

Material Types

This section looks more closely at raw materials - how we extract, process and use them and the products made from them that are often thrown away as 'waste'. It shows how recycling returns waste back into the production process to be used again.

Living in a material world

When we use resources we don't usually think about where they have come from and what happened to them during the manufacturing process. However, the 'life history' or life cycle of a product, from extraction of the raw materials to final disposal, can help us to understand how we could use fewer resources, save energy and avoid waste.

PAPER

What is paper?

Today, paper is made from the fibres in trees, a renewable resource. The trees are usually grown in managed forests. After harvesting, the wood is pulped - this is the raw material for most paper.

How much do we use?

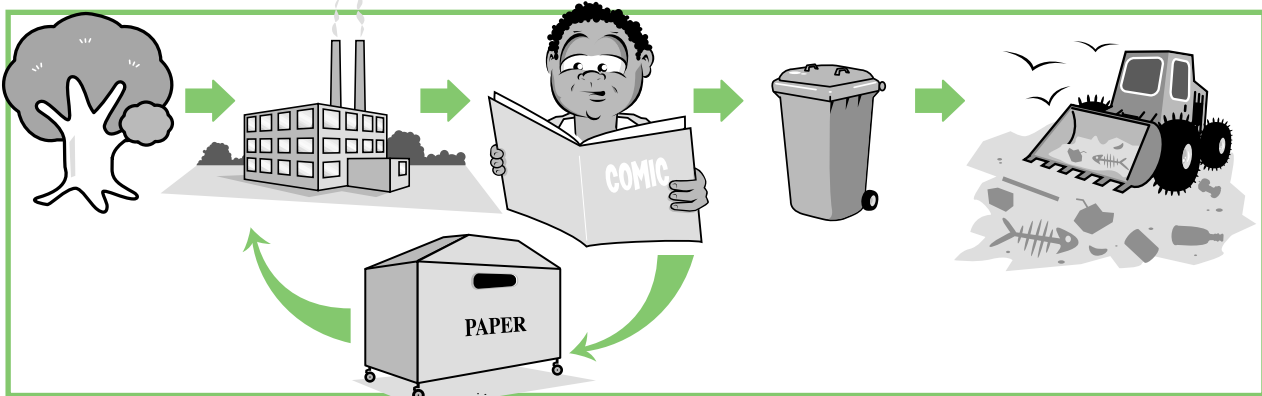
The average family in the UK disposes of 8.5 kg of paper and card each week. Each of us uses paper equivalent to 2 trees per year.

Recycling paper

Paper accounts for up to 20% of household waste. Paper is easy to recycle if it is kept

separate. Paper is either collected through kerbside collections, at neighbourhood recycling banks or at household waste and recycling centres. Waste paper is sold to a waste paper merchant who sorts it and sends it on to a paper mill where it is de-inked and made into pulp. The recycled pulp is made into paper again. Using waste paper in this way uses 28% less energy than making paper from new wood fibre.

Recycled paper has improved in quality from the early days. Today, it is often hard to tell the difference between recycled and non-recycled.



Recycled paper is used for:

- Packaging
- Newspapers
- Toilet paper
- Magazines
- Books
- Writing paper
- Office stationery
- Computer paper
- Tissues



Buying and using recycled paper increases the demand for paper to be recycled. Look for the recycled logo.

The **Apsley Paper Trail** and **County Supplies** sell recycled paper and Waste Watch can provide details of products and suppliers (**Wasteline 0870 2430136**)

Why recycle paper?

The benefits are:

- Less waste goes for disposal in landfill sites or incinerators.
- Recycling paper uses much less energy and water than the original manufacturing process.
- Recycling saves resources - less trees have to be cut down saving wildlife habitats and woodland ecosystems. Forests managed for paper production do not have such a rich wildlife population as ancient woodland.
- Recycling saves the UK money - using recycled paper means we are using a local resource from within the UK rather than importing wood pulp and paper from abroad.

Can we recycle paper forever?

Answer: Paper can only be recycled between 4-6 times before the fibres begin to wear out. Adding new fibre from wood pulp to the mix strengthens it again.

Every tonne of paper used for recycling saves:

- **17** trees
- **30,800l** of water
- **4200 KWh** of electricity (enough to power a house for 6 months)
- **9kg** carbon dioxide emissions
- **18kg** nitrogen and **36kg** of sulphur dioxide

Useful websites

The Apsley Paper Trail

www.thepapertrail.org.uk

British Recovered Paper Association

www.recycledpaper.org.uk

Yellow Pages

www.yellgroup.com

Aylesford Newsprint

www.aylesford-newsprint.co.uk

Confederation of paper industries

www.paper.org.uk

Paper and the three R's

REDUCE

- Avoid over-packaged products.
- Use cotton handkerchiefs instead of paper tissues.
- Avoid having disposable plates and cups when you have a party.
- Stop junk mail by getting your name removed from mailing lists. Register for this free service with the Mailing Preference Service by calling **0845 703 4599** or log on to **www.mpsonline.org.uk**

RE-USE

- Use both sides of a sheet of paper.
- Make your own notepads. Collect up paper just printed on one side, cut it all to one size, staple it across the top. Use it for 'Things to Remember' lists, telephone messages, shopping lists.
- A4 paper used on one side can be used in your computer printer for printing draft copies.

