken advantage of new technology to reduce the problems. Plastic can now be made from natural products like corn starch which will break down or *bio-degrade* into natural products relatively quickly. Samoa has banned non-biodegradable shopping bags and all shopping bags used must be able to break down within six months. It costs a bit more but will be better for our future.

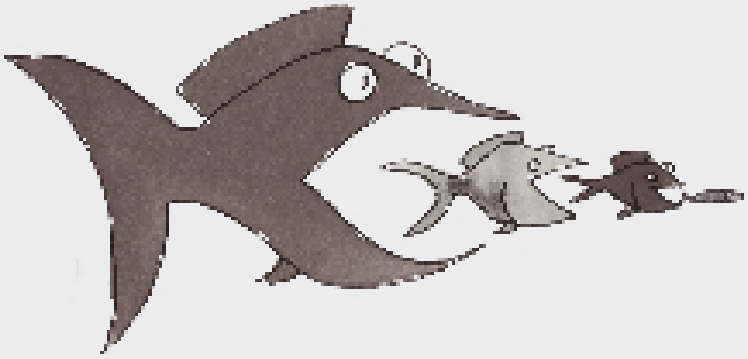
Toxic waste: is man-made waste that can poison or kill living creatures if they come into contact with it or eat even very small amounts of the material. They are sometimes called *hazardous* waste and are often difficult to dispose of safely. Toxic waste comes into your body in small amounts but don't pass through. They build up and increase up the food chain *bio-accumulate* until they can reach dangerous levels. Toxic waste can be found in many common household items such as car batteries, car oil, bleach, pesticides and weedkillers. There is even very small amounts of *hazardous* waste in computer monitors, televisions and other electronic equipment.

In the Pacific, we produce very small amounts of *toxic waste* compared to *organic* and *inorganic* waste but it can have a big, bad effect on our environment!

Did you know?

The American bald eagle, was almost made extinct by agricultural pesticides. The chemicals didn't kill the birds but made their egg shells so soft that the baby birds were killed.

Very large fish like swordfish, shark and albacore or big eye have high levels of mercury, a very toxic heavy metal. The tuna has eaten lots of smaller fish which eat lots of smaller fish. Each time, the tiny amounts of mercury stay in the fish, multiplying up each level of the food chain.



WARNING!

Some household items contain toxic materials

Household Item	Toxic or hazardous part	Suggested action
Bleach	Sodium Hypochlorite – a strong alkali that kills bacteria and can damage human flesh	Rinse empty container very well. Dilution is effective.
Car batteries	Lead – a heavy metal poison Sulphuric acid – very damaging to eyes and other soft tissue	Cover eyes. Very carefully, empty liquid into lots of water or into container of crushed coral to neutralize. Flush any spillage with lots of water. Return dry battery to seller for recycling or put in tied strong plastic bag and put in rubbish. Don't breathe fumes if using for making fishing sinkers.
Computers and TVs	Lead in the monitor (screen) and various low levels of heavy metals and other toxics in the electronics	Ask the retailer or waste manager to recycle. If that is not possible, wrap in a tied strong plastic bag and put in waste collection
Fluorescent light tubes	Mercury – a heavy metal poison	Place in strong plastic bag, tie tightly and put in rubbish collection. Don't breathe white powder.
Old paint tins	Some have lead or oil-based solvents	Leave in sun with lid off until hard, wrap in plastic bag and put in rubbish collection.
Pesticides and weedkillers	Many different biocides (kills living things)	Rinse empty containers with washing powder and lots of water then place in rubbish – do not re-use containers.

What makes up waste in the Pacific?

Most of the waste in the Pacific can be reused or recycled to make other things. Here is what makes up the waste in the Pacific.

Type of waste	Approximate percentage (by weight)	What can you do?
Organic	**70%** Food and garden = 60% Paper, cardboard =10%	Put your green waste in your garden or compost heap to make natural fertilizer to grow plants and food.
Inorganic	**30%** Metals = 8% Textiles = 5% Plastics = 12% Glass = 5%	Reduce the number of plastic bags you use by taking your own bag to shop. Recycle plastic, cans and bottles where you can.
Toxic	**0.5%**	Only buy the amounts you need to use immediately. Store them safely where children can't access. Take old containers or products back to where you bought them and ask them to arrange safe disposal.

Now would be a good time to try Activity 4:
Waste detective

What is 'waste' made from?

Most 'waste' is actually made from precious resources that can be used again. Many of our everyday items come from mining the earth, and instead of discarding them after use we can re-use or recycle them to make them into new products.

Aluminum cans

Aluminum is a kind of metal made from bauxite ore that is mined from the ground. Ore is metal in its original state, before it has been processed. Ore is a *non-renewable resource*, which means that there is a limited amount of it in the earth and when it used up, there is no more. Manufacturing your drink can uses huge amounts of energy that causes *global warming*. It is very important to limit our use of it and to recycle metal whenever possible.

Did you know?

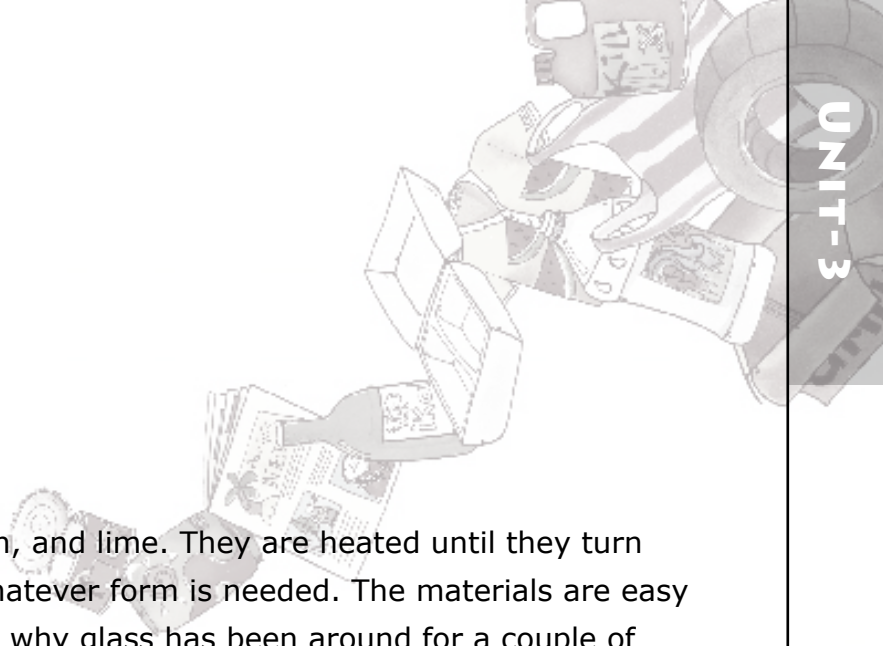
When a factory makes a new aluminium drink can from an old drink can, it only takes about 5% of the energy it takes to make it from the original materials. The amount of energy you save could run your TV for up to three hours! After collection, aluminum cans are sorted, crushed and pressed into blocks.

These materials are then shipped to a processing plant where they are heated to melting temperature. The recycled aluminum is then pressed and rolled out into large sheets that can be made into cans, car parts or a range of other products. Aluminum can be recycled over and over again.

Most Pacific countries do not have facilities to re-manufacture aluminum cans. Some countries send their cans overseas to be made back into cans.

Cleaning Kiribati

Kiribati has cleaned up its beaches by putting a 5c deposit on drinks containers. When you buy a drink, it may cost more but you get 4 cents back when you return it. Not only does this keep their beaches cleaner they can make money too!



Glass

Glass is made from sand, soda, ash, and lime. They are heated until they turn into liquid and then shaped into whatever form is needed. The materials are easy to get and it's easy to make, that's why glass has been around for a couple of centuries. It's easy to recycle glass; glass that is returned to the factories can be melted down and re-made into glass. It can be recycled without losing its strength or changing its qualities. In many countries, people receive money when they return their bottles, and these bottles are cleaned and reused.

In many Pacific countries, because it is too expensive to send overseas, glass can be crushed and used in concrete to replace 10% of the coral sand mined for building and construction.

Paper

Paper is made from trees, and is a *renewable resource* which is any natural resource that can replenish itself naturally over time. However, we need to carefully plan how we manage these resources to ensure that there will be trees for future generations.

Trees also capture *carbon dioxide* which they use to make food. The more trees, the greater the amount of *carbon dioxide* is absorbed from the air, which helps to reduce climate change. When trees are cut down, they release the carbon into the air, which is a key contributor to climate change.

How is paper made?

The wood from trees is shredded into very small pieces. Water and chemicals are added to turn the wood chips into pulp. Then the pulp is spread out on thin screens and dried with heat. People have been making paper for thousands of years.

Although many Pacific islands cannot recycle paper here are some ways you can reduce the amount of paper you throw away.

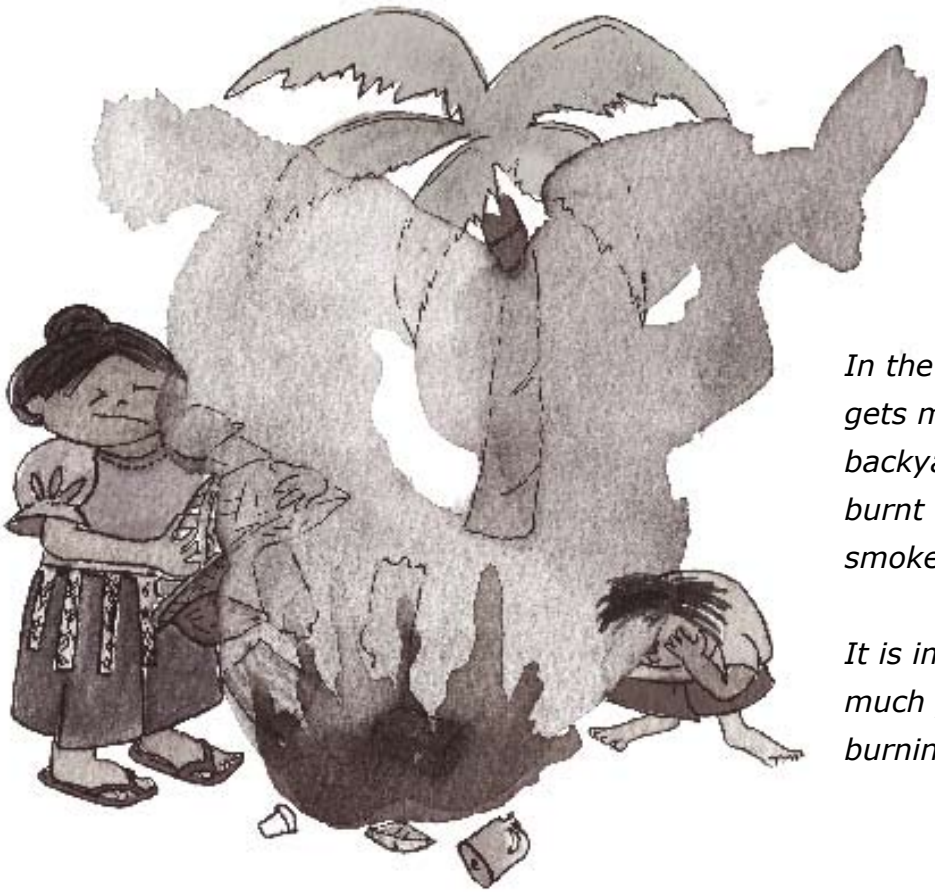
5 ways to reduce paper

1. Use both sides of paper
2. Reuse paper for taking notes
3. Buy recycled paper where possible
4. Use cardboard from around the house for making craft activities in schools
5. Soak egg cartons and other cardboard to use in your compost heap

You can make your own paper – see Activity 5:
Make your own paper

Plastic

Plastic is made from fossilized forests that have turned to oil deep in the earth. Factories use the oil and other chemicals to mould plastic of all shapes, textures, colours and strengths and the products are now found everywhere as they are cheap and useful. However, making plastic is a very dirty job. There are lots of poisons and pollutants that hurt the environment when plastic is made. It's important to use as little plastic as possible, because it is bad for the environment, both as it's being made, and later when it's thrown away.



In the Pacific, plastic often gets mixed up with the backyard rubbish and burnt which can make toxic smoke.

It is important to get as much plastic out of your burning pile as possible.

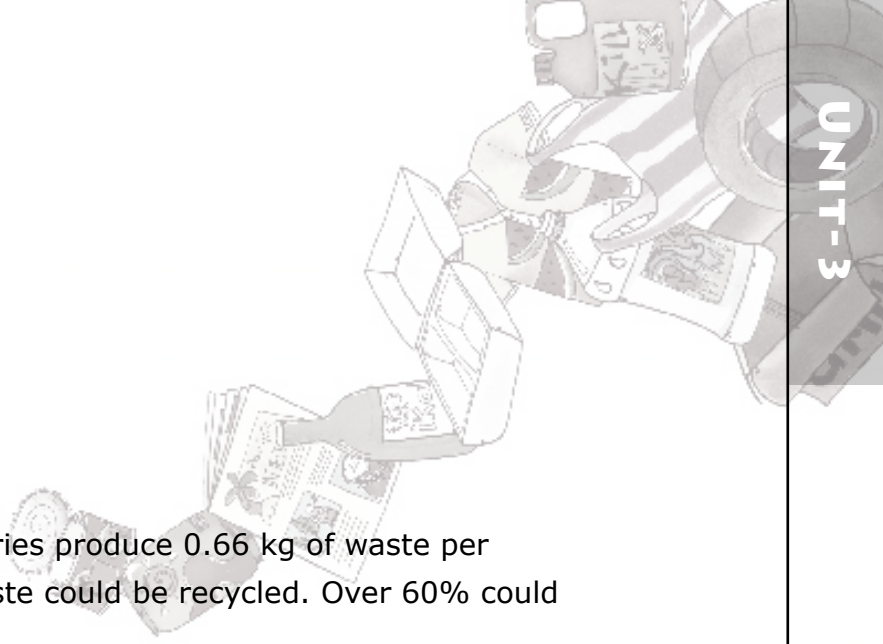
Tin cans

Tin cans are made from steel coated with tin. Both are metals that are mined from the ground like aluminum cans. They are also *non-renewable*, so it's important to reuse and recycle tin cans wherever possible. If there is no can recycling program, they can be placed in your banana circle to provide minerals for the trees.

