

Statewide Recycling Education Centre

Teaching Resource



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KESAB environmental solutions is a non-profit community organisation which delivers a range of action programs and education resources to schools and the wider community, working with people to restore, preserve and improve our environment.

Statewide Recycling Education Centre is part of the Statewide Recycling facility located at Duncan Court, Ottoway. Statewide collects plastic bottles, aluminium cans and liquid paperboard containers, that carry a 5 cent deposit in South Australia, from recycling depots across the State. These containers are sorted and baled ready to be transported to recycling factories locally, interstate and overseas.

Overview

Visitors to Statewide will engage in activities to investigate the use, reuse, disposal, recovery and recycling of common materials. They also have an opportunity to tour the site and explore the interactive displays in the education centre.



Teachers will receive a selection of education resources to use as a follow-up to their class visit to Statewide. The following extension activities, which can be adapted to suit different age groups and ability levels, relate to each interactive display station in the education centre.

Key Understandings

- Waste management and reduction is vital for environmentally sustainable societies.
- Natural resources are used to manufacture materials such as plastics, glass, paper and metals, commonly used in packaging.
- Reducing and recycling provides a wide range of environmental and economic benefits such as the conservation of natural resources and energy.
- Plastics are generally sorted prior to being recycled. There are 7 commonly used types of plastic, identified by a Plastic Identification Code system.
- Most recyclable materials collected in kerbside wheelie bins are sorted at material recovery facilities (MRFs) then baled and transported to manufacturing plants for reprocessing.
- Some materials are not currently collected for recycling because they pose problems in the sorting process.
- Preventing litter, minimising waste and recycling is everyone's responsibility.

Key Vocabulary

recycle	waste	depot	environment	supermarket
litter	bottle	reuse	reduce	packaging
glass	plastic	metal	aluminium	paper
deposit	collection	landfill	natural resource	processing

Statewide Recycling Education Centre

Station 1 Shopping Centre



Introduction

Every year tonnes of packaging, and unused products, from our supermarket shopping ends up in landfill. Traditional packaging materials such as tin cans, glass jars and cardboard boxes are easy to recycle but some packaging materials (and over packaged items), can be difficult to recycle. This station will make students aware of the natural resources used to produce packaging and encourage them to consider packaging and wastage more carefully.

Aims of Station 1

- † Make comparisons between different types of packaging materials.
- † Make choices that create minimal waste when shopping.
- † Choose packaging which is both economical and environmentally sustainable by:
 - buying in bulk
 - selecting and using reusable containers
 - purchasing items packaged in a recyclable material
 - avoiding products which are over packaged

Extension Activities - Shopping Centre

Mathematics

- Take children to the local supermarket. In-groups, children select 5 different products (e.g. beans, chips, rice, tomato sauce and meat), count the number of different brands and identify the most common type of packaging used for each product.
- Compare the price of a similar product, packaged in different quantities. Look at volume, quantity, weight, etc. Calculate the most economical way to purchase that product and make a chart to illustrate your findings.
- Measure the dimensions and surface area of a cereal box. Calculate the dimensions of a box half the size, then construct.

Science

- Design and conduct an experiment to test the suitability of different types of packaging for different applications. For example, place a piece of bread in paper, plastic, foil and a glass jar and make observations over a two week period. Record your observations and share your conclusions.
- Design and conduct an experiment to test the biodegradability of different types of packaging. For example; Leave a paper bag, plastic container, steel can, plastic shopping bag and a foam tray out in the weather (or bury in your own mini landfill) and record observations over a period of time.

Society and Environment

- Use the Internet to research an industry that supplies food products to supermarkets i.e. Heinz, Allen's, etc. Find out the types of packaging used for their products. Why?
- Supermarkets are responsible for waste as well. List some ways your local supermarket helps to reduce waste. You may like to interview the store manager.
- Investigate how many different ways fruit or vegetables are packaged and list the advantages and disadvantages of each.
- Interview older family members to find out how products were packaged when they were your age.

Language

- Identify a product that is over packaged then write a letter to the company suggesting ways they could make their packaging more environmentally friendly.
- Using the word supermarket, write an acrostic poem that will encourage shoppers to choose products with environmentally friendly packaging.

Health

- Select three products and explain the health and safety reasons for the materials used in their packaging. Describe an unsuitable packaging material for each product.

Arts

- Manufacturers also use packaging to attract customers to their products. Design a box cover or bottle label to promote one of the following; fresh air, clean water, sweet dreams or exercise.
- Create a collage poster (using only reused packaging materials) to promote recycling.