- Once you have read a comic or magazine, pass it on to a friend; take unwanted books to a charity shop or jumble sale.
- Envelopes: Re-use envelopes by using a sticky label over the old address. Some charities sell re-use labels especially for this purpose or you could design your own.
- Get crafty - make some papier-mâché pots or masks.

RECYCLE

- Don't throw paper in the dustbin -put it in local paper recycling banks or use a kerbside collection scheme if it is available.
- Buy Recycled - writing paper, envelopes, wrapping paper, even toilet paper!
- Does your school buy recycled paper?
- Set up a paper recycling scheme at school if you don't already recycle.

Investigating Paper



Paper Detectives

Paper and card are made from fibres. Usually they are wood fibres, but they can be mixed with other fibres such as rags. Tear pieces of paper and card and then examine the edge under a magnifying glass or microscope.

Describe the texture of the paper or card.

Compare an expensive paper and a cheaper one and see if you can see any difference between the fibres. Describe the differences.

Try tearing a sheet of writing paper and a sheet of toilet paper lengthways and sideways. Describe the differences and see if there is a difference in the way that the fibres lie.

Tear non-recycled and recycled paper. Describe any differences you find.

YOUR NAME

TODAY'S DATE



Investigating Paper



Properties of Paper

Paper and card are used in many different products such as cartons, writing paper, packaging material, cups, boxes, and even clothing. Sometimes the paper is coated with another material.

Write down 5 different paper products, describe the materials and choose words from the list below or your own words to describe the properties of the paper or card. An example is provided to help you.

Product...	Description of the material...	Properties...
Cup (example)	Paper with a shiny coating	Rigid, waterproof

Words / phrases that can be used to describe the properties of paper:
 Soft, hard, sharp, rigid, flexible, inflexible, strong, weak, waterproof, soaks up liquids, liquids run off, elastic, dense, impervious, porous, fluffy, can be written on, cannot be written on, tough

GLASS

What is glass?

New glass is made from sand, soda ash and limestone. These are common minerals, obtained in the UK and elsewhere by quarrying. Different mixtures of these raw materials (depending on the colour of glass required) enter a red-hot furnace which melts them into a soft liquid. This is poured into moulds to make bottles and jars.

How much do we use?

Every family in the UK uses about 500 glass bottles and jars every year - making up 6% of a dustbin's contents (by weight). Over 2 million tonnes of glass containers are used in the UK each year.

Recycling glass

Glass is a valuable material because it can be recycled again and again without losing its strength or quality.

In Hertfordshire 55% of household glass was recycled in 2003/04. Every local authority in the UK has a glass-bank scheme. The banks are found in places used by lots of people, for example, supermarket car-parks, council buildings and Household Waste Recycling Centres. The design of glass banks means that glass is smashed when it hits the base. This enables more glass to be collected at the bank than if bottles & jars were deposited whole.

After collection, the recycled bottles and jars are crushed. It is then called cullet.

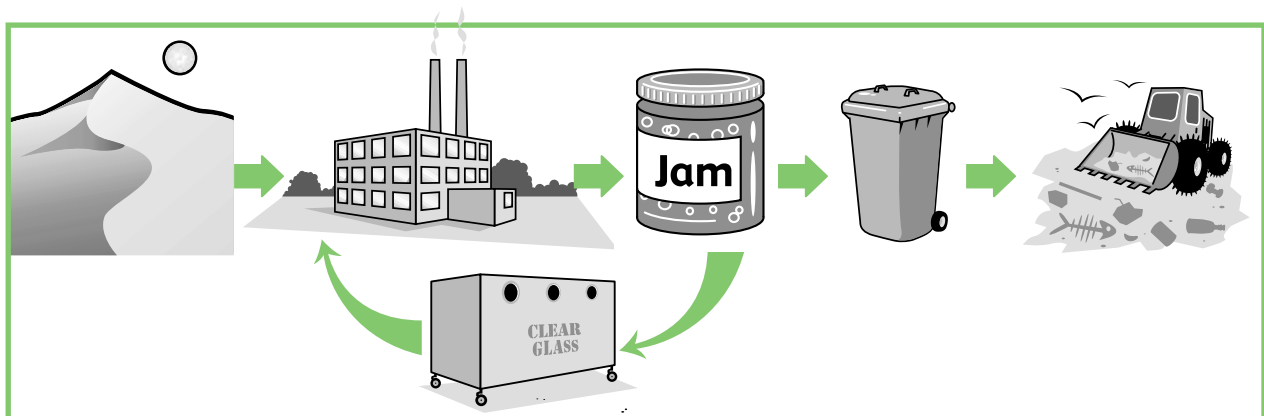
Cullet is often added to the glass-making process as melting old glass uses less energy than digging new raw materials out of the ground and processing them. In the UK about 28% of cullet is used in bottle-making factories but some green bottles contain over 90% cullet. Not all cullet ends up in bottles. Other uses include insulation