Waste takes time

Waste just doesn't disappear when we throw it away. Much of it stays in our environment for a long, long time. The quickest waste to break down is made from *organic* materials, like banana peels. However, *inorganic* waste, such as plastic bags and containers, take decades or more to break down. That's why we have to be very careful about how we dispose of our waste.

Banana peel	3-5 weeks
Paper	4–15 weeks
Cigarette butt	2-5 years
Tin can	2 -10 years
Aluminum can	5– 20 years
Disposable diaper	10-20 years
Plastic bag	10-25 years
Hard plastic container	10-50 years
Glass bottles	Thousands of years



Pacific waste facts

- On average, Pacific island countries produce 0.66 kg of waste per person per day. 20% of that waste could be recycled. Over 60% could be composted at home.
- Most of the waste produced in the Pacific is *organic* meaning it can be returned to the garden to grow vegetables and plants.
- More than 100,000 sea animals die each year from consuming or become caught in plastic bags and other debris floating in the ocean.
- Most of the waste in the Pacific is not actually waste – but precious resources that can be used again if government or business provides a reason (or money) to encourage reuse.
- Litter costs money – each year governments and communities spend money to clean up waste, money that could be better spent on other services such as health or education.
- A study in Palau in 2006 estimated that unmanaged waste costs USD$1.9. million per year. Half of the costs were impacts on tourism and another third on public health.

Unit 4
Why should we care about waste?

Litter costs us money

Litter is waste that is not disposed of properly, either by mistake or on purpose.

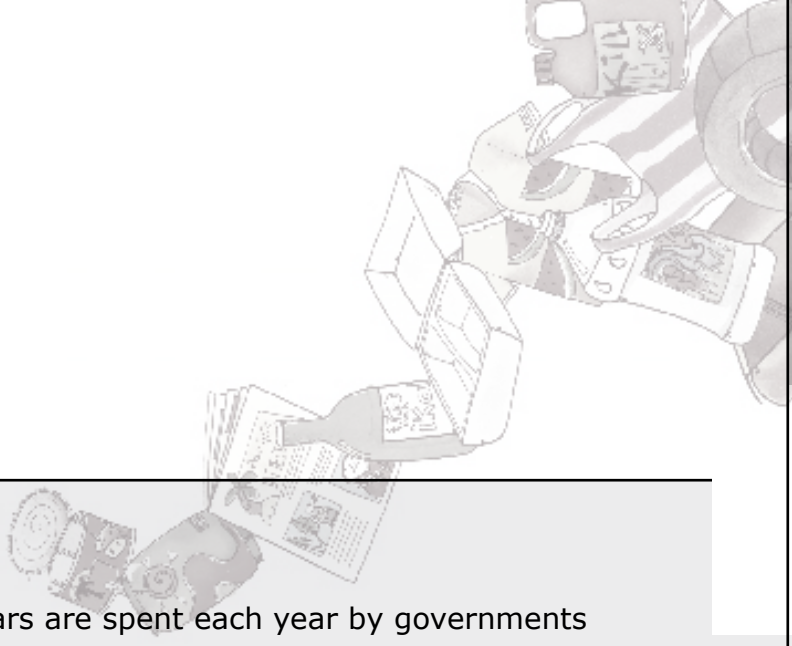
Sometimes litter escapes from the bin by wind or by animals looking for food or when a container is knocked over. Then there are people and businesses who just throw their waste anywhere they feel like without thinking about the environment or the people in it. We have all seen litter around our islands. How does that make us feel? Have you ever littered? Why?

Litter affects the environment around us and we, in turn, are affected by our environment.

What happens to rubbish that is left lying around the place? What about when stray dogs get into the rubbish? What does it feel like to get up in the morning, look out your window and see your lawn strewn with rubbish? Naturally, it is not a very pleasant sight (or smell). Improper waste management can attract flies to houses and make us sick.

Although many places don't have the bins for your litter, that is no excuse! Take it with you and put it in a bin somewhere else or take it home with you.

Remember - waste is everybody's responsibility!



Wasting money

Litter costs money! Millions of dollars are spent each year by governments around the world cleaning up other people's litter. The money could be better spent on other services like improving education and health services. Litter also wrecks the Pacific Paradise image that attracts people to our beautiful beaches and forests. That hurts our economies and reduces the money for other needed services.

Litter catches water and breeds mosquitoes. Those mosquitoes can carry dengue fever and malaria and make you very sick. This also costs your country a lot of money.

Because plastic doesn't break down, litter clogs up drains and can make flooding worse. This can ruin homes, cause diseases like cholera and destroy roads and bridges.

In Tonga, each family averages 1 tonne of solid waste each year. Inadequate waste management was costing AUD$3.36 Million (TOP 5.6 Million) each year.

Polluting land, water, air and the atmosphere

In most Pacific island nations, landfills and dumps contain *organic*, *inorganic* and even *toxic* waste. When waste is dumped at landfill sites, it is sometimes buried to keep the rats and flies from spreading disease or sometimes burned to allow for more space.

Note: 1 TOP = 0.60 AUD

If the waste is stored or buried near a stream, mangrove area or the ocean, it can flow into the water. The *organic* waste breaks down and contaminates the water with too many nutrients, changes *habitats*, uses up all the oxygen and may kill the animals that live there.

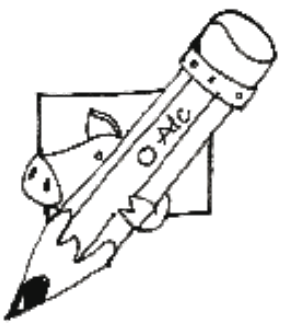
Toxic waste that is buried may eventually seep or *leach* into the soil destroying important soil *organisms* and contaminating ground water. Eventually, this toxicity can pass through the food chain and may end up in human beings.

In the Pacific, household waste is often put into piles and burnt. While this stops disease and reduces the impacts of waste, excessive burning can affect the quality of the air we breathe. The smoke particles are very small and get stuck in our lungs which can cause diseases like cancer. If we don't separate out the plastics, this burning can also release small quantities of toxic gases.

Burning some plastic releases very small quantities of chemicals called *dioxins* and *furans*. They are highly toxic, remain in the environment for a long time, build up in body tissues and cause poor health for humans and the environment.

Dioxins and *furans* can accumulate or build up in body fat and women tend to accumulate them more readily in their body tissues than do men. Because body fat is used for feeding babies during pregnancy and breast-feeding, babies are particularly at risk of absorbing these chemicals from their mothers.

If you or your family burns waste, make sure there is no plastic in it and that the smoke doesn't blow where you or your neighbours will breathe it.



Now would be a good time to try Activity 6:
Dramatic connections

Landfills need land

Another impact on people from waste is the amount of land that is used by the landfill sites. Some islands are quite small and have growing populations. As the population grows, so does the amount of waste produced and the size and costs of the landfill site. Reducing this waste efficiently is very important because the land has a high value. Even on larger islands, all land is valuable and should not be wasted. On atolls, there is very little space, the sand lets everything through to the water and lagoon and the storms can wash rubbish into the lagoon.

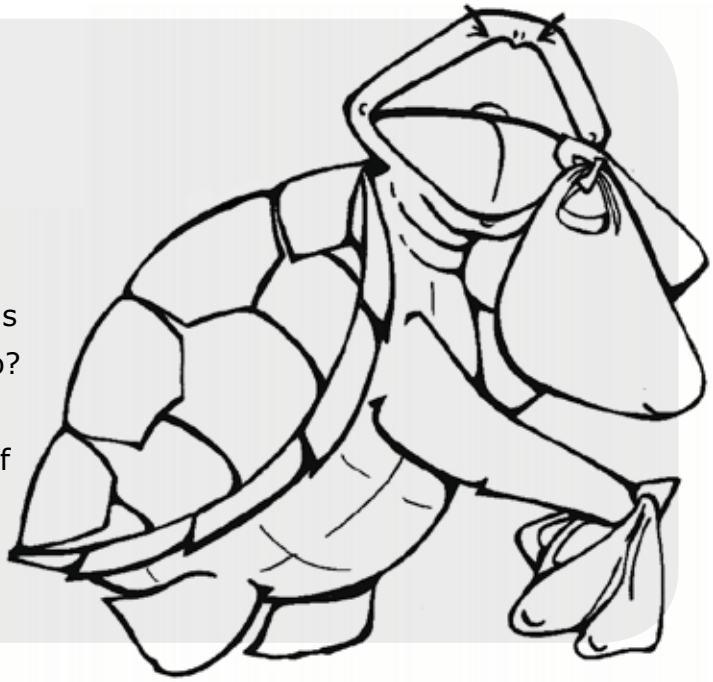
Threatening the lives of animals

When we clear the land for landfills, we also remove the *habitats* or homes of many plants and animals. Discarded waste in our environment also threatens the lives of many animals who can die through choking on or becoming caught in our rubbish.

Now would be a good time to try Activity 7:
A Fishy Tale

Did you know?

100,000 sea animals, including sea turtles, die each year from plastic debris including plastic bags. What can you do? Take a re-usable bag to the shops and make sure all your plastic is disposed of properly.



Unit 5
Where does waste go?

A mystical place called "away"?

Where does your rubbish go? Does a truck take it 'away' or do you have to burn and bury it yourself? What if the rubbish truck never came? What would happen to all the household waste?

In towns, the rubbish truck takes the waste "away'? We forget about it. But where does it go? Where is 'away'?

Nearly all towns or villages have a landfill or dumping site that holds the entire community's collected or dumped rubbish. A landfill is like a huge rubbish bin where waste from towns and cities is deposited.

If the landfill is poorly managed, the pollution can sometimes escape into the surrounding environment. If the rubbish is burned, this will cause air pollution and can release dangerous toxic chemicals into the environment.

People who live near rivers often decide to dump their rubbish in the river so that it will be washed 'away'. This spoils the river *ecosystem*. The part of the rubbish that can float will travel downstream and some waste will sink and persist in the environment for many years. Households further inland usually throw their rubbish in one corner of the yard and then burn it. On a smaller scale, this will cause the same problems as burning waste at the landfill site.

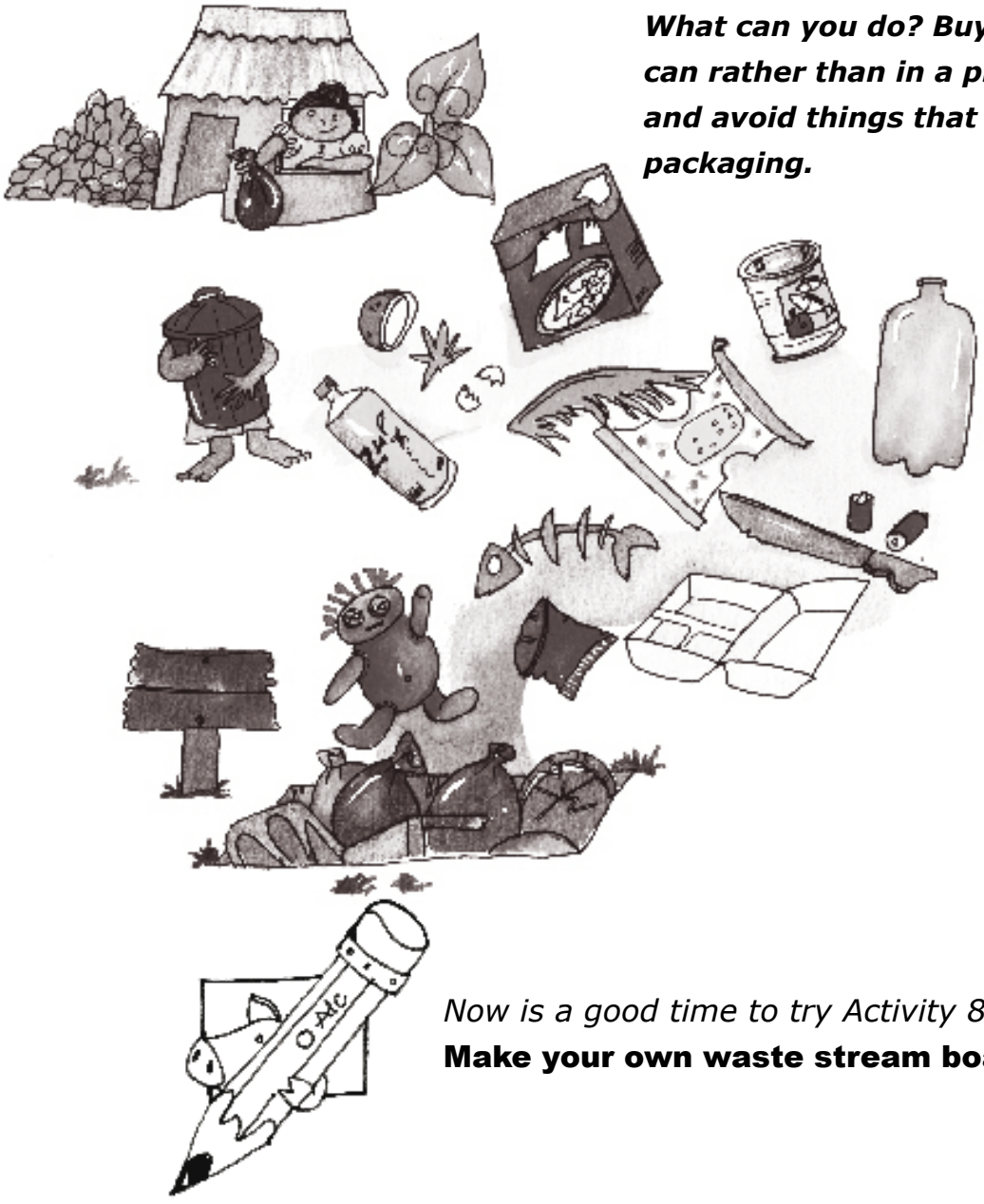
In the end, there is no magical place called 'away'. In our environment, everything is connected so we all have to live with the consequences of the waste we produce. That's why minimizing our waste is so important. By reducing the plastic bags we need, composting *organic* waste, and recycling containers when we can, we will reduce the amount that needs to go 'away' to about 15% of the original volume! This reduces the costs as well as the environmental impacts.