Design and Technology

- Design, make and critique an alternative to plastic shopping bags.
- Design and make a tool or ornament for the garden, reusing a 2 litre milk, juice or soft drink bottle.
- Select an item from the supermarket that you believe has unsuitable packaging. How would you change it? Draw and label your new package, giving reasons for your changes.

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Station 2 Public Places



Introduction

Public places, which attract large numbers of people, such as parks, beaches and sporting venues often become polluted with litter. Litter is ugly; it can be a health hazard and has the potential to harm wildlife. To maintain healthy and inviting environments, it is important to develop responsible waste habits. Use the waste and recycling bins provided or, when packing a picnic, consider reusable containers and taking your waste home with you. This station develops an awareness of how we can help to make these places enjoyable for everyone, including flora and fauna. It also looks at local community areas, and identifies ways people can be responsible when disposing of waste. Students will appreciate that their choices have an impact on the environment. They will appreciate the importance of waste management in public places and consider personal responsibility.

Aims of Station 2

- † The affects that waste has on the environment (habitats, flora & fauna)
- † Ways to reduce waste in the local community
- † Appropriate sorting and placement of waste

Extension Activities - Public Places

Mathematics

- In pairs students survey teachers and students about how they reuse and recycle waste. Represent findings in tables and graphs
- Record the types and amount of litter found in your area of the schoolyard each day. Display findings on a chart and make suggestions for reducing and recycling these materials.

Science

- Reuse milk cartons and yogurt containers to sprout seeds and propagate native plants for the garden.

Society and Environment

- Think of three different public places and list the types of litter you would expect to find there. Describe the harm that litter can cause to the environment.
- Use a map of your local area to identify public parks, playgrounds and sporting facilities. Investigate litter issues in these areas and make recommendations to your local council for managing waste, such as signs, bins and fines..
- Look at areas in your school where there is a litter problem. Devise ways to reduce the waste in this area and consider the number and design of waste bins
- 'Litter Prevention is better than Litter Control' discuss / debate this statement with a focus on Clean up Australia Day.

Language

- Create posters to place around local environments to create positive attitudes and behaviour regarding litter reduction.
- Interview a Local Council environmental officer to find out about waste management in public places.
- Write a story or short play about a Litter Bug.

Health

- Waste can be dangerous in public places. Make a poster showing the types of rubbish which can be unhealthy, and why.
- Debate 'Fresh food vs Packaged food' in terms of human and environmental health.

Arts

- Create a collage / mural, using litter items, to remind people not to litter.
- Decorate and colour code school bins to educate the community about landfill and recycling.
- Create a sculpture that highlights the affect of pollution on a natural environment.

Design and Technology

- Design a bin system that prevents rubbish from being blown away.
- Design a system for collecting waste in your school. For example food scraps and 5 cent containers.

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Station 3 Home Waste & Recycling

Introduction

All households, schools, businesses and industries produce waste, much of which is collected and deposited into landfill. This station will make student aware of the ways they can help their family reduce household rubbish and the amount that is placed into landfill. The focus will be on the 3 R's (reduce, reuse and recycle). The activities will encourage children to take care in re-using where possible, sorting rubbish so that a large portion of the household waste can be recycled or composted. In an average household around 50% of waste could be composted, 35 – 40% recycled or reused, leaving only 10% of waste for landfill.



Aims of Station 3

This station on home waste and recycling will help children develop awareness in: -

- † The composition of household waste
- † Appropriate methods of sorting waste
- † Awareness of how the amount of landfill waste can be reduced by using the 3 Rs

Extension Activities - Home Waste & Recycling

Mathematics

- Record the amount of food and packaging in your lunch and recess (for one day) then record what you consume, discard, reuse and recycle. Discuss your observations.
- Keep a record of the amount of waste your family (or class) generates in one week. Create categories to sort the materials. Make recommendations for reducing or reusing some of this waste.
- Create a shopping list for a birthday party. Do a cost comparison of environmentally friendly and unfriendly items, packaging etc. (What can you buy in bulk, reuse or make yourself).

Science

- Research and make a worm farm.
- Design and conduct an experiment to test how long different materials take to breakdown in landfill.