material (fibreglass), reflective paint, filtration systems and 'glasphalt' - a road surface.

Some areas of Hertfordshire have kerbside collection of glass. This glass is unsorted, so it is crushed to become an aggregate for road resurfacing.

To find out your nearest glass bank - look in the Waste in Hertfordshire section or check on www.wasteaware.org.uk



Why recycle glass?

The benefits are:

- It saves energy because it takes less energy to melt one tonne of recycled glass than to make one tonne of glass from raw materials. 566,563 tonnes of glass were recycled in the UK during the year 2000, saving 153,000 Mw hours of electricity.
- It saves the mining of sand, limestone and soda ash. Each tonne of recycled glass replaces 1.2 tonnes of primary raw materials and cuts mining waste by 80%. This reduces environmental damage.
- It reduces the amount of used bottles and jars going to landfills.
- It helps to reduce pollution and the release of 'greenhouse' gases such as carbon dioxide by using less energy.
- In 2002 more than 41 million items of glass went in Hertfordshire's 550 glass banks. That meant 13,800 tonnes of glass could be recycled instead of going to landfill sites, saving enough energy to power 3 million light bulbs for a day.



Useful websites

British Glass

www.britglass.org.uk

Bankit

www.bankit.org

Glass Forever Educational Site

www.glassforever.co.uk

Glass and the three R's

REDUCE

- The amount of glass you put in your bin. Only Pyrex, light bulbs and sheet glass should go in your dustbin as they cannot be recycled with bottles and jars.

RE-USE

- Use jars to store items such as dried food, flour, sugar and spices.
- Using jars to keep buttons, paper clips and screws together.
- Using attractive bottles and jars as vases for flowers.
- Using them to store home made foods, e.g. jam.
- Paint them and use as pencil / pen holders.
- Find out if milk is delivered locally in returnable bottles. Today only a few kinds of bottles are returnable. They are made of thicker glass to stop them breaking when they are washed or moved around. As their manufacture uses more energy and raw materials, they shouldn't end up in glass-banks.

RECYCLE

- Take any glass that can't be re-used to local glass-banks.

Teachers - there is an AO size poster showing the recycling of glass in the resources section at the end of the pack.

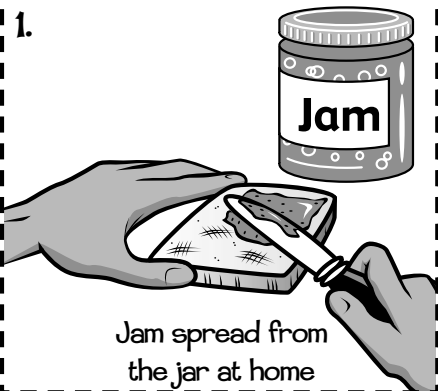
Use local facilities or combine trips by dropping off your bottles and jars en route to somewhere else - travelling a long way just to recycle materials reduces the environmental benefits.

At the glass bank:

- ✓ Separate out the different colours and remove bottle tops, corks and metal rings from bottles. (Unfortunately lids cannot be recycled. As a composite material they are difficult to recycle).
- ✓ Never put window glass, light bulbs, Pyrex or glass cooking dishes into glass-banks.
- ✓ Don't leave carrier bags or boxes around the glass bank - take them home.
- ✓ Avoid using a glass-bank at night - the noise can disturb people.

Glass lasts forever...

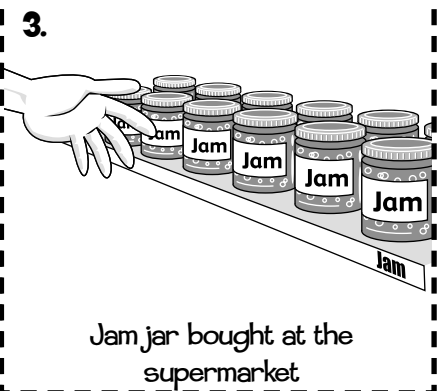
Some stages in making and using glass...

1. 

Jam spread from the jar at home

2. 