Reducing waste around us is one way that we can manage the waste at home, and we can send only the remainder of the waste to a landfill or to be buried.

The Waste Stream

The waste stream is the flow or movement of waste from the point of disposal, such as household or commercial premises, to final destination for example the landfill site. Think of it like a giant river of rubbish flowing from all the houses and shops back into the environment somewhere. The volume, or amount, of waste in the waste stream may be significantly reduced over time if valuable items are separated for recycling and are recovered to become resources for future re-manufacturing. Waste can also be reduced by reducing the number of products we consume.

What can you do? Buy drinks in a can rather than in a plastic bottle and avoid things that have lots of packaging.



Now is a good time to try Activity 8:
Make your own waste stream board game

Disposal

Open dumps

Many Pacific islands use open dumps that are just like a big pile of rubbish in the bush. They smell and look awful but they also leak *leachate* into the streams and oceans. This can damage or kill the fish and other *organisms*.

They often catch on fire because of the *methane*, a flammable gas produced by the rotting *organic* material. This makes them very unpleasant and makes it even harder to salvage any usable resources. Open dumps allow litter like paper and plastic to blow with the wind and spoil everything nearby. Quite often, these dumps are put into mangroves or creek banks because it is easier for people to place their rubbish in these locations. This has a negative impact on our environment. They are the worst way to get rid of waste.

Landfills

Landfills are gradually being built throughout our region to take our waste. The rubbish is usually covered with soil to reduce rats, dogs and birds and the *leachate* leaking from the waste is collected and treated.

Some landfills are in holes in the ground. Once all the oxygen in the rubbish is used up (*anaerobic*), they produce *methane* which is a very strong contributor to *global warming*. Some new landfills in the Pacific are *semi-aerobic* which means they let oxygen into the waste pile and produce *carbon dioxide* instead of *methane* which is much safer and cleaner.

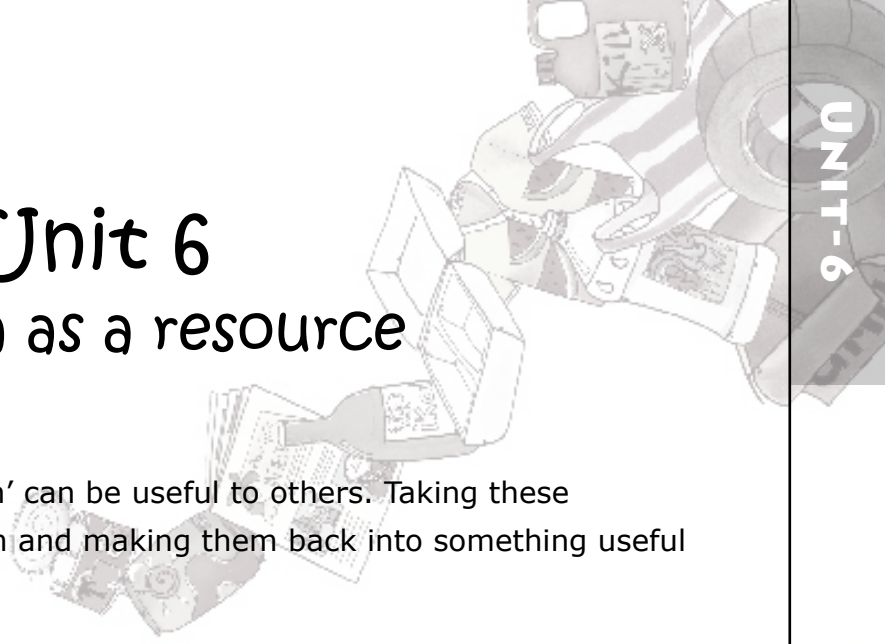
All landfills are expensive to build and run. By reducing our waste and making the landfills last longer, we can save money.

Incinerators

Some places burn their rubbish in special equipment (incinerators). This is even more expensive than landfills and any poisons produced go up in the smoke and then come down on our homes. Making them safe by filtering the poisons is even more expensive.

You can see why avoiding disposal is such a good idea.

Unit 6
Rubbish as a resource



What some people think is 'rubbish' can be useful to others. Taking these 'resources' out of the waste stream and making them back into something useful is known as recycling.

In a sustainable world, every country would have a great recycling program. Everything that could be removed from the waste stream would be. Unfortunately, recycling is most effective in countries with bigger populations and companies that can recycle the collected materials. In Pacific island countries, many of the populations are too small to support recycling industries.

An alternative is to collect recyclable materials such as cans, bottles, paper and plastic containers and ship it all to the closest country that is able to recycle it into new material. This is also difficult because of the high shipping costs. In the Pacific, some countries have their own systems for ensuring that recyclable materials are not sent to the landfill. Hopefully, these will increase if enough people insist on it.

Many Pacific countries also practice recycling but to a lesser extent. In Vanuatu, soft drink bottles are recycled and used again and again. The Cook Islands sends old metal to New Zealand and Palau ships its used tyres to Japan.

Many Pacific island countries collect aluminum cans to recycle since aluminum is worth more than it costs to recycle. A crusher or baler is required to flatten the cans into an easily transportable block to make it cheaper to ship overseas (as it takes up less space in the containers when pressed into smaller blocks).

Composting

When *organic* material in the waste stream is placed with *inorganic* and *toxic* wastes, and thrown in a landfill, an important resource is lost. *Organic* waste can be composed to recycle the nutrients. Composting provides a great resource in countries where the soil is very poor. For countries with fertile soil, composting ensures that the *organic* material does not end up in the landfill where it takes up valuable space and causes problems with odour, attracts animals and dirties recyclable materials.

Home composting

Compost is *organic* matter which has broken down by the action of bacteria, funghi and other *microorganisms* over a period of time. Many types of *organic* matter, such as leaves, fruit and vegetable peelings and manure can be used to make compost. The end product is very different from the original materials. It is dark brown, crumbly and has a pleasant smell.

Compost is cheap, easy to make and improves soil and crop quality.

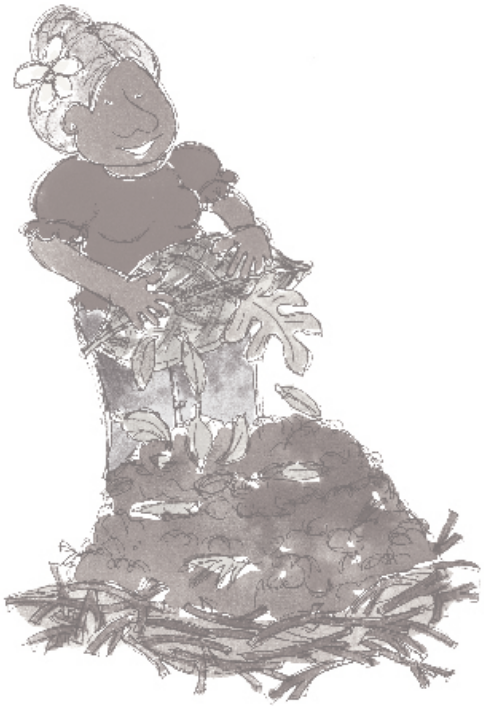
- Compost improves the structure of the soil. It allows more air into the soil, improves drainage, prevents drying out in times of drought and reduces erosion.
- Compost adds nutrients to the soil and does not wash away like chemical fertilizers.
- Compost can reduce pest and disease problems in the soil and on the crop.

Good composting requires a mix of different proportions of various types of *organic* material, so that the composting *organisms* get the right diet and to break it down reasonably quickly.

It is essential to include a mixture of old and tough plant materials with young and sappy materials for a good result. This is because different types of *organic* matter contains different proportions of carbon and nitrogen. In general, young, soft, living material that *decomposes* fast contains low levels of carbon but high levels of nitrogen.

Tough, dead material, for example straw, decomposes slowly and contains large amounts of carbon but low amounts of nitrogen. Too little nitrogen-rich material and the *decomposition* will be slow; too much and the heap will become *anaerobic* (lack oxygen and smelly). You can reduce this by turning the pile over to mix in oxygen or to build the pile with branches to allow air to flow through the pile.

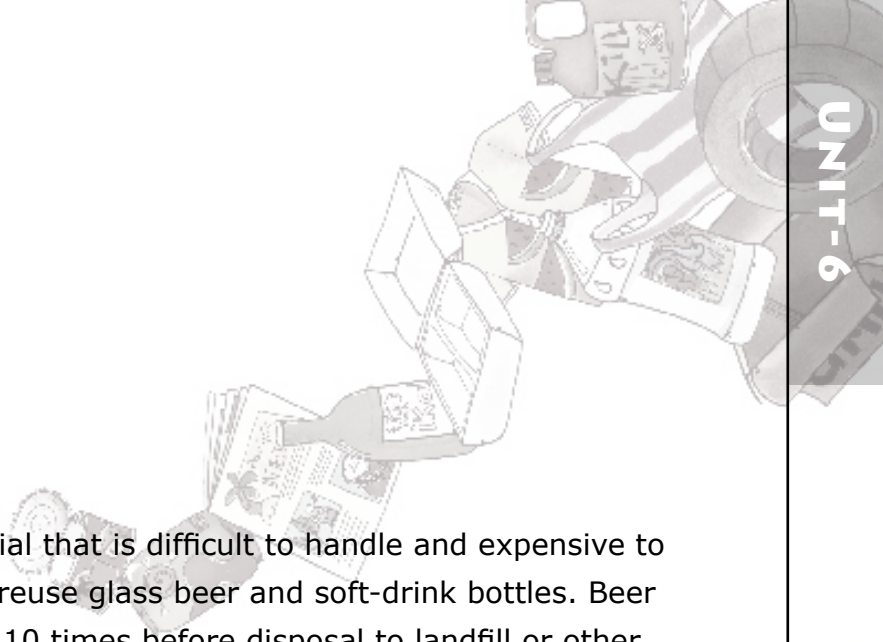
Build your own compost heap! See Activity 9:
Grow great fruit and vegetables!



Banana Circles

Making a Banana Circle is an easy way to reduce our waste at home. The Banana Circle is a shallow pit or pile and filled with any *organic* waste that is available. Bananas are planted around the waste pile; the roots grow and feed on the naturally composting *organic* waste, and the banana trees become strong and healthy and produce lots of fruit. Some people pipe their wastewater from their kitchen and washing onto the pile. This speeds up the composting, and helps the bananas, and treats wastewater at the same time. Other plants can be used instead of bananas depending on what you can grow in your country.

Try building a banana circle see Activity 10:
Go bananas with your waste!



Glass

Glass is a heavy, low-valued material that is difficult to handle and expensive to ship. Many Pacific island countries reuse glass beer and soft-drink bottles. Beer bottles can be used approximately 10 times before disposal to landfill or other re-use/disposal means. After a bottle has been used to its capacity, the glass can then be crushed. Glass crushers crush the glass into gravel or sand-size pieces so that the material can be used in construction projects as fill or to replace rocks in concrete. Even if glass was crushed prior to landfilling, a lot of space could be saved.

Lead-acid batteries

The lead is the valuable but poisonous component in the battery to be recovered through recycling. Batteries can be shipped overseas, where the lead can be recovered and re-used. The best form of collection is through a deposit/refund system. Kiribati has removed a vast number of dangerous batteries from the local environment through a $5 deposit at import that is mostly refundable on return.

Paper and cardboard

Both paper and cardboard are technically easy to recycle, with the material being turned into paper pulp and used to make new paper products. Paper and cardboard require a large machine to compress the material into solid enough blocks to be viable for export. Where there is a large population of paper users, such as Fiji, paper recycling works well. Small nations will have difficulty producing enough waste paper and cardboard to make recycling programs possible. As paper and cardboard are *organic,* they can easily be turned into compost but they have to be ripped into small pieces and mixed with other materials like grass or leaves.

Plastic

The plastic in a Pacific waste stream is primarily bottles, packaging for food and consumer goods and plastic shopping bags. Plastic containers and bottles are low value for export and are light, so it's difficult to pack enough into a shipping container without expensive equipment. Plastic bags are even worse as they are light and blow into streams and the sea, choking animals and fish. The best way to reduce plastic waste is to use alternatives, or to not buy any plastic where possible.

Scrap metal recycling

Scrap metal is one of the most recyclable products as it can be recycled over and over again. By doing this, landfill space is saved and the world's resources are conserved. The main source of scrap metal for Pacific island countries is old vehicles, tin cans and household appliances. Vehicles can be dismantled and many of the parts recycled.

Did you know?

Melting down one tonne of recycled steel cans uses only around one quarter (or 25%) of the energy needed to make new steel!

Unit 7
Campaigning and advocacy for change

Sometimes we get frustrated because we don't think enough attention is given to an issue that we feel is important. When we try to influence the regulations or laws of our governments or try to convince a local industry to improve its waste management practices then this is called *advocacy*.

Advocacy is the act of publicly recommending a course of action or being actively supportive of a cause. It is done when people are not satisfied with the status of something in their community or country and they want to do something more targetted then voting in an election.

If you feel that there are some important changes to make in your community that will improve the way that waste is managed, you may want to convince the public, leaders or decision makers to consider your ideas.

People are turning to *advocacy* in order to improve society by influencing decision makers who have more power to make changes happen. We have to let our politicians, village leaders, church officials, women's groups and business owners know what we value and how they can help to preserve the environment and keep waste to a minimum.