Society and Environment

- Choose one item in your lunch box and create a web or flow chart to demonstrate the 'life' of that item from natural resources, through manufacture, transport, consumption and disposal.
- Design an advertisement to let your local community know when, where and what types of recyclable materials they can deposit in their wheelie bins or at the local recycling depot.
- As a class, collect and record the quantity and type of junk mail you receive in a fortnight. Discuss the purpose and usefulness of junk mail and ways to reduce it.

Language

- Make a brochure advertising the services of your local recycling depot.
- Pretend you are a glass jar or cardboard box. Write your life story.

Health

- Write a health and safety check list for managing waste in your school.
- Draw a safe and not so safe way to dispose of 5 items of waste from your home

Arts

- Make a paper maché mask for Halloween party or cultural event.
- Make a mobile using natural (leaves, gum nuts, etc.) and human-made waste items
- Create a welcome sign out of reusable waste from around your home.
- Reuse waste materials to make puppets, robots or costumes for a performance about waste.

Design and Technology

- Research and design a compost system for your school or home waste.
- Investigate and make recycled paper. Use this to make a greeting card or stationary to sell as an enterprise activity.
- Design a device for making paper fire logs.

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Stations 4, 5 & 6 Mini Statewide

Introduction

Once items have been collected and sorted at a recycling depot, Plastics 1 = PET, 2 = HDPE and 3 = PVC, LPB = Liquid Paper Board and Aluminium cans are placed into a 3-cell truck and delivered to the Statewide Recycling facility. At Statewide the bottles, cans and liquid paperboard products travel through a production line that uses a variety of processes and systems to move, weigh, sort and compact the materials.



The plastic bottles are sorted into sizes and weighed for calculation of the amount of money to be returned to recycling depots. PET bottles are also sorted into coloured and clear to prevent coloured bottles mixing with clear bottles and contaminating the clear recycled product. A magnet is used to extract any steel products from plastic and aluminium products prepared for recycling. All products are compacted and baled for easier and more efficient transportation.

Aims of Stations 4, 5 & 6

Learning about the processes and systems used at Statewide Recycling enable students to develop:

- † Understandings about a variety of recycling processes.
- † Knowledge about the plastic identification number system.
- † Understanding of the characteristics of aluminium and steel containers.
- † Connections between the concepts of size, weight and space, and the transportation or movement of large quantities and weights of recyclable products.
- † Understandings of the economic and environmental benefits of recycling to individuals and communities.

Extension Activities – Mini Statewide

Mathematics

- Students compare the weight of 20 empty plastic bottles, aluminium cans and steel cans and describe the amount of space they take up. Then crush the containers, remeasure and compare results.
- Use number computation and sentences to predict the weight and space of 40, 60, 80, 100 etc plastic bottles and metal cans before and after crushing. Describe the growing patterns and speculate about the economic and environmental benefits of compacting plastic bottles and aluminium cans for transport by truck and/or shipping container.
- Calculate the monetary refunds on various weights and amounts of cans and plastic bottles.

Science

- Collect and present data about the characteristics and uses of different plastics, using tables or charts.
- Research different types of metals, their production, properties and uses. Present your findings.
- Use the plastic identification number system to identify a variety of plastic containers, and then devise other ways to classify them according to different physical characteristics.

Society and Environment

- Design a marketing campaign to promote the benefits of Container Deposit Legislation (5 cent deposit on containers) to people in other States or Countries.
- Visit the following website www.recycling.sa.gov.au and identify the recycling facilities in your local area and the materials that can be collected and processed for recycling.

Language

- Write a story about the life of an aluminium can or plastic drink bottle. How was it made? Where was it sold? Who bought it? Where did it go before it arrived at Statewide and what happens next?
- Create a flow chart or topic web that describes the processes used at Statewide Recycling.

Health

- List the safety hazards at Statewide and create a visitors' brochure to explain the importance of safety procedures such as wearing earplugs and safety glasses.
- Devise a recycling relay game using plastic bottles and sorting stations.

Arts

- Students role play the journey of cans a bottle through the Statewide Recycling process.
- Use bottles and cans to make instruments. Write a 'Recycle Rap' and perform it at a school assembly.
- Use pictures from magazines and catalogues to create an "Eye Spy Poster" of non-recyclable products hidden amongst recyclable.

Design and Technology

- Using some of the machinery seen at Statewide (conveyer belts, air blowers, a trommel and baling machine), design a production line for processing an imaginary product.
- Design a simple pulley system for lifting packages and explore energy transfer and loads.
- Design a system for collecting bottle tops at Statewide, recycling depots or at home.

