



Wipe out Waste

Teacher Resource Sheet

Materials Recovery Facility (MRF)

(Pronounced *murf/merf*)

Materials Recovery Facilities are where the contents of the yellow lidded co-mingled kerbside recycling bins are taken. At the MRF, there are a series of mechanical and human sorting processes that separate the items into groups of the same material. These materials are then baled and taken to recycling plants to be reprocessed into new materials.

Each MRF is slightly different based on the machinery and technology available but there are some features that are common to many.

Trommel - This is a large spinning cylindrical barrel with holes in it. The materials enter the trommel, and as the trommel spins around the three dimensional items (bottles, jars, containers) fall through the holes, whilst the two dimensional items (paper, cardboard) travel through the trommel to the next conveyor. This is the first separation stage.

Bounce Conveyor - This is the second sorting phase to further separate the items. A sloped conveyor belt bounces the materials up the conveyor. The heavier items (typically the 3D objects) fall back down the conveyor belt, whilst the lighter items (typically 2D objects) travel up the conveyor.

After these two mechanical stages, the materials travel along a horizontal conveyor belt and the objects are sorted by hand. People working along the conveyor belts focus on sorting particular items into the sections behind the conveyor (see a picture of this conveyor on *Plastic*, pg. 3).

How fast are the conveyors? Fast! (see footage below). It depends on the materials and the size of the loads, as the speed can be adjusted.

A short 4 minute video segment from *Totally Wild* shows footage of some of the different sorting processes. The video can be viewed at

<http://www.youtube.com/watch?v=86yib5fpGrs&feature=related>.

In Metropolitan Adelaide, there are three MRFs operated by VISY, located at:

- NAWMA (Northern Adelaide Waste Management Authority)
- SOLO Resource Recovery (North Plympton)
- Integrated Waste Services (Wingfield)

Regional MRFs are located in Naracoorte, Mt Gambier, Port Lincoln, Whyalla and Port Pirie. Other regional areas have recycling depots or transfer stations instead of a MRF.

Container Deposit Legislation (CDL)

South Australia introduced Container Deposit Legislation in the 1970s to increase the rate of recycling and to reduce litter. The deposit is only on 'convenience' items or take-away products because these contribute to the litter problem more than the larger containers (such as plain milk, juice and flavoured milk in containers greater than one litre).

The 10c containers that are put into recycling bins (without claiming the deposit) end up at a MRF. From here, they are sorted and then taken to a 'super collector'. All of the containers that are taken to local recycling depots where the deposit is claimed are also taken to the super collectors. In South Australia there are four Super Collectors - Statewide Recycling, Toll, Marine Stores and Scout Recycling.

For more information, history and fact sheets about CDL, visit the EPA website and download the fact sheet -

http://www.epa.sa.gov.au/xstd_files/Container%20deposit/Information%20sheet/info_cdl.pdf

Big Book Support Information

The following sections have prompting questions or further information relating to the pages in the individual books, as well as some extra tips for recycling each of these materials and activities relating to the material.



Paper

Pg 1. Liquid Paper Board (LPB) is a type of paper/cardboard. It is the material that cartons and fruit boxes are made from (see page 4). It has a very thin layer of plastic on both the inside and outside, but this comes off in the giant washing vat before the paper is recycled. Some cartons have a 10c deposit, but plain milk cartons do not.

? What is wrong with the fruit box in this book? Why can't it be recycled as it is? (It needs to have the straw removed. The straw is plastic. Removing straws helps to ensure that cartons are empty. Recycling depots can refuse to take containers that pose an OHS & W risk, which can occur if liquid is spilled).

Suggested activities

Soak a fruit box or carton in a bucket of water for a few days. You should be able to see how the plastic will separate from the LPB, like it would at the paper recycling centre. This leaves the LPB which can be recycled to make new products.

Hire a papermaking kit from KESAB *environmental solutions* and making your own recycled paper.

In South Australia, paper is taken in bales from the MRF to New South Wales or overseas, which will depend on demand and price.