Through public awareness campaigns, we can get together with other members of our community and discuss the impacts of how we currently manage our waste. Once they understand the problems, we can all move onto the more difficult challenge of changing the way we live and work. This will work for other issues, not just to protect the environment.

Remember: it is better to make some small changes rather than waiting to change the whole situation.

Advocating for change

Here are some of ways we can advocate for change:

Talk to people: Tell them how you feel. Maybe they will agree with you. Maybe they know something that you don't. Try to speak to people in positions of authority who have some kind of influence in decision making. Talk to your parents, the school principal, the manager, the chief, your mayor or even your member of parliament. See how you can work together to begin change.

Education: Educating children and adults is a very effective way of advocating for change. Young people are the future of your community and your country and what they learn when they are young will become an accepted part of society when they grow up.

Public Awareness Campaign: The more people aware of the issue you are concerned with, the more support you will have. The media is an effective tool for educating the public. You can write articles for your local newspaper and use the radio or television for announcements or interviews. Other ways that you can get your message to the public is through pamphlets, posters, workshops, special events, a song or a play.

Stakeholder Group: Form a committee made up of people who represent different aspects of your community who are also concerned about the same issues. As a group you can work together and have more influence. You also get different views and ideas.

Political: Support and vote for political candidates who share your views and support your ideas for improvement.

Take a stand on waste! *Try Activity 11.*
and Write a Letter to the Editor, *Activity 12.*

Unit 8
Reduce your waste - take the 4Rs Challenge

The **4Rs** is a way to manage our waste and can be applied to our daily routine in many ways. This is one way that you can help keep your homes and communities free of waste.

Refuse to use or purchase items that you know are bad for the environment and are unnecessary.

As a consumer you have a lot of power and influence by what you select to buy.

- *Refuse* to buy items with too much packaging
- *Refuse* plastic shopping bags – bring your own reusable bag
- *Refuse* to buy 'over-processed' food – natural food is better, cheaper, often unpackaged and any waste can be composted
- *Refuse* to use items that contain toxic materials if alternatives are available
- *Refuse* to use toxic household cleaners – choose environmentally friendly alternatives (such as vinegar, lemon juice, baking soda and borax)
- *Refuse* plastic utensils when buying take-away – carry your own or use your fingers

Reduce the amount of waste you create.

When you go shopping, consider how much waste will result from each purchase. We can reduce the amount and type of waste we produce in the following ways:

- *Reduce* your consumption in general – do you really need it or is it just to impress your friends?!
- *Reduce* your purchase of items that are not recyclable
- Buy quality items that will last a long time – cheaper items will be thrown out much sooner
- Choose products with less packaging or buy in bulk
- Always choose environmentally friendly products when available

Reuse = use again.

When you wear your older sister's clothes or are given your brother's old bike, you are re-using. Sometimes you can re-use goods in different ways to their original use. For example, used car tyres can be used to grow sweet potatoes in, and old jam jars can be used to store food in the kitchen. A huge amount of waste that goes to the landfill could have been reused, if not by you, then by someone else. The following list gives some ideas about how we can reuse items in our daily lives:

- Use both sides of paper to write or print on
- *Reuse* plastic containers and bags
- Consider reusable products when shopping
- Maintain and repair durable products (products that will last) - consider the environmental impact of disposal or producing a replacement when making decisions about the costs of repair, etc.
- *Reuse* glass jars to store food
- Use reusable shopping bags or local baskets to carry groceries
- Buy used items instead of new ones and save money
- Use old newspaper to clean windows, or turn other paper into cool gift wrap!
- Sell or donate goods instead of throwing them out
- Borrow or share items that you don't use much
- Use handkerchiefs instead of tissues
- Use cloth diapers or nappies as much as possible instead of disposable ones

Recycle whenever possible.

Depending on what country you live in there are probably some products that are recyclable.

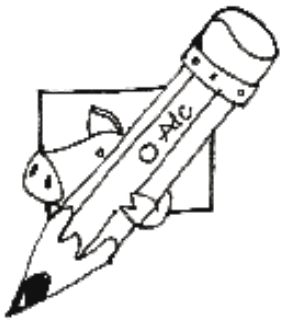
- Find out what can be recycled in your area
- *Recycle* everything you are able to
- Purchase items made from recycled materials (look at the labels)
- Recycle garden trimmings as compost for your fruit and vegetables
- Ask your politicians why some countries can recycle but yours doesn't

Take the 4Rs challenge!

We all produce waste so we are all part of the waste problem AND the solution. Of all the environmental issues we face today, waste is one thing that we can ALL do something about. Waste is OUR responsibility.

The choices we make every day affect the amount and types of waste we produce. When we rethink the way we live, reduce what we buy, reuse things instead of getting new ones, recycle and compost; we not only make less waste, we also save valuable natural resources and energy, and create less pollution.

Take responsibility for the waste you produce. Make a difference at home, school and when shopping. It's easy and every little bit helps!



Now would be a good time to try Activity 13:
Take the 4Rs challenge

At school

Students can make a difference by working together to manage the waste in and around their school.

Students can:

- Work with teachers to develop a waste system for their class, school or community. Work out how to get other people in the community involved. It's better to start small and then expand when you know how to manage the waste problems in or around your school.
- Reuse paper on both sides – establish recycled paper boxes in classrooms and offices.
- Do a litter survey or rubbish audit. Then map where most of the litter is and consider putting bins in those places.
- Organize a two-hour litter clean-up each week.
- Create a compost heap and learn how to manage it.
- Put out separate rubbish bins for different kinds of rubbish, for example; *organic* waste, *inorganic* waste, recyclable materials and waste.
- Create partnerships with companies that recycle bottles or aluminum cans so that they will collect the recycled materials from your school.
- Tell your friends and family members about the 4Rs.
- Write letters to people working in waste management (such as the government, private sector and NGOs) to come to school and explain how their actions are helping the environment.

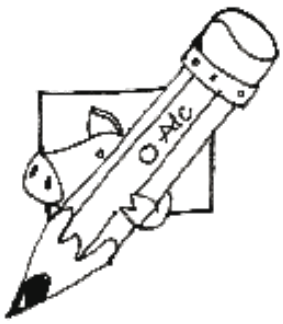
Many of these ideas can also be applied by employees at offices and other work places.

In the village

People who live in villages can also take action to ensure that all the waste produced in the village and nearby is properly managed.

You can:

- Build a compost pile or Banana Circle.
- Encourage others not to burn their plastic rubbish. If you DO need to burn your rubbish, take the plastics out before you start to burn.
- Recycle what you can, and then make sure the *inorganic* waste for the village is properly buried in a safe area that won't harm the environment, humans or wildlife.
- Ask your chief and elders to put a taboo or ban on dumping waste in the ocean streams, in rivers, or in other empty spaces.
- Talk about any waste management practices of towns or industries that are situated nearby, and discuss the options for reducing the waste from that area. Tell your friends and family that littering isn't cool.



Try Activity 14:
Reduce your rubbish
Developing a 4Rs Action Plan

When you are shopping

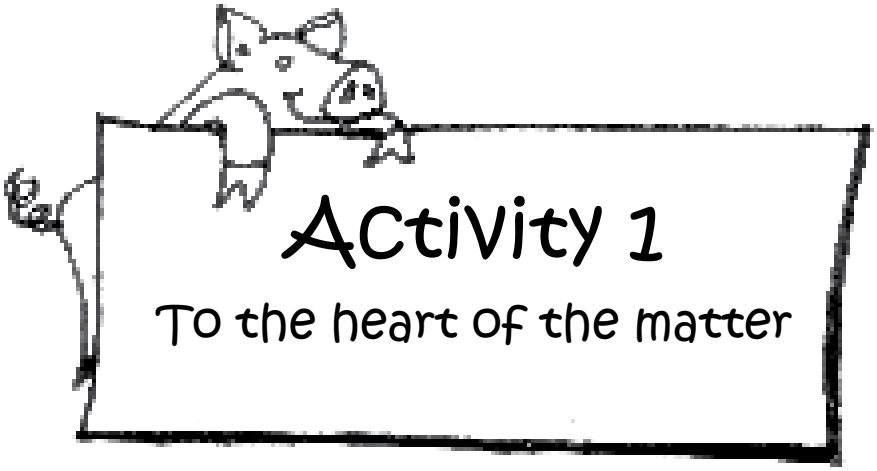
You, the consumer, have a lot of influence when selecting products which have recyclable or minimal packaging. If good products are not in your usual shop, ask the shopkeeper to get them in so you can buy them.

Here are some ways you can reduce your waste when you go shopping:

- Select environmentally friendly alternatives. Some stores now stock environmentally friendly cleaning products, for example, laundry detergent that has reduced or is phosphate free.
- Use a reusable bag or local basket that is reusable instead of plastic shopping bags.
- Talk to your supermarket about selling reusable bags for sale at the checkout counter to encourage other people to buy and use these bags.
- Reduce the plastic bags for the fruit and vegetables – do you need a bag for every item?
- Buy paper products that are made from recycled paper.

Try Activity 15:
Make your own bag!

Activities



Activity 1

To the heart of the matter

Purpose: Highlight what is important to people and highlight how topics like waste can be connected to these values.

Time: 20 minutes

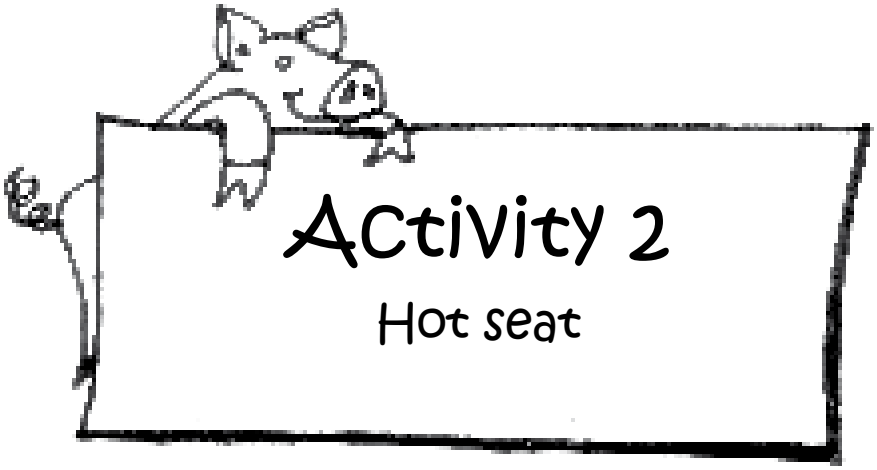
Materials: Pens and several large sheets of paper

What to do

1. Each group member should receive their own piece of paper. Ask group members to draw a big heart in the centre of the paper and write 'me' in the centre of the heart.
2. Instruct each group member to highlight the key things that 'drive' them, or motivate them. Draw lines from the heart and highlight what's important to them.
3. After 10 minutes, ask each person to present their picture.
4. When everybody has shared their picture, discuss some of the key points that people shared. You might be surprised to find that there will be very common points (family, religion, work etc).

Reflection and drawing conclusions:

- Did anybody highlight 'waste' or 'the environment' in this exercise?
- What does this highlight to the group? Does this perhaps recognise the importance of starting with people and not the topic or issue?
- What were some of the common or shared values that people highlighted?
- How can these values be used to raise awareness of your topic?
- What are the connections between the shared values and issues like 'waste' and environment?



Activity 2

Hot seat

Purpose: Understand that people have different values, thoughts and ideas. Recognise that within a group, there will be different ways to 'speak' to people.

Time: 15 minutes

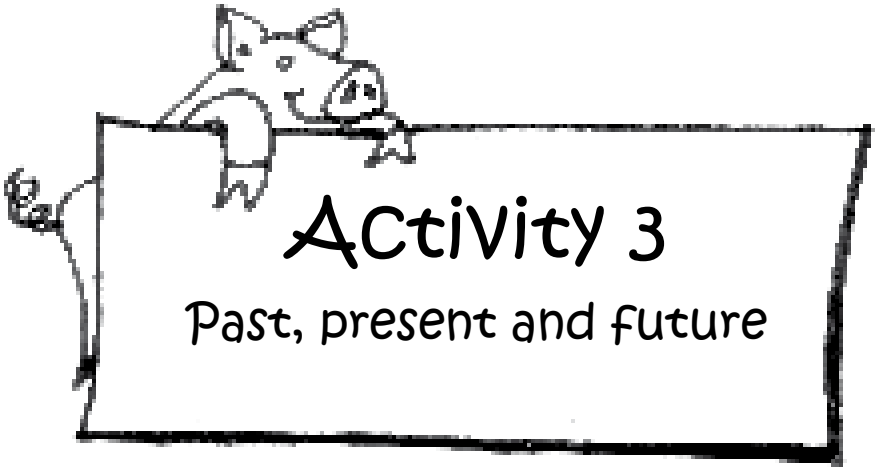
Materials: Paper, pen or marker

What to do

1. Write different types of people on separate pieces of paper. For example, 'Mother', 'Father', 'Businessperson', 'Teacher', 'School student', 'Priest' or 'Farmer'.
2. Ask for a volunteer to sit in front of the group.
3. Ask the group about a real life situation involving waste. For example, you see somebody from your village dumping rubbish into the ocean or your neighbour is burning plastic.
4. Give the person at the front of the group a piece of paper (with one name written on). Ask them to answer what they would do if they were that person. For example, if their card says 'Teacher', they have to respond the way a teacher might in this situation.
5. Continue to give cards to other people and ask them to respond from the viewpoint of the different roles.

Reflection and drawing conclusions:

- Highlight how different people share the same values to give a sense that within a community people know what the 'right' thing is to do.
- Did the group agree with the comments made?



Activity 3

Past, present and future

Purpose: Think critically about changes in waste generation over time. Recognise and involve local and traditional knowledge.