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Station 7 Where in the World



Introduction

After plastic bottles, aluminium cans and liquid paperboard have been collected,

sorted and compacted at Statewide they are sent off to a variety of destinations interstate and overseas for reprocessing. Reprocessing involve shredding and melting (or pulping in the case of paper), to transform the material into pellets, flakes or granules. The recycled materials are then used to make new products.

Aims of Station 7

Where in the world enables students to develop:

- † Understandings about a variety of recycling processes.
- † Understandings about the transportation of recyclables globally.
- † Knowledge of the natural resources used to produce products and the importance of resource recovery.

Extension Activities – Where in the World

Mathematics

- Estimate and calculate the distance bottles and cans travel from your local recycling depot to Statewide. Calculate fuel costs.
- What variables would be used to calculate transport costs? Explain why the cost to transport materials, by road and sea, is often calculated by cubic metre rather than weight.

Science

- Design and conduct an experiment to investigate the break down times of a variety of materials, under different conditions.
- Investigate the complete process of “Raw to Recycled”. How is plastic, liquid paperboard, and metal originally made? What properties/elements do the materials have and where do they come from? What products or packaging are they made into? And what recycling processes do they go through?

Society and Environment

- Research the geographical locations of recycling facilities and identify other industries in that area.
- Many things made from plastic today were once made from other materials. Select an everyday item, from Australia or overseas, which is made from plastic and research how it was originally made (e.g. bowls, bags, jewellery, tools).

Language

- Explore the concepts; ‘User Pays’ and ‘Corporate Responsibility’. Use persuasive writing to express your views on who should pay the cost of recycling packaging or e-waste.

Health

- Research and present information about, the type and amount of recycled materials that are allowed to be used in food storage containers and explain how this relates to human health.
- Visit www.ban.org and research the impact of global waste disposal on third world countries.

Arts

- Collect waste materials that are not generally recycled (e.g. chip packets, bottle tops, plastic shopping bags and confectionary wrappers) and reuse these materials to create a 3D art work with a sustainability message.

Design and Technology

- Create a 3D model or computer graphics program that shows the journey of natural resources and/or recycled materials around the world.
- Design and describe a process that could change a particular material from one form to another.

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Station 8 Buy Recycled



Introduction

This station displays a variety of items made from recycled materials, particularly plastic. We have recyclers in South Australia that take mixed plastics, such as shampoo bottles and ice cream containers, and transform them into useful recycled products. Students will discover a range of products made from recycled materials and appreciate the benefits of putting these materials to good use, rather than sending them to landfill.

Aims of Station 8

This station on recycled materials will allow students to develop an understanding of:-

- † The variety of products made from recycled materials.
- † Recycled alternatives to traditional materials.
- † The difference between reusing and recycling.

Extension Activities – Buy Recycled

Mathematics

- Compare the weight and other properties of similar items made from different materials. For example steel, wood and plastic garden stakes.
- Aluminium bales at Statewide contain approximately 16,000 cans. Calculate the number of cans transported for recycling each week (150 - 200 bales) and the value, at five cents per container.

Science

- Look at energy flows in recycling processes for aluminium, plastics, steel, glass and paper.
- Design and conduct an experiment to test the durability of garden stakes, made from different materials.
- Choose one product and investigate how it is recycled. Develop a flow chart diagram.

Society and Environment

- Research businesses in your local area involved in the reuse and recycling of car parts, tyres, oil and bodies. Create a poster or brochure to illustrate.
- Create a list of items in your classroom that would usually be thrown away when no longer used. Generate reuse and/or recycling alternatives for as many as possible.

Arts

- Collect waste materials that are not generally recycled (e.g. chip packets, bottle tops, plastic shopping bags and confectionary wrappers) and reuse them to create 2D or 3D artworks.
- Use broken crockery to create mosaic garden ornaments, pots and/or stepping stones.
- Collect waste paper (make sure it has been used on both sides). Shred and soak in water to create a pulp that can be moulded to make bowls, masks or other 3D objects.

Language

- Research the recycling processes for plastic, glass bottles or steel cans. Present your findings in an interesting way.
- Use the Internet to help you research how rubber tyres are recycled. Write a newspaper report on the latest methods and technologies.

Design and Technology

- Collect disused household items (e.g. umbrella, clock, radio, typewriter, toys, and furniture) and dismantle. Document the components that could be reused (e.g. knobs and handles) and generate a list of innovative ways to reuse other parts.
- Design and make a model of a house using as many recycled and reused materials as possible. Make sure you label the materials you have used.