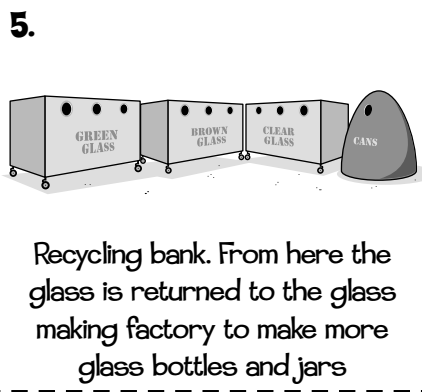
Factory where glass jars and bottles are made

3. 

Jam jar bought at the supermarket

4. 

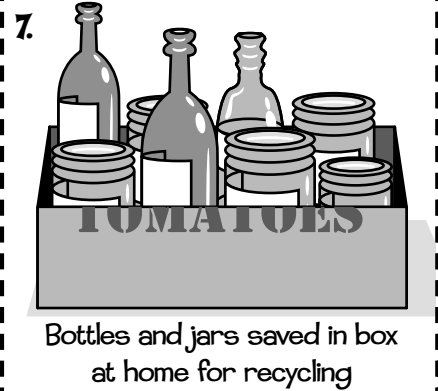
Jar thrown in the bin after use as general waste

5. 

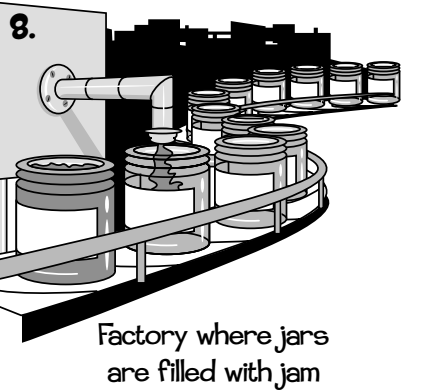
Recycling bank. From here the glass is returned to the glass making factory to make more glass bottles and jars

6. 

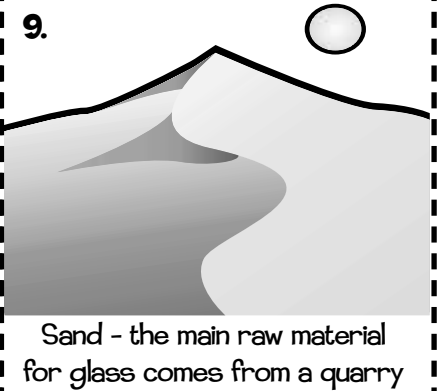
Jar lost in a landfill site forever

7. 

Bottles and jars saved in box at home for recycling

8. 

Factory where jars are filled with jam

9. 

Sand - the main raw material for glass comes from a quarry

Cut out each square and arrange as many pieces as needed to show:

1. A jam jar made from digging up raw materials to the jam jar ending up in a landfill site. How many pieces were used?
2. A jam jar made from recycled materials, being used and then recycled. How many pieces were used?

PLASTIC

What is plastic?

Plastics are made from oil, a non-renewable resource. Oil wells are drilled and the crude oil is sent to an oil refinery to turn it into products such as petrol, paraffin and lubricating oil. It is also used to make plastics. At the factory the atoms in the oil are pulled apart, separated and reorganised into long, thin chains called polymers. Different plastics can be produced by changing the order of the atoms in the polymer chains. The different types of plastics have different properties and are used in many different types of products. They can be 'blow moulded' to make products such as containers.

It is a light and strong material and is very popular for packaging. About a third of plastic used in the UK is for packaging.

How much do we use?

50 years ago we used about 5 million tonnes of plastic: in 2002 we used about 100 million tonnes.

About 5,000 million plastic bottles are thrown away each year in the UK. Plastic packaging accounts for up to 7% of household waste by weight (11% by volume). About 80% of plastic waste goes to landfill, 8% is incinerated and 7% is recycled.

The problem with plastics

Plastics are versatile. They are light, resistant to moisture, chemicals and decay. They can be flexible like cling film or rigid like a surf board. Most plastics are also designed not to decay - that's why they are used for packaging. However, this also means they won't rot down when they are discarded or landfilled. Waste plastic has become a worldwide problem with plastic bags and bottles littering countryside and coastlines. One section of the British coast was found to have 550 plastic bottles per kilometre!

Useful websites

Recoup (Recycling of Used Plastics Ltd)

www.recoup.org

Save A Cup

www.save-a-cup.co.uk

Recycling plastics

Less plastic gets recycled compared to other materials. This is mainly because there are so many different types of plastic. They need to be identified and sorted for successful reprocessing. There are also fewer uses for recycled plastic than other recycled materials. The main use of plastic is food and drink containers but health and safety regulations mean recycled plastic cannot be used in these.