Time: 2 hours

Materials: Pens and paper

What to do

1. Refer to Unit 2 'Changing Lifestyles'. Explain the importance of learning from the past, from elders. You may wish to cover the following points: *Traditional knowledge is what our ancestors pass down to us: by word of mouth, through experience and observation, and sometimes through formal instruction. We can learn a lot about the world we live in by asking people what the world was like when they were the same age.*

2. Ask the participants to interview an elder in their community about what the village was like when they were the age of the students. Here are some questions they might wish to ask:

    - What was the village like when you were younger?
    - Were there any shops nearby?
    - Was there much plastic or waste?
    - Was there mainly green or garden waste? What did you do with the waste?
    - How has the village changed in the past 10 years, 20 years?
    - What's better, what's worse?

3. Ask the students to present their stories to the rest of the group.

Tips for interviewing elders

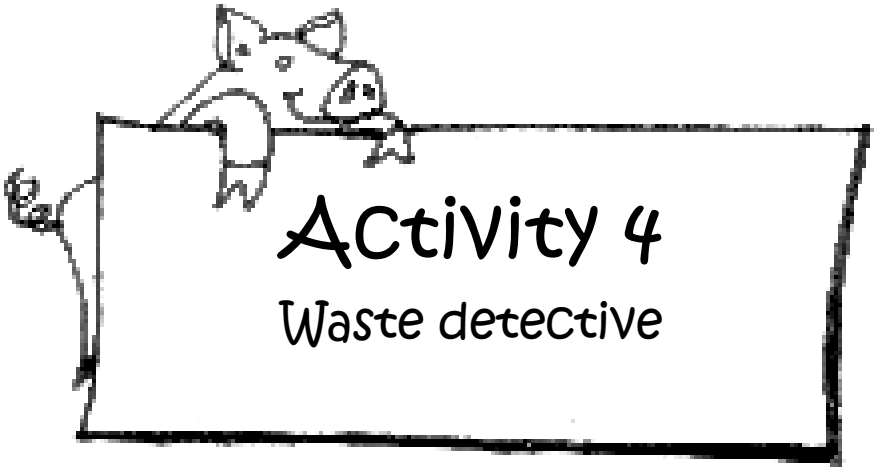
- Carefully prepare your questions in advance. Limit the number of questions to about ten.
- Before you begin asking questions, explain how you will use the information.
- Ask your questions clearly and give the interviewee time to respond.
- Remember to listen. The person you are talking to may not need you to ask them questions. Only ask your questions when you need to.
- Before you end the interview, thank the interviewee for taking time to help with your project.
- Send the interviewee a copy of your report when completed.

Reflection and drawing conclusions:

- What are some of the ways the villages have changed?
- Has there been an increase in waste?
- What did people do with the waste in the old days? Now?
- What actions could be undertaken to improve this issue?

Extension

Plan an action to raise awareness of waste issues in your community. You could develop posters or hold an information day.



Activity 4

Waste detective

Purpose: Understand the difference between *organic*, *inorganic* and *toxic* waste by examining waste found in your school or home.

Time: 1 hour (group session) + individual survey work at home

Materials: Paper, pens or pencils

What to do

1. Refer Unit 3, 'What is waste'? Explain the difference between *organic, inorganic, and toxic* waste.
2. Ask participants to think about the type of waste they usually throw away at home. Request the group members to suggest examples of everyday waste, and list them under the headings Organic, Inorganic, and Toxic. What type of waste do they think would be most common?
3. Ask the participants to make a survey of the type of waste their family throws away over a set time period (e.g. in a couple of days or one week). The waste should be sorted under the categories of Organic, Inorganic, and Toxic. Ask participants to construct a table like the one below:

	Organic	**Inorganic**	**Toxic**
Monday	E.g. Cabbage leaves, pandanus basket, 2 coconuts, egg shells, noodles	Plastic bags, 2 chip packets, corned beef can	1 car battery
Tuesday			
Wednesday			

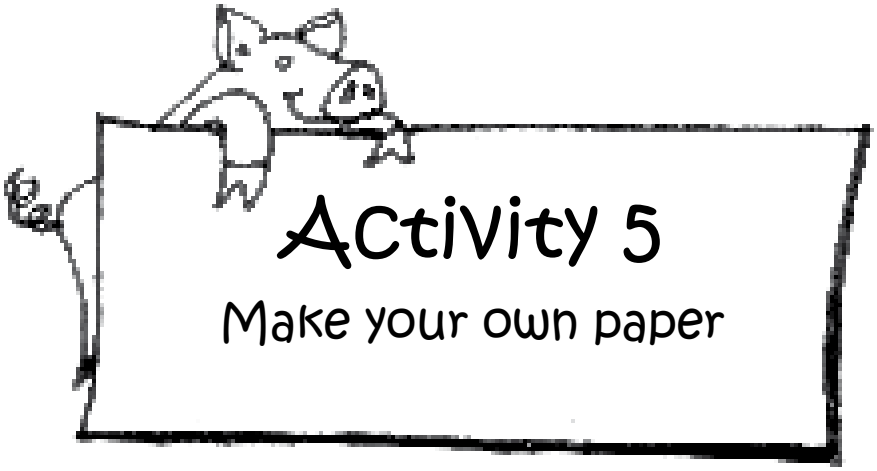
4. After everyone has completed their survey at home, ask participants to work in small groups to compare what they found. Encourage participants to discuss whether they think their waste is sorted under the correct categories.
5. Instruct participants to make a giant wall chart by writing the headings Organic, Inorganic, and Toxic and pinning examples of this waste underneath (or attaching pictures or photographs of the waste).

Reflection and drawing conclusions:

- How did the results of the survey differ from participants' predictions before the survey? Which waste was most common?
- What type of waste is the most difficult to dispose of? What is the most easiest? Why?
- Why is so much waste created today? Has it always been this way?
- How could you reduce the amount of waste produced during the survey?

Extension

Undertake a cleanup outside your school or village. Refer Unit 4, 'Why should we care about waste?'. What are the most common items? What categories of waste are they? Which items are likely to be the most damaging to the environment? Who is doing most of the littering? How could we convince people to reduce their litter?



Activity 5

Make your own paper

Purpose: Understand how paper is made and how we can reduce paper waste in their classroom/community.

Time: 1 hour

Materials: Used paper, a piece of screen, a flat dish/pan (a little bigger than the screen), pieces of fabric the size of the screen, a bowl, a blender or egg beater (or you can use a fork), a round jar or bottle, and two cups of hot water

What to do

1. Tear the paper into very small pieces.
2. Beat the torn paper and water in the bowl for a very long time to make pulp.
3. Pour the mixture into the flat dish/pan.
4. Slide the screen into the bottom of the dish and move it around until it is evenly covered with pulp.
5. Lift the screen out carefully. Hold it level and let the water drain from it for a minute.
6. Put the screen, pulp side up, on a hard, flat surface covered with a piece of cloth.
7. Place another piece of cloth on the pulp. Press down gently on the top cloth to remove any excess water.
8. Turn the cloth sandwich over so that the screen is on top. Then take off the piece of cloth and the screen very carefully. Don't move the pulp.
9. Let the pieces of pulp dry. There is your paper!

Extension

You can get creative with your paper by adding colours to the pulp mix or press leaves, flowers, pieces of string or other materials into the sheets. Use heavy objects to weigh down the pieces of pulp when they are laid out.

Activity 6

Dramatic connections

Purpose: Highlight the connections between waste and the impacts on people, the economy and the environment. For example how does waste affect health, education or employment?

Time: 2 hours

Materials: Refer Unit 4, 'Why should we care about waste?'

What to do

1. Divide participants into three groups. The best number in each group is six, however this isn't essential. Provide each group with one of the lists from the table below.
2. Ask each group to prepare a short drama/role play that must include all of the objects or people on their list. The participants are allowed to speak during the performance and may like to develop a script (this is optional).
3. Explain that the list can be arranged to tell a story that shows relationships between the environment and how people live. There is no right or wrong order to use the objects or people (from the list) in the drama.
4. Allow sufficient time for the groups to prepare a drama performance (15-20 minutes), and 5 minutes for each performance.

List 1	List 2	List 3
A supermarket or store	A baby	A drain filled with litter
A dead marine turtle	A well	An angry headmaster or principal
A happy jellyfish	A person drinking	A very bad smell
A plastic bag	Several dirty nappies	Junk food
A person shopping	An empty rainwater tank	A happy canteen lady
A sad, old man	A sick person	A child not feeling well

Reflection and drawing conclusions:

- After each performance ask the class: what was the message in the performance?
- Do you agree with the links made between people and the environment?
- Ask the performers: did you get your message across?
- What were the relationships that you were trying to show? Is this a realistic situation in your community?

Extension

Ask the participants to make up another drama about waste that links the social, economic and environmental issues. This time don't give them a list and have them create six of their own objects or people that will be included.

Now that participants have made connections between social, economic and environmental issues, challenge them to consider what they should do with this knowledge? How can they take some action?

Activity 7

A Fishy Tale

Purpose: Participants consider the impacts of waste on the natural environment and the way in which this can affect humans.

Time: 1 hour

Materials: Pens and paper. Refer Unit 4, 'Why should we care about waste?'

What to do

1. Explain to the participants that they are going to role play and see the world from the perspective of a fish. First ask each participant to choose a *habitat* to live in; it could be the coral reef, river, lake, ocean or mangroves.
2. Ask the participants to imagine they are a fish living in their chosen *habitat*. Ask them to close their eyes for a few minutes and imagine what their surroundings look like and what life is like in their natural environment. Encourage participants to share what they imagined with the group.
3. Explain to participants that unfortunately their *habitat* is becoming polluted because people are throwing their waste away irresponsibly. Now ask them to close their eyes again for a few minutes and imagine what their surroundings look like and what life is like in their dirty environment. Encourage participants to explain what they imagine.
4. Encourage the students to write a letter to another fish that lives in a clean healthy *habitat*. Ask students describe the place where they live and how they feel about all the rubbish that people throw in their home.

Example letter

Dear Charlie,

Hi, how are you? Hope you are fine. Forget about me because my fins are losing their color. My friends Mary, Chris, Tim and Joe are all gone forever. Oh! Not forgetting my cousin Mere who left this place a few months ago.

You might be wondering why I am writing this letter. This is because local factory wastes are dumped in my home. People and children who go past me cover their noses because they can't bare the smell of my home.

If it is ok with you, can I come and stay with you for a while.
Bye for now because I have a lot of cleaning to do.

Your friend, the fish

Student from Bethel Primary School, Fiji, as part of the Live and Learn HOPE Initiative 2004

Reflection and drawing conclusions:

- How do you think waste could affect the health of wildlife such as fish?
- How could it affect the people who eat the fish?
- How realistic is this situation in the community where you live?
- How could you reduce the amount of waste?
- What type of waste enters the water and where does it come from?
- Who is responsible for this waste?
- What effect could the reduction in fish numbers have on people?

Extension

Instead of writing to another fish, ask participants to write a letter to the newspaper or Government explaining their situation.

Plan an activity to reduce the impact of waste on the environment.

Activity 8

Make your own waste stream board game

Purpose: Make a board game that tells a story about the journey of waste from where it was discarded (e.g. in a bin) to its final resting place (a landfill site). The game will highlight positive and negative activities that happen along the way.

Time: 2 hours (can be shorter if the board is already made)

Materials: Cardboard, pens, markers or coloured paints. Refer Unit 5, 'Where does waste go?'

What to do

1. Explain the concept of the 'waste stream' and discuss where waste goes after it is thrown 'away.'
2. Ask participants to make their own board game by using the example provided. Make the board game as big as you wish – the bigger the better. Draw and number the board game squares (make them a different shape or different pattern if you wish). See the example on the next page.
3. Use the dice diagram on the next page to make your own dice.
4. To play: each player takes turns to roll the dice and move forward on the board. If a player lands on a square with a negative waste impact or action they must follow the instructions and move back. If a player lands on a square with a positive impact or action they must follow the instructions to move forward or roll again. The winner is the player who crosses the finish line first. See the list on page 63 for your clues.

Reflection and drawing conclusions:

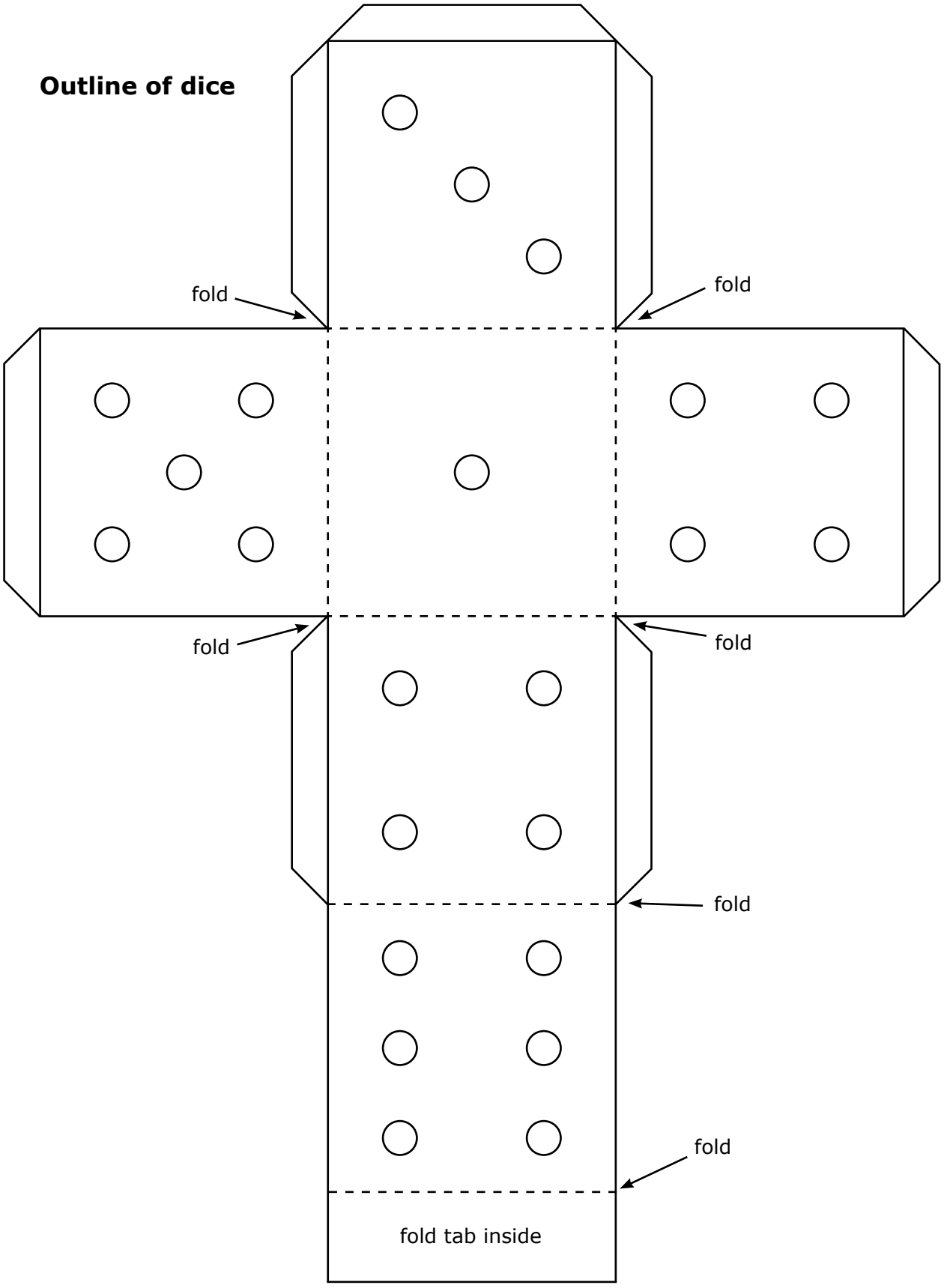
- Discuss each positive and negative instructions on the game board. How do these situations relate to real life? How relevant are they in your community?
- Where does waste comes from? Where does it go?
- Why is waste created?