Plastic

The triangle with a number inside found on plastics is a Plastics Identification Code (PIC). This number identifies the type of plastic it is made from. Not all the materials with a plastics identification code can be recycled in your kerbside bin. Kerbside recycling can not take soft, scrunchable plastic or expanded foam plastic. For more information and a fact sheet on the plastics identification code, visit

<http://www.zerowaste.sa.gov.au/upload/facts-sheets/RecycleRight-plastics-fact-sheet.pdf>.

Suggested activity:

Use the plastics identification code to identify different plastics inside the classroom and at home.

Can some be recycled more easily at home than school? Why? Why not? Do the same types of plastics look the same? Why? Or Why not?

Pg 1. ? What different types of plastic can you see in the picture? (PET 1, HDPE 2, PVC 3, LDPE 4, PP 5, PS 6, Other 7)

Pg 2. ? Would the plastic containers fall through the holes in the trommel, or move through? (They would fall through, because they are 3D objects.)

Lids can now be recycled if they are put into a large plastic milk bottle and the bottle is filled with lids.

Pg 3. ? Can you see any other materials on the conveyor waiting to be sorted? (steel, aluminium, paper, glass)

Back cover. Plastics can be spun into thread and made into clothes or carpet. Outdoor benches and infrastructure can also be made from recycled plastic (see Replas - www.replas.com.au)

In South Australia, there are three different plastic processing plants:

- Plastics Granulating Services - Kilburn
- Advanced Plastics Recycling - Kilburn
- Plastic Recyclers Australia - Pt Pirie

Material may go to one of these, or be sent interstate or overseas.



Aluminium

Pg 1. Aluminium is used for some food cans and also drink cans. 10c cans that are at a MRF would have come from a kerbside recycling bin (which means the monetary deposit was not claimed)

Pg 4. 'You might get to drink from me again!' This doesn't mean the same can, but when it has been recycled into a new one. Some aluminium cans are made into new aluminium cans, as well as other products.

Back cover. Like steel, aluminium is often mixed with other metals when it is turned into recycled products. It is likely that the step ladder, drink can and coffee tin are made from aluminium. The bicycle frame may be aluminium.



Steel

Pg 1. Lids of the steel cans can be recycled, but they need to be placed inside the can and squashed closed. Aerosol cans can be recycled with the small plastic nozzle left on, but the larger plastic lid should be removed and placed separately in the recycling.

Suggested activity:

Use a magnet to identify the difference between steel and aluminium containers. Containers made from steel will attract the magnet, whilst aluminium will not. Which containers are steel? Which are aluminium? Be careful - this test is not foolproof! Some products are also a mixture of several metals.

Pg 4. Labels can be left on cans as they will come off in the washing or melting processes. Steel is infinitely recyclable. It can be recycled continuously without degrading in quality.

Back cover. When steel is turned into recycled products, it is often combined with other metals. On the back page, the construction girders, biscuit tin, beetroot tin, and pots and pans are *likely* to be steel. Bicycles can be either steel or aluminium – you can often feel the weight of the bicycle to help decide if the frame is steel or aluminium.



Glass

Pg 1. Glass is made of sand, but there are also other ‘ingredients’ including limestone and soda ash. Soda ash (sodium carbonate) can be made synthetically from limestone and salt. Glass does not degrade when it is recycled, so it can be recycled continuously. Most of the recyclables collected from kerbside bins are paper and card. This provides a cushion for the glass and prevents most breakages when glass is travelling in the truck or being tipped out.

If glass is broken at home, this needs to be disposed of in the landfill bin.

Pg 3. Glass is sorted into the different colours to keep recycled glass products the same colour. Some items can’t be recycled because they have different melting points (such as pyrex), and some items (such as mirrors) have other things added.

Suggested activity:

Can you think of another way that these non-recyclable glass products could be used? Could you collect these and undertake a project that would divert them from landfill? (eg. mosaics, artworks)

Pg 4. The cullet is taken to glass recyclers where it is melted and remoulded into new glass products. In South Australia, there are two glass recyclers:

- Amcor - Freeling
- Owens-Illinois - Kilkenny

A video that shows the whole process of glass recycling can be found at

<http://www.o-i.com/why-glass/how-glass-is-made/>

If you have any further questions or queries, please email jo@kesab.asn.au or heather@kesab.asn.au