Recycled plastics are collected, sorted into the different types and sent to processing plants where they are melted down again and made into new containers or other products. Different plastics can be recycled into fleece jackets, textiles, sleeping bag filling, carrier bags, recycling boxes, compost bins, fencing, garden furniture that looks like wood, road signs and road cones.

The plastics industry is being encouraged to use recycled plastics and there is a growing number of plastic collection schemes, but often only for bottles. This is because bottles are usually made from just three types of plastic (see table overleaf). They are more easily identified by reprocessors, into either PET, HDPE or PVC and then separated for recycling. They are also less likely to have food contamination like an oven ready meal tray.

Hertfordshire began collecting plastic bottles at most of its HWRC's in April 2004, and in the first year collected approximately 115 tonnes - over 2.3 million bottles!

CASE STUDY

Irish Shopping Success

In the Republic of Ireland a tax on plastic shopping bags has reduced the amount of bags used by 90%. The Irish government introduced the 'plastax' scheme after it estimated that 1.2 billion plastic bags were being handed out free each year. Many of these ended up as litter in the street and countryside. A tax of 15 cents a bag was introduced and after just three months about 277 million fewer bags were being handed out and millions of euros were raised to spend on environmental projects. Shoppers were also encouraged to use tougher, re-useable bags. Many other countries are now thinking about taking up the scheme.

Plastic and recycling

There are about 50 main types of plastic. The six most commonly used types of plastic are:

Symbol	Name	What it comes from	What it is made into
PET Polyethylene terephthalate	drink bottles & oven ready meal trays	→	stuffing for cushions, fleece jackets & sleeping bags
HDPE High-density polyethylene	bottles for milk & washing up liquids	→	traffic cones, road signs, flower pots
PVC Polyvinyl chloride	food trays, cling film, bottles for squash mineral water & shampoo	→	shoes, plastic pipes
LDPE Low density polyethylene	carrier bags & bin liners	→	refuse bags
PP Polypropylene	margarine tubs, microwaveable meal trays	→	plastic mouldings, drainage pipes
PS Polystyrene	yoghurt pots, foam trays, hamburger boxes and egg cartons, vending cups, protective packaging for electronic goods and toys	→	recycled versions of original products such as yoghurt pots

Why recycle plastics?

The benefits are:

- Plastics production uses about 8% of the world's oil production. Recycling is a sustainable use of a non-renewable resource. 1.8 tonnes of oil are saved for every tonne of recycled polythene produced.
- Recycling reduces the amount of waste going to landfill.
- Recycling saves energy - just one plastic bottle can save the same amount of energy needed to power a 60 watt light bulb for 6 hours.
- Saving energy also reduces pollution.

Plastic and the three R's

REDUCE

- Refuse unnecessary plastic carrier bags - take your own bag to the shops.
- Buy food and goods with less plastic packaging: choose glass not plastic where possible.
- Buy things in returnable or refillable containers.

RE-USE

- Some supermarkets offer a stronger, re-usable plastic bags (Bag for Life scheme), which they will exchange for free.
- Re-use plastic carrier bags for shopping or as rubbish bags.
- Use plastic containers such as margarine tubs and yoghurt pots for putting leftover food in

the freezer, growing plants and seeds, or for craft projects.

- Give unwanted plastic toys to friends, charity shops, jumble sales or playgroups.
- Find out if there is a refill service near you - try wholefood or health stores.
- The top of a bottle makes a good funnel or cut a bottle in half and use it as a mini-greenhouse in the garden to protect seedlings.

RECYCLE

- Use local recycling banks or kerbside boxes if they are available. Most HWRC's now have compactors for squashing plastic bottles. This reduces the amount of space the bottles take up when transported, thereby saving on fuel. Take the lids and caps off, as they are normally made of a different plastic which, would contaminate the bottle plastic when recycled.

YOUR NAME

TODAY'S DATE



Plastic Sort Out



1. Write down a list of as many different uses of plastic packaging as you can, such as sandwich holders, egg boxes, drink bottles and so on.
2. Write down as many properties of the many types of plastic packaging as you can, such as thick or thin, stiff or flexible, is see through or cannot be seen through.
3. Sort the plastic packaging you have been given according to their properties. If you have a lot, try to reduce the number of categories to about four.
4. Sort the plastics using the key provided. Look on the bottom of the plastic container for the key codes.

	PET	Polyethylene terephthalate	Drink bottles and oven ready meal trays
	HDPE	High-density polyethylene	Bottles for milk and washing up liquids
	PVC	Polyvinyl chloride	Food trays, cling film, bottles for squash mineral water and shampoo
	LDPE	Low density polyethylene	Carrier bags and bin liners
	PP	Polypropylene	Margarine tubs, microwaveable meal trays
	PS	Polystyrene	Yoghurt pots, foam trays, hamburger boxes and egg cartons, vending cups, protective packaging for electronic goods and toys

COMPOSTING

What is composting?