Extension

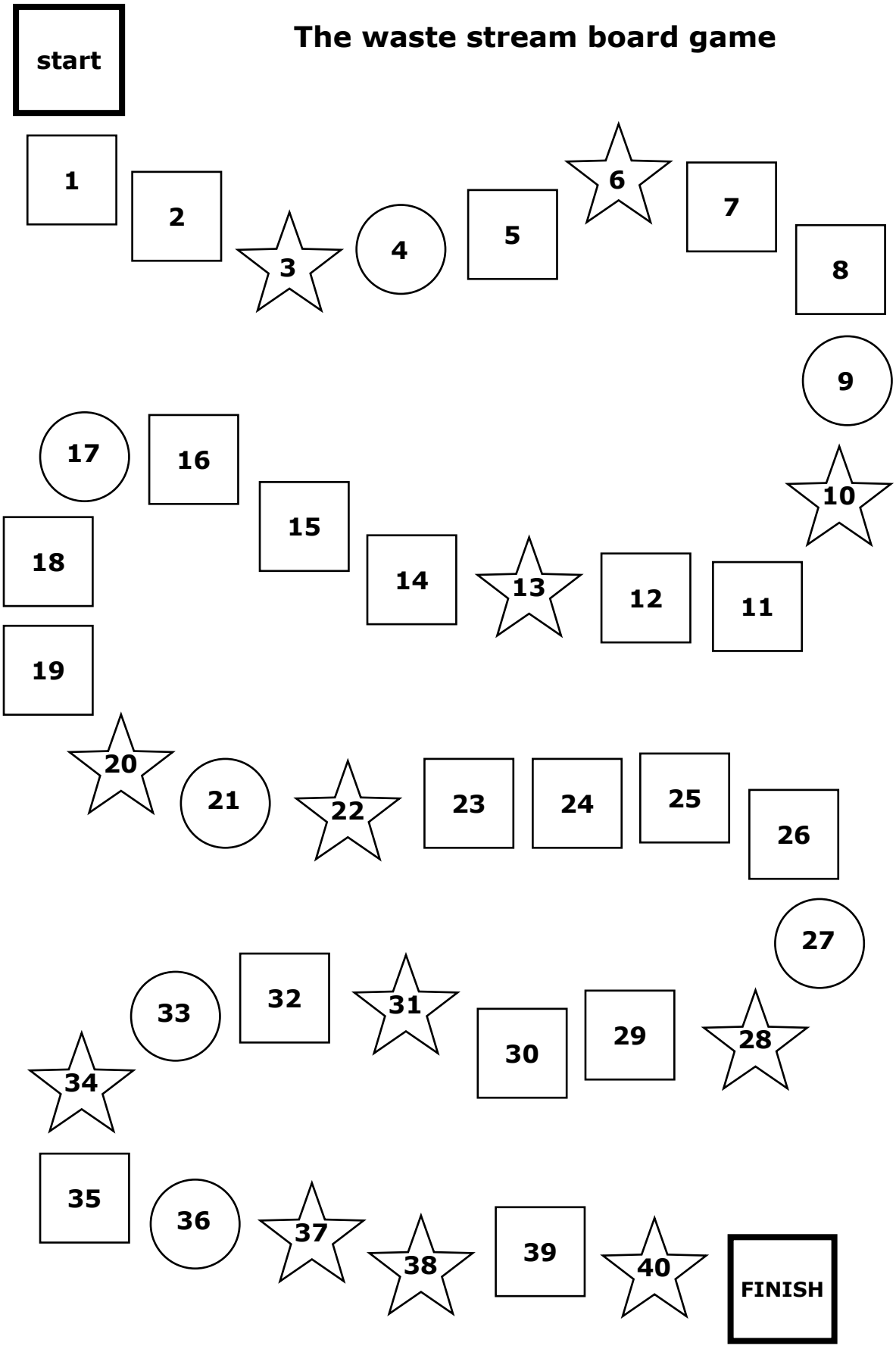
Now that you understand that 'waste' is simply the result of small choices. What should you do with this knowledge?

Dice diagram: cut out and fold to make your own dice.

Outline of dice



The waste stream board game



The "Waste Stream" Board Game

☆ 3 You are invited to a friend's birthday party

◯ 4 You decide all your shirts are too 'unfashionable' – back 1 place

☆ 6 You borrow a shirt from a friend – forward 3 places

◯ 9 You "must" have a new shirt to impress your friends – back 3 places

☆ 10 You decide to give a gift – forward 1 place

☆ 13 You make a really nice gift from stuff around the house – forward 3 places

◯ 17 You decide to buy a present from town – back two places

☆ 20 You take a re-usable bag shopping – forward 2 places

◯ 21 You drive to town – back two places

☆ 22 You catch the bus or share with friends – forward two places

◯ 27 You buy a magazine that gets read once – back one place

☆ 28 You buy a book that can be passed on – forward two places

☆ 31 You refuse any wrapping and the plastic bag – forward two places

◯ 33 You buy a birthday card – back one place

☆ 34 You make a card and wrapping from recycled paper – forward two places

◯ 36 You scrunch up the docket and chuck it out the window on the way home – back two places

☆ 37 You put the docket into the rubbish bin – forward one place

◯ 38 You put the docket into your compost heap – forward two places

☆ 40 You go to the party and have a great time – you win!

Activity 9

Grow great fruit and vegetables!

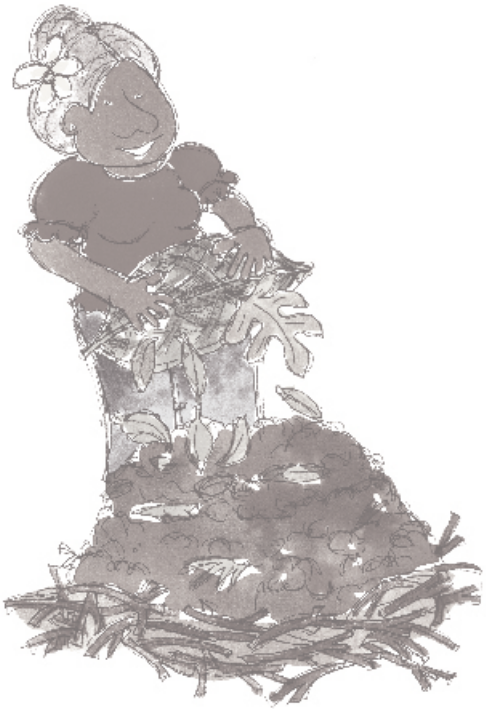
Purpose: Learn the basic principles of composting and gain hands-on experience by beginning a real compost heap.

Time: 2 hours

Materials: Grass, leaves or other green waste, spade, access to water, cardboard boxes. Refer Unit 6: 'Rubbish as a resource!'

What to do

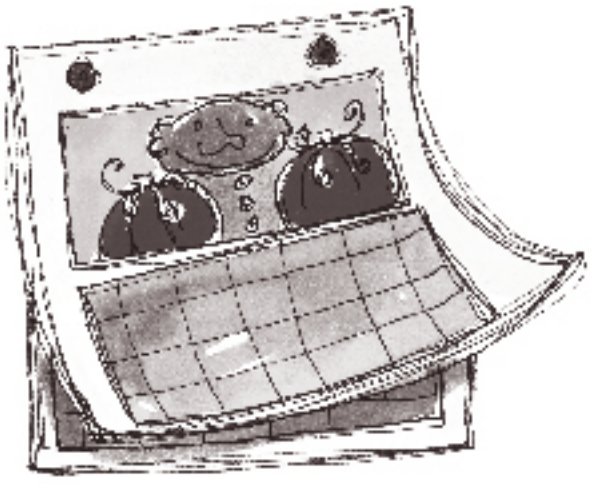
1. Put down a layer of long branches first. This lets air in and allows water to drain. Add grass, leaves, torn cardboard, soil, animal manure and old compost. Do not put any food in as it will attract animals.



2. Wet the pile as you build it up. You can use your washing water but do not use water that contains bleach. The compost should be damp, not wet. Squeeze it and you should get a few drops.

3. After four weeks, put more branches next to the pile and shift pile over to mix it up.

4. Shift the pile every month. In three months, the compost is ready to be used in your garden.



How to use the compost

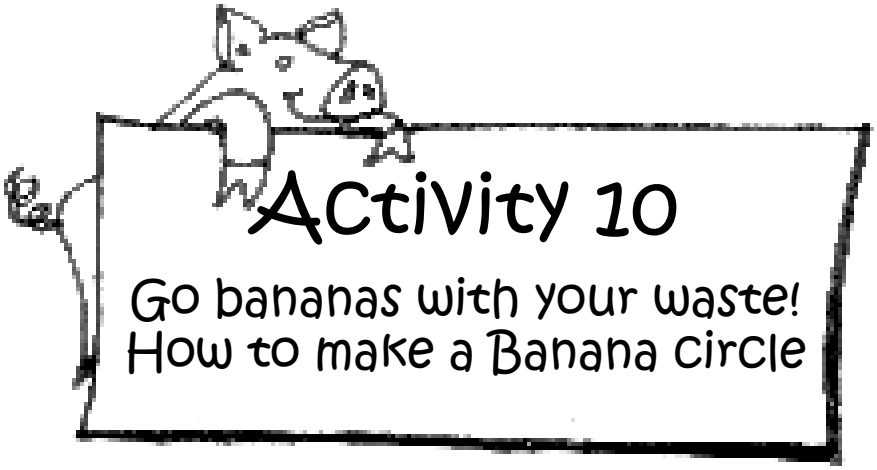
Place compost under the branches around fruit trees, but do not let it touch the trunk. Dig compost into soil of vegetable patch two weeks before planting seeds. Put compost on your vegetable patch but be careful the compost does not touch the vegetable's stems.

Reflection and drawing conclusions:

- Why is composting an important part of minimizing waste? (reflect that *organic* waste typically makes up the highest proportion of all solid waste produced).
- Why is composting an important part of gardening?
- How could you encourage other people to create compost?
- How could composting be used to earn money or improve crop production?

Extension

Now that you have the knowledge and skills required to make a compost heap, what will you do with this knowledge and skills? Make a commitment to start compost heaps at home, or conduct a training workshop to show other people how to compost and grow better food.



Activity 10

Go bananas with your waste! How to make a Banana Circle

Purpose: Understand that waste management 'technology' does not need to be a complicated science, you can use simple Banana Circles to turn *organic* waste into yummy food.

Time: 2 hours

Materials: Cardboard, yard waste, organic household waste, water. Refer Unit 6, 'Rubbish as a resource!'

What to do

1. From the readings, discuss the issues about *organic* waste. What is *organic* waste? How much of total waste volume produced is *organic*? How can *organic* waste be a problem? How could *organic* waste become a useful resource?
2. Explain that Banana Circles are a simple way to turn *organic* waste into something very useful: nutrient rich soils that can grow food crops such as bananas.
3. Explain the steps required to make a Banana Circle.

Step 1: Make a 2x2 metre pile of garden waste (leaves, grass, small branches). Pig and chicken manure will also help.

Step 2: Throw several buckets of water onto the pile. Washing or kitchen water is great, but make sure the water does not contain bleach.

Step 3: Plant bananas or other fruit trees around the pile, half a metre out from the pile and at least two metres apart. Water daily until they are strong.

Don’t mix bananas with other fruit trees around the pile. Bananas are so strong they will kill the other plants.

Step 4: Just keep piling your garden waste on top of the Banana Circle.

Too much garden waste? Make another Banana Circle!

Feed your fruit trees...fruit trees feed you!

Reflection and drawing conclusions:

- How useful do you think Banana Circles would be in your community or other rural communities?
- How do you think communities could benefit from knowledge about how to make a Banana Circle?
- How long do you think you should use a Banana Circle before making a new one?
- How do you think the food crops grown from a Banana Circle would compare to ordinary crops?

Extension

Now that you know more about Banana circles and their advantages, what will you do with this knowledge? Participants could start a Banana Circle in their own household. Alternatively, they could train other people in their community to make Banana Circles.