Composting is a form of recycling. Compost is made from a mixture of organic ingredients that have decomposed (rotted down). More than half of household waste is paper, cardboard, food and garden waste. These materials are organic, that is they are, or once were, living. Organic materials are broken down by natural decomposition processes (by worms and other creatures) to release nutrients (food for plants) back into the soil. This is called composting.

Farmers and gardeners have practised composting for over 4,000 years. It's an easy way

to turn food and garden wastes into something useful. It is helpful because it reduces the amount of waste needing disposal (over 30% by weight of the contents of the average bin is kitchen and garden waste), saves money on waste collection and disposal charges, and saves you money as you don't need to buy peat or other soil improvers.

It's easy to compost at home, try following the guidelines detailed later in this section. This can make use of / recycle much of your garden and kitchen waste. Some Hertfordshire councils also offer a green waste kerbside collection service for residents. It is best to check with your local council if there is one in your area and the type of waste it accepts. In addition to this, each of the 19 Household Waste Recycling Centres (HWRCs) in Hertfordshire will accept green garden waste from your home. For further details see

www.wasteaware.co.uk

For peat's sake

A good soil is needed to grow healthy plants. It is often necessary to improve the soil's structure. Many people use peat as a soil improver. Peat comes from fragile, threatened habitats where many rare plants and animals live. 95% of the UK's lowland peat-bogs have already been damaged or destroyed by the peat industry. Composting your own organic waste provides you with a soil improver that makes it possible to garden without using peat.



Food for thought?

There are basically two types of materials that can be successfully composted at home: the 'greens' and the 'browns'.

Greens: They break down quickly and keep the bin moist.

Browns: They give the compost its fibre and allow good air circulation.

Do compost at home	
<p>Greens</p> <ul style="list-style-type: none"> Raw fruit & veg peelings Tea bags/coffee grounds Plants, flowers & weeds Vegetarian pet droppings e.g. rabbit 	<p>Browns</p> <ul style="list-style-type: none"> Cardboard e.g. ripped up egg boxes Paper e.g. shredded pages of the Yellow Pages Big woody branches Dry & woody plant stems, small amounts of dead leaves

The following materials must not be composted as they will hinder or contaminate the process:

Don't compost at home		
Diseased plants	Persistent weeds	Oil, fat or grease
Dog or cat faeces	Big woody branches	Meat, fish & cooked foods
		Coal ash

Kitchen Waste

Although vegetable peelings etc make great compost, it is not generally advised to compost meat, fish & bones at home as it is thought they may attract vermin. Kitchen waste is not widely collected by District/Borough Councils with their

kerbside compost collection due to the treatment requirements of this material in accordance with the Animal By-Products Regulations. However, as new composting methods are being put in place, kitchen waste will be accepted in more kerbside compost collections in years to come.

Making compost - the magic process

You can just put a load of your kitchen or garden waste in a composter and wait for it to eventually rot down but the result may not be the crumbly compost you were expecting. You will get a better quality compost in a shorter time by following a few simple rules. The secret of composting is to set up an ideal environment for the bacteria, fungi and other creatures that contribute to the decomposition process. They thrive in a moist but not waterlogged environment, with plenty of air.

Ingredients

By mixing up the 'brown' and 'green' materials listed in the table and cutting them up or shredding them your compost will work much quicker.

Water

Most of the waste like grass clippings and vegetable peelings that you'll be adding will contain enough moisture to make it work. In very dry conditions you might need to water it occasionally.

Air

The hard-working bacteria in a compost pile need air to breathe. Bulky materials like twigs or pieces of plain cardboard help keep air spaces open in the heap. You can also turn over the heap from time to time to speed up the process.

Temperature

A high temperature is a good indicator of how much biological activity is taking place inside the compost heap. Some composting containers keep heat in better than others. A piece of

carpet or old sacking laid on top of an open compost heap will help keep the heat in.

Trouble-shooting tips

If you are having problems with composting check out the Composting Problem Solver on www.wasteaware.org.uk or call **08457 484959**.

What is happening in your composter?

The compost heap is really a teeming microbial farm. Bacteria start the process of breaking down the soft organic matter of plants into simpler substances such as carbon dioxide and water. This rotting process is called decomposition. Fungi and micro-organisms (known as 'heaters' in the composting process) join the bacteria, making the temperature rise to over 60°C, which in turn encourages the process further.

Later in the cycle when the compost heap cools down a bit, the 'chompers' - centipedes, millipedes, beetles and earthworms (invertebrates) - do their bit by breaking down the tougher materials. Earthworms are the 'workhorses' of the soil. They eat the organic matter, breaking it down into worm casts, which is a natural plant food. By creating narrow 'tunnels' in the compost, the worms also help get air into the soil, which improves the conditions for the bacteria and micro-organisms.