Activity 11

Take a stand on waste

Purpose: Think critically about who is responsible for waste issues, listen to and consider a range of views, and develop and express opinions about taking responsibility for waste.

Time: 1 hour

Materials: A sign that reads 'strongly agree' and one that reads 'strongly disagree'.

This activitiy is better suited for older students or community members.

What to do

1. Refer Unit 7, 'Campaigning and advocacy for change'. Highlight to participants that there is no 'right' or 'wrong' answer.
2. At one end of the room place the sign that reads 'strongly agree' and at the opposite end place the sign that says 'strongly disagree.' Draw a line between the two signs using chalk or masking tape.
3. Start with some questions that will show the participants how this exercise works. Ask questions like, "You have brown hair and blue eyes", "You like ice-cream for breakfast" or "School is great!". Encourage participants to stand along the line depending on how strongly they agree or disagree with this statement.
4. Present participants with the statement "we are all responsible for fixing waste problems on our island" and tell them that they must decide if they support it or reject it. If they strongly agree they should stand closest to the 'strongly agree' sign, if they strongly disagree they should stand at the opposite end of the room, next to the 'strongly disagree' sign. They can also choose to stand anywhere on the line in-between the two extreme opinions which represents a continuum (e.g. agree to some extent), or in the middle (agree and disagree to the same extent).

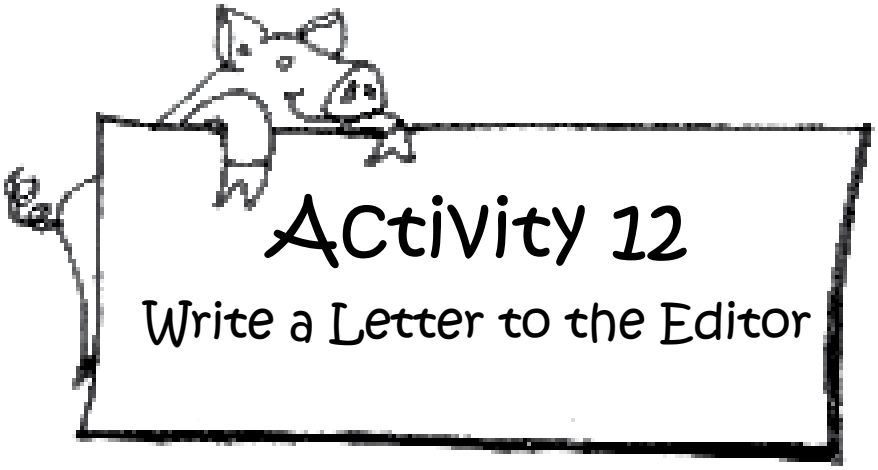
5. Ask the participants to provide their reasons for why they have decided to stand in their position on the line. If the participants are clustered in groups, you may give them time to discuss their reasons amongst themselves and then select a spokesperson.
6. After each participant or group speaks the others should be encouraged to ask them questions. Allow each student or group the opportunity to have their say.
7. Having considered a range of opinions, encourage the participants to change their point of view (where they stand on the line and on the issue). Explain the importance and value of considering a range of ideas and being prepared to change their mind.

Reflection and drawing conclusions:

- Ask the participants: if you changed your minds, what were some of the things that made you change?
- Why is it important to hear a range of views or opinions about an issue such as waste?
- In what ways has this discussion increased your understanding about the waste issue?

Extension

- Repeat the activity using other statements that you develop. Here are some more examples: 'Teachers are responsible for the school environment,' 'Business and industry are responsible for waste,' 'Rubbish dumping is a more important issue than water quality.'
- Now that you have discussed who is responsible, what should you do to make sure these responsibilities are fulfilled? Work together to undertake a community action against waste.



Activity 12

Write a Letter to the Editor

Purpose: Educate students about the role of the media and how the media can help promote an issue in their community.

Time: 2 hour

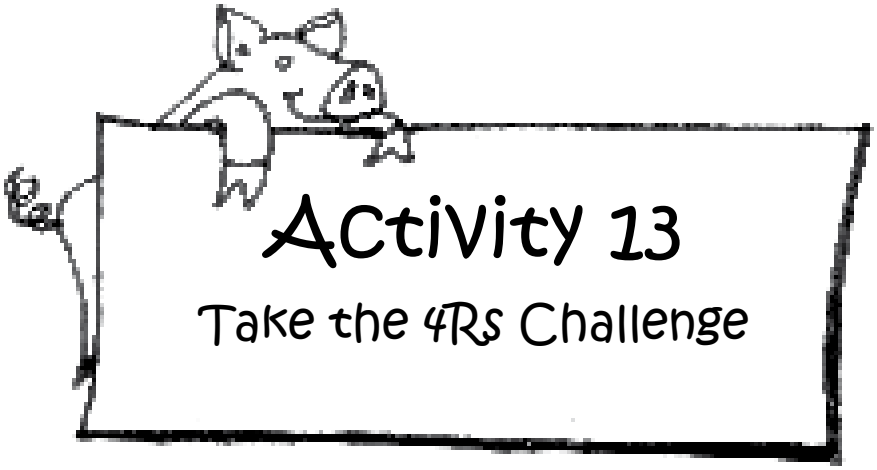
Materials: Pen and paper

What to do

The media plays an important role in raising awareness of issues facing our communities and countries. Write a Letter to the Editor of your local newspaper, explaining why it is important to minimise waste in our communities. Highlight how we can all make a difference by taking small steps to reduce waste. Highlight that one of the easiest things we can do is to throw our green waste in our garden, and to take our own bags to the supermarket.

Here are some tips to help with the letter writing:

- Be brief and to the point. A good length for a Letter to the Editor is approximately 100 words.
- Do not personally attack people. Provide a rational and practical argument for what you are advocating. Who should do it? How will it be paid for? Why is it a good idea?
- Include your name, address, and phone number with the letter. An anonymous letter probably will not be published and the editor might need to call to confirm that you are the author before printing it. Send a copy to your local politician.
- Your letter is likely to be edited or shortened to fit the space available so try to edit the letter and keep it simple and to the point. Remember to look out for your letter in the paper.



Activity 13

Take the 4Rs Challenge

Purpose: Learn the '4Rs' concept: 'Refuse, Reduce, Reuse, and Recycle' and put these ideas into action.

Time: 1 hour (game) + establish ongoing systems for practicing the 4Rs

Materials: Bag of rubbish, five containers (buckets, baskets or boxes), paper or cardboard to make labels, Refer Unit 8: 'Reduce your waste - take the 4Rs Challenge'

What to do

The 4Rs Challenge

1. Ask several participants to collect the rubbish that would have been thrown out from their home and bring it to the session. Ask them to bring *inorganic* and *organic* waste, but make sure they don't bring anything dangerous or unhygienic (no dirty nappies!). If that is too difficult, get waste from the school or village.
2. Organise participants into small teams. Provide each team with an equal amount of the waste that was collected by participants, and five containers in which to sort the waste. The containers should be labeled: Refuse, Reduce, Reuse, Recycle or Waste You could use a bucket, cardboard box, or basket for a container, or just label a place on the ground for sorting.
3. Read and discuss Unit 8.
4. Explain the rules of the game to the players:
   - The object of this challenge is to be the fastest team to sort their rubbish into the categories that they believe they will fit under. For example, if they have a glass bottle, they need to decide if it will be placed in the Refuse, Reduce, Reuse, Recycle or Waste containers.

- The team that finishes first will score 20 points, second will get 19 points, third will get 18 etc.
- However teams can also lose points! At the end of the game each teams' piles will be inspected by the group. Teams will lose 1 point for every item that is placed in the waste bucket.
- Each team will also have to provide a reason for why they have chosen to place a particular item of rubbish in any specific container. The other teams will have the opportunity to challenge their decision. If there is any controversy over a choice, the group will vote to decide if an item cannot be placed in a particular pile. If the team is outvoted then they will lose one point for the item. (Note: you must vote on whether it cannot be placed in a particular pile because items may be able to go in more than one pile).
- If the team has placed an item in 'Refuse' they must be able to identify an alternative product they could use in its place that provides an equivalent use or service, but doesn't create waste. For example, using reusable bags over plastic bags.
- If there is no clear decision by the group then the teacher/facilitator will be the umpire with the final say.
- The winner of the game is the team with the most points.

5. After the teams have completed the sorting challenge facilitate a discussion about each teams' choices. Encourage dialogue and debate about the choice before it is put to the vote.

Take the challenge further – take Action!

6. Involve participants in creating a 4Rs program for their school or organization. Find out what can be recycled in your country. Make a decision about which items can be collected to be reused or recycled. Label containers so that these items can be collected.
   For example:
   - Glass
   - Paper
   - Plastic bags & bottles
   - Aluminum cans
   - Compost (organic waste – but no meat or fish!)

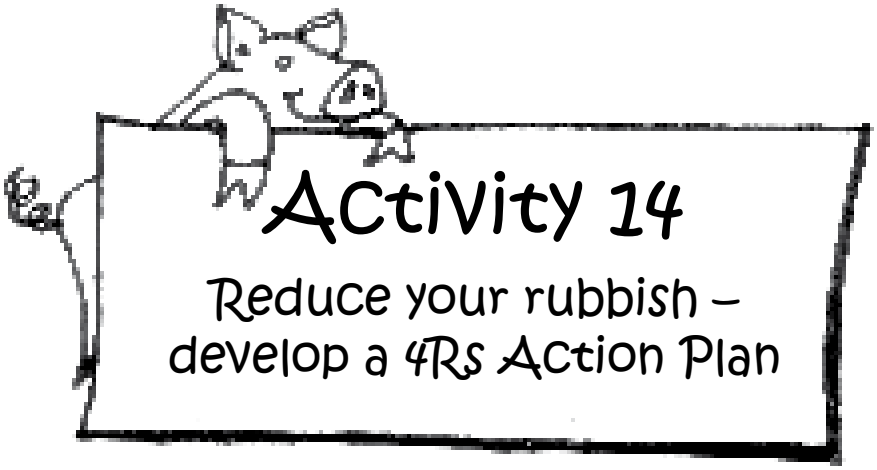
7. Make sure that the items collected are suitable. There is no use collecting a particular type of rubbish unless you have a plan for what to do with it. However, if you are creative you will be able to find many ways to reuse items.
8. Make a plan for how to manage the 4Rs program. This might require students or participants to be given responsibility for particular tasks. For example a small team could be responsible for finding opportunities for reusing paper.
9. This may require an awareness program within your school or community. Give the participants ownership of this process and they will likely work hard to get other people involved.

Reflection and drawing conclusions:

- How can individuals or small groups of people make an impact on big environmental problems such as waste?
- What problems did they encounter with trying to start a 4Rs program?
- What do you think is meant by the phrase "Think Globally, Act Locally"?
- How can Governments or businesses act to support the 4Rs?
- How could you influence communities, Government or businesses to make it easier to practice the 4Rs?

Extension

Now that you understand the importance of the 4Rs, what will you do with this knowledge? You could write to businesses to advocate for improved opportunities to practice the 4Rs. What else could you do?



Activity 14

Reduce your rubbish – develop a 4Rs Action Plan

Purpose: Learn how to identify types of waste. Identify ways to Refuse, Reduce, Reuse and Recycle and to put these ideas into action.

Time: 2 – 3 hours

Materials: Waste reduction plan templates, gloves (or clean plastic bags), writing materials. Refer Unit 3, 'What is waste'? and Unit 8, 'Reduce your waste – take the 4Rs challenge'.

What to do

Part 1: What is 'waste'?

1. Ask the participants to define what waste is. Refer Unit 3, 'What is waste?'. Ask 'How do decide if an item is waste?'
2. Divide the participants into groups. Ask them to brainstorm and make a list of things they think people throw away.
3. Give each group a sheet of paper. The participants should draw a table with the following headings:

Can be reduced, Can be refused, Can be recycled, Must be disposed, Can be reused, Can be composted.

4. Ask groups to sort out their rubbish list and put them under the correct headings. Display their group work.

Part 2: A Waste Audit

5. Use a garbage bag or bin to collect the waste thrown away in one day at your school. As a class, place a sheet of plastic on the floor and empty the bag of waste collected by the group onto the sheet of plastic with the participants standing in a circle around it.
6. Wear a pair of gloves or clean plastic bags on each hand. Ask the participants to direct you to sort the waste on the plastic into the different groups. Ask questions to get participants to think critically about which category to place the waste. For example: Can this be recycled or not?
7. Ask the participants: Does this seem like a lot of waste for one day? In our school or community, what is the most common type of waste? What would be the most common type of rubbish in households?
8. Work out how many bins are in the school or community. How much waste is collected in a week? (i.e. based on the amount you have collected x total bins x number of days per week). In a month? A year?
9. Ask the participants to imagine how much rubbish they personally make in one year. Also imagine how much waste their family makes in a year.
10. Ask the participants: What would you do with your family's waste if there was no truck that came to take it 'away'? Would it affect the amount of waste your family makes? What can you do to reduce the amount of waste at home?

Part 3: Developing a 4Rs Action Plan

11. Put the participants back into the same working groups. Explain that in this activity participants will identify actions they can take to Refuse, Reduce, Reuse or Recycle waste. Remind participants that they should come up with actions that are practical, something that they can do. Everyone can make a difference. It is up to them to identify how they can make a change to the waste that is generated.
12. Provide each group with a copy of the 4Rs Action Plan templates provided.
13. The whole group should participate in developing their 4Rs Action Plan.
14. Provide support and advice to the groups as they work. When each group has completed their plans, ask them to present their plans.

Reflection and drawing conclusions:

This is a model of how they can develop a 4Rs Action Plan with their friends, school groups, class, school, families or even communities.