Compost is safe to handle but always wash your hands after using it and keep any cuts or grazes covered.

Types of composter

Composters come in all shapes and sizes. You can make your own at home using bits of wood or buy a composter as below.

Home composter special offer and advice

Information on reduced price home composters (made from recycled plastic), help and advice is available from the



WasteAware Helpline on **08457 425000** or check the WasteAware website at www.wasteaware.org.uk. Currently every Hertfordshire home and school can claim up to two reduced price home composters. Compost bins can also be made at home or school quite easily using left-over bricks and wood or even using old car tyres.

The wonder of worms

Most compost heaps will naturally contain earthworms, which will 'worm' their way into the open-ended compost heap from the ground it is sitting on and be part of the composting process. Worm manure, called 'worm casts', is very beneficial for all soils and plants.

Worm Facts

A worm can eat half its own body weight of food a day

Worm composting (its proper name is vermiculture) uses special red worms known as 'tiger worms' or 'brandlings'. They are particularly suited to composting as they naturally inhabit the upper layer of soil. They can be bought from specialist suppliers or from fishing shops where they are sold as bait! They are also found naturally in compost and manure heaps. For worm composting, the worms are housed in a 'wormery' - a specialist enclosed container, which can be kept indoors. A wormery is particularly suitable for composting kitchen waste on a smaller scale than a composter.

Wormeries are a fun way for children to learn about composting but they will need a little more care to keep the conditions suitable for the worms. There are many suppliers of purpose built wormeries. Check out some of the websites at the end of this chapter.

Community Composting

Composting on a larger scale involves the same process but more material and more people all working together. This happens when people living in a street or village build one big compost heap. For example, on an allotment, in a community garden or in a local park. The compost is then shared amongst all the gardeners in the local community.

Centralised composting at Household Waste Recycling Centres

All nineteen Household Waste Recycling Sites (HWRC) in Hertfordshire have specific bins for green garden waste. This collection method is ideal for some types of garden waste that cannot be dealt with at home. The green waste collected at the HWRCs is taken to a special site where the materials are heaped into long piles called 'windrows'.

Machines are used to turn these windrows to get air into them to help the composting process, just as turning the pile of a home composter encourages the decomposition. The finished compost is left for a while - a process known as curing - before bagging up for re-sale to those who use the HWRCs.

Tree branches and Christmas trees may be collected locally for chipping. Machines shred the material into 'chips' that can be used as covering for woodland paths or the soil in parks and gardens. This layer, known as mulch, helps soil to maintain water that falls on it and to keep weed growth at a minimum.

Useful websites

The Composting Association

www.compost.org.uk

Royal Horticultural Society

www.rhs.org.uk

The Green Gardener Website

www.greengardener.co.uk

Compost and the three R's

REDUCE

- Composting reduces the quantity of waste that goes in the dustbin and then to landfill.
- Home composting is the most economical and environmentally friendly way of dealing with organic waste as it doesn't involve any transport.

RE-USE

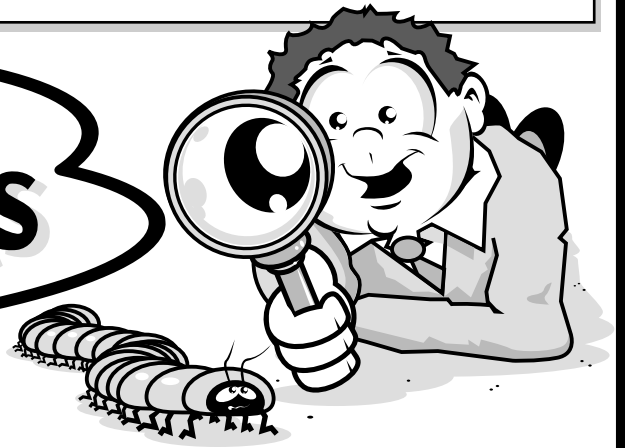
- Composting re-uses kitchen and green waste by turning it into soil improver for the garden.

- Peat bogs benefit too, as less are dug up to provide garden peat.

RECYCLE

- Composting recycles nutrients, adding them back into the soil. Compost improves the soil by making it loose, moist and well drained. It helps plants grow better and makes gardening easier. If you have a garden, a lawn, trees and shrubs, or even pots on a balcony, you have a use for home compost.

Compost Creatures






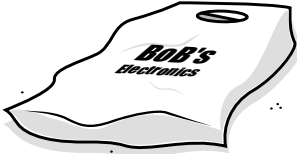
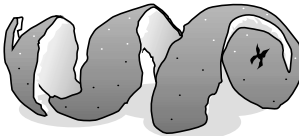
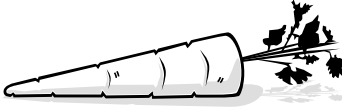
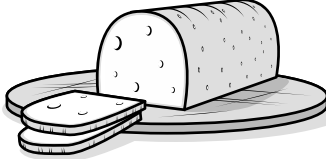
Wear gloves for this task.

- Gently rake through your box of compost with the spoon looking for any signs of life. As you find minibeasts put them into small containers using a separate container for each type of minibeast.
- Use a magnifying glass to have a closer look (or microscope).
- In the table below, draw a picture of the minibeasts you find, write a brief description of each type and if possible name it.

Drawing...	Description and name...

What can be Composted?

Look at the materials which were buried in the soil one week or longer ago and describe the state of each material..

Item...	How much has it rotted?
	
	
	
	
	
	
	

Which materials do you think are most suitable for composting?

TEXTILES

What are textiles?

Textiles are made either from:

natural fibres from plants or animals such as cotton, wool, linen and silk, which are renewable resources

or

synthetic or 'man-made' fibres such as nylon, acrylic and polyester. These are usually made from oil, a non-renewable resource.

How much do we use?

In the UK one million tonnes of textiles are discarded every year. Up to 10% of household waste is unwanted textiles such as clothing, shoes, rags, cleaning cloths, old blankets, curtains and carpet. About 3-4% of the contents of a household dustbin are textiles and up to 700,000 tonnes of textiles are put into landfills in the UK a year. Much of this waste could be re-used or recycled.



Re-using and recycling textiles

Re-use happens when clothes are passed on to other people or given to charities either through charity shops or jumble sales or put into textiles banks at household waste sites. Charities resell some clothes in the UK, while others are sent abroad to countries where money and resources might be scarce.

Textiles banks get emptied regularly and local authorities or charities receive money for all the material collected. The textile merchant sends the material to sorting centres where the fabric is graded according to its next use. Sorting is a very specialised skill. Many textiles are in good condition and can be directly re-used as clothes. Others not suitable for re-use are recycled and go to a processing centre or textiles factory where they are sorted and shredded to make filler textile for car insulation, roofing felt or as stuffing for furniture. Woollens can be reclaimed so the fibres can be used again and cottons and silk can be made into wiping cloths for use in industry.

Why recycle textiles?

The benefits are:

- Every tonne recycled is a tonne that doesn't have to be manufactured, burnt or buried in a landfill - this saves energy, resources (such as wool, chemicals and dyes) and also reduces pollution from manufacturing and transportation.
- Clothing given to charity stores may be kept for sale or is shipped abroad to less developed countries where items are always needed. Countries coping with disasters, war or refugees may also benefit.
- Money is raised for charity.

Shoe Recycling

Some charities in the UK collect shoes to send abroad. After sorting to make sure the right types of shoes go to the right country (warm climates don't need fur boots!) paired shoes are shipped to countries that can make use of them. The shoes are then sold through local markets, at very low prices, to people who may otherwise have no shoes at all. When you put shoes in a recycling bin, remember to tie the shoes together!



Textiles and the three R's

REDUCE

- Only buy things you really need; try not to be pressured into continually buying new clothes and household items in order to be fashionable (save your money for other things instead!).
- Buy from charity shops.

RE-USE

- Repair clothes and shoes rather than throw them out.
- Give clothes you don't want to friends or charities.
- Cut up fabric scraps to make patchwork or cushion covers.

- Old woollen jumpers (your own or from jumble sales) can be un-picked and the wool re-used. Charities always need leftover wool which is knitted into blankets.
- Start a dressing up box for play and drama.
- Cut up old scraps of fabric or felt for craft activities or toy making.
- Make a patchwork quilt or rag rug.
- Start a school uniform shop in your school.

RECYCLE

- Worn out clothes which cannot be re-used can be given a new lease of life if taken to a local textile recycling bank - they should be clean and in tied up plastic bags. They can be shredded for stuffing or used as rags.

Useful websites

Textile Recycling Association
www.textile-recycling.org.uk



Everything deserves...
New and old textiles can be re-used or recycled saving energy and raw materials.

...a second chance!

It's only rubbish if you throw it away!

www.wasteaware.org.uk Tel: 08457 425000

 **WasteAware**
Hertfordshire Partnership

YOUR NAME

TODAY'S DATE



Clothes line Jumble



Look at five pieces of clothing at home and write down on the table below what the clothing is and what the label says it is made from, for example 100% cotton or 75% polyester/25% viscose or wool. An example is given to help you.

Type of clothing	Type of cloth
e.g. Shirt	75% polyester, 25% viscose

Take your sheet back to school and do the next activity with your teacher.



Draw lines from the material used to make the clothing to either the 'man-made' heading or the 'natural' heading. An example is given to start you off.

linen	Man-made or synthetic fibres
acrylic	
cotton	
polyester	
polypropelene	
wool	Natural fibres
silk	
lycra	
nylon	