Discussion questions:

- Why is it important for everyone concerned to participate in developing the plan? Who does the plan belong to? How will you make sure it is implemented?
- What relationship might exist between an increasing population and the amount of waste generated?
- How has the amount of waste a family generates been influenced by the changes in lifestyle over the past 50 years?
- How has the increase in the number of people in cities and volume of waste affected the environment?
- What predictions can you make about the amounts of waste that we'll produce in the future?
- Where will we put the waste when we run out of land space?
- What are the long term benefits of refusing, reducing, reusing and recycling?

Extension

As a group take action to encourage others in your community to reduce their waste. Visit household or other groups to assist them develop and implement their own waste reduction plans.

Waste Reduction Plan Templates

(Make copies for all the groups)

Individual Actions

What each student/ person can do. Actions we can take on our own.

Actions to REFUSE the waste:

Actions we will take	What are our targets? How will we know it is successful?

Actions to REUSE the waste:

Actions we will take	What are our targets? How will we know it is successful?

Collective Actions

actions we can take as a group

Actions to REFUSE the waste:

Actions we will take *together*	What are our targets? How will we know it is successful?

Actions to REUSE the waste:

Actions we will take *together*	What are our targets? How will we know it is successful?

Activity 15

Make your own bag

Purpose: Make and decorate your own bag out of an old t-shirt to reduce the amount of plastic being used and disposed of.

Time: 2 hours

Materials: An old t-shirt (with no holes in it), scissors, needle/thread (or sewing machine if possible), paints or markers, iron

What to do

1. Draw a dotted line across the t-shirts from the bottom of one sleeve to the next
2. Cut across the dotted line, and sew the bottom
3. Open the sleeves and roll them, sew them at the edges and attach them to the top of the bag.
4. Use the markers or paints to decorate the bag. Iron the bag on the inside of the shirt to fix the paint.
5. Take your own bag when you go shopping and say 'no!' to plastic bags!

Glossary

A

Aerobic: A biological process or environmental condition occurring in the presence of oxygen.
Anaerobic: A biochemical process or environmental condition occurring in the absence of oxygen.

B

Bacteria: A group of *microorganisms* (some of which cause diseases).
Bio-accumulate: The process by which some contaminants or toxic chemicals gradually collect and increase in concentration in living tissue. This can be in a single *organism* like a plant or move up the food chain as larger animals eat contaminated smaller animals.
Bio-degrade: Capable of decomposing (breaking down) by natural means.
Bio: Life or living organisms.

C

Carbon doixide (CO2): The greenhouse gas produced most by human activities, primarily through the burning of fossil fuels.
Chlorofluorocarbons (CFC): Gas compounds used as refrigerants and aerosol propellants, some of which break down the ozone in the atmosphere.

D

Decay: To break down.
Decompose: To rot, decay or separate into different parts.
Degradation: To reduce in quality or to decompose into smaller atoms.
Dioxin: A toxic byproduct of combustion, both from natural sources like forest fires and from manmade sources like power plants, backyard burning and industrial processes.
Disposable: Designed for disposal (to be thrown away) after use.
Durable: Strong and long lasting.

E

Ecosystem: The system of relationships between plants and animals and the environment.

F

Food chain: The process where animal eats another, and in turn, gets eaten itself. The food chain starts with tiny animals and ends up with big ones like humans or sharks.
Fluorescent lights: Tube that contains a thin layer of phosphorous on its inside surface to provide light.
Furan: See Dioxin.

G

Greenhouse gas: Gases make up the atmosphere. Some trap heat on earth, like a greenhouse keeping it warm.

H

Habitat: The place or type of site where an *organism* or population naturally occurs.
Hazardous: Dangerous or toxic.
Heavy Metals: The term heavy metal refers to any metallic chemical element that has a relatively high density. They are toxic, highly toxic or poisonous at low concentrations. Examples of heavy metals include mercury, cadmium, arsenic, chromium, thallium and lead. Heavy metals are dangerous because they tend to bioaccumulate.

I

Inorganic: Not having the structure or characteristics of living organisms (e.g.: plastics, glass)

N

Leachate: the liquid that drains or 'leaches' from a landfill; it varies widely in composition regarding the age of the landfill and the type of waste. Usually it has too many nutrients and can kill habitats by consuming all the oxygen. It may have traces of metals or poisons from the landfill waste.

M

Methane (CH4): A colorless, odorless flammable gas (the main constituent of natural gas) produced in landfills and swamps. Methane is 21 times more damaging as a greenhouse gas than carbon dioxide.
Microorganism: An organism that can be seen only through a microscope.

N

Non-renewable resource: Energy which comes from a source which can only be used once and cannot be replaced once it is used up, e.g. energy from burning fossil fuels.

O

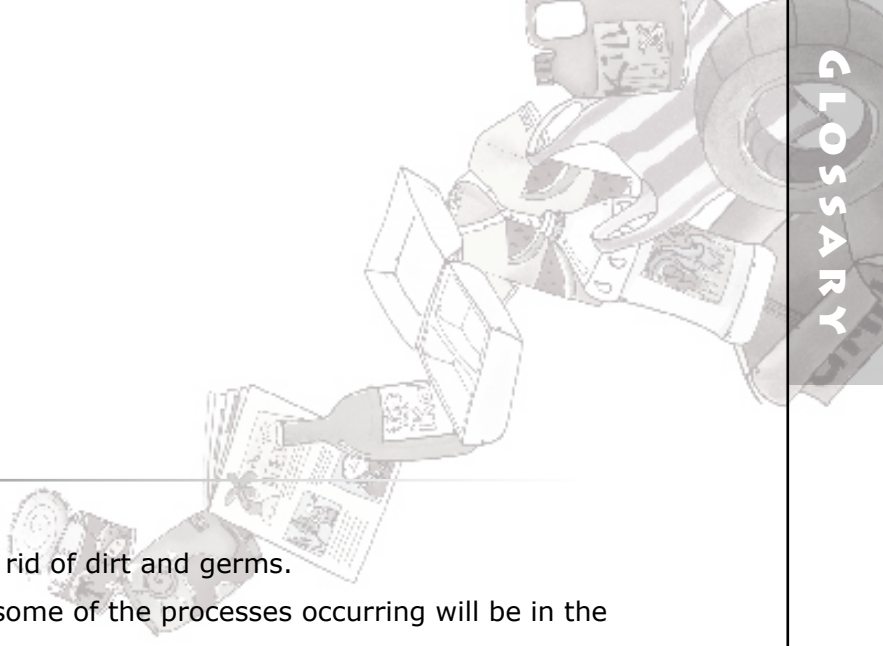
Odour: A particular and distinctive scent or smell.
Organic: Produced by or found in plants and animals.
Oxygen (O2): A colorless, odorless gaseous substance essential for life and burning.
Organism: A living thing that has (or can develop) the ability to act or function independently.
Oxidise: Add oxygen to or combine with oxygen.

P

Pulp: Any soft, moist material.

R

Recovered: To get something back as in to treat or process (used or waste materials) so as to make suitable for reuse.
Recycling: To reprocess things already used for further use.
Rehabilitation: To restore something to its original state or to something better.
Renewable resource: Any natural resource that can replenish itself naturally over time, such as wood.
Respiratory: Involving the process in living *organisms* of taking in oxygen and giving out *carbon dioxide*. Humans and animals respire.



S

Sanitary: Promoting health by getting rid of dirt and germs.
Semi Aerobic: Only partially *aerobic*; some of the processes occurring will be in the presence of oxygen.
Solid waste: Any waste, refuse or discarded material.
Stabilization: The composting process that a landfill undergoes to become stable. During the stabilization process, there are environmental releases such as *leachate* production and the release of certain gases. It may take as many as thirty years for a landfill to be completely stabilized for closure.

T

Toxic: Poisonous

Additional resources and reference documents

Additional resources

Rubbish is a Resource: A Waste Kit for the Pacific Islands Workbook and DVD

Posters

- 4Rs - Refuse, Reduce, Reuse, Recycle
- Stop solid waste, is it too late?
- Don't Litter in our Beautiful Pacific

DVDs

- 'Bring your own bag' animated DVD
- 'Waste World' DVD

Books

- Waste comic book

Reference documents

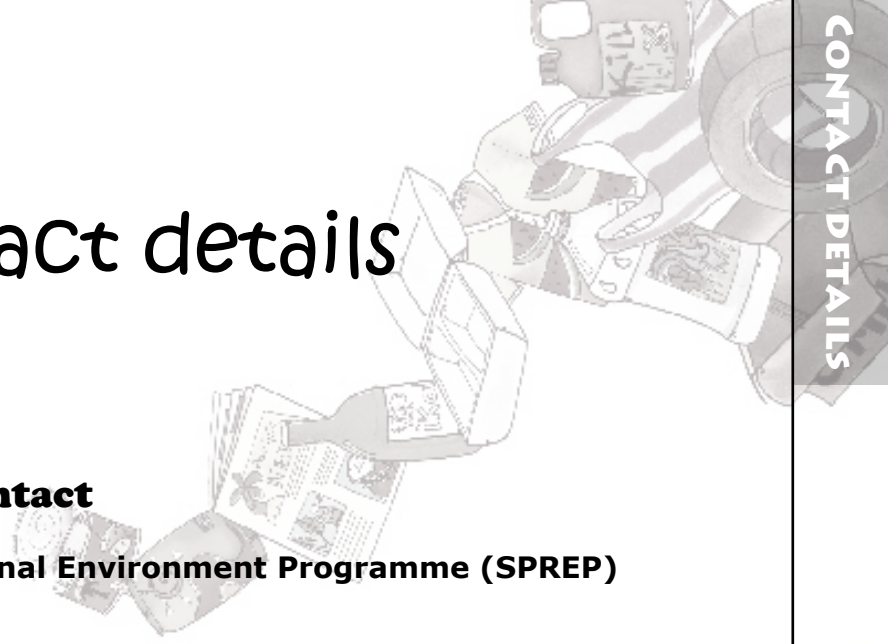
Solid Waste Management Strategy for the Pacific Islands

Action Plan for Solid Waste in the Pacific Islands

Economic cost scenarios for solid waste-related pollution in Palau. IWP-Pacific Technical Report (International Waters Project) no. 28, SPREP, Apia.

Economic costs of waste in Tonga. IWP-Pacific Technical Report (International Waters Project) no. 33, SPREP, Apia.

Contact details



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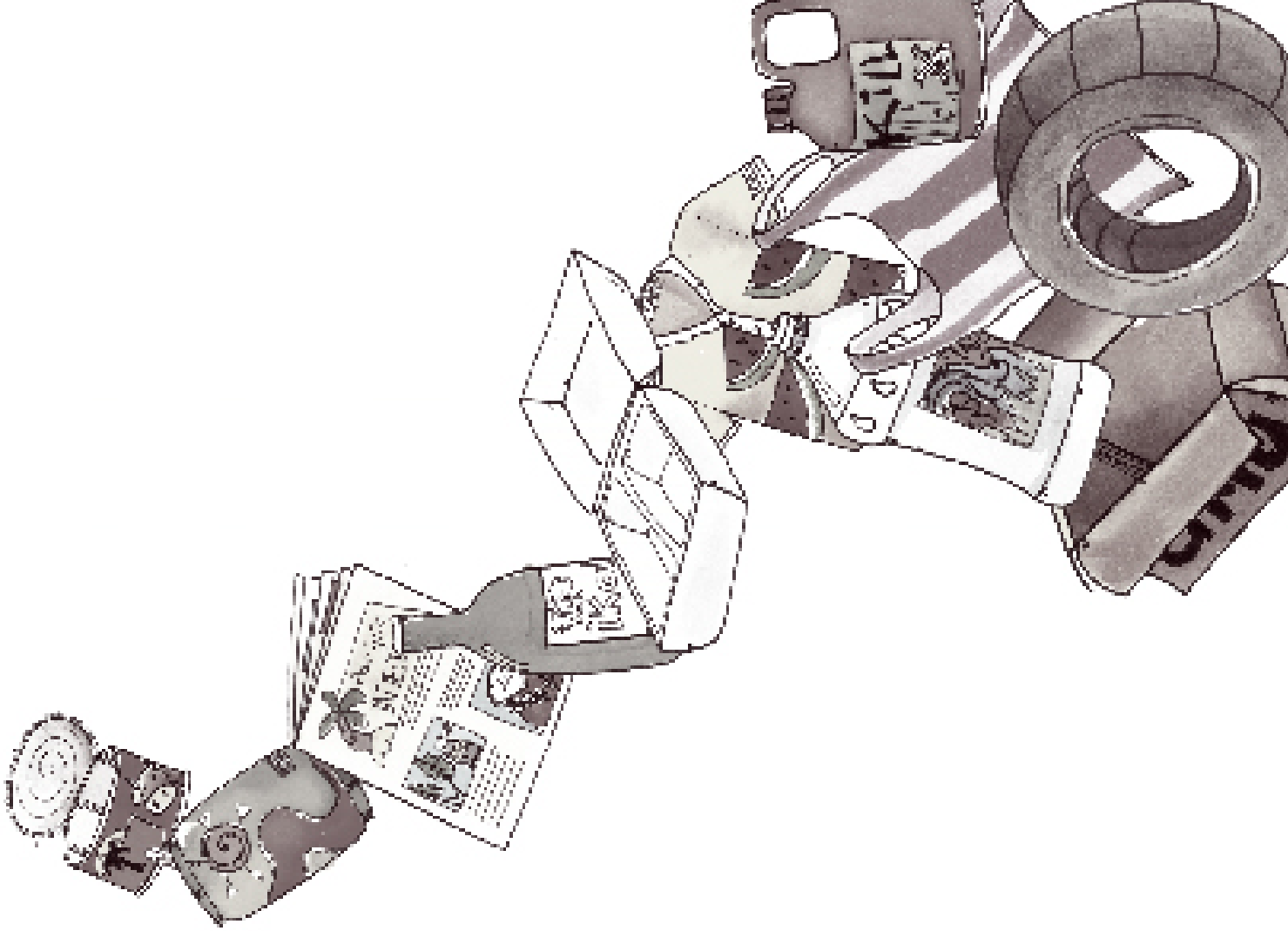

Pacific Waste

Education Handbook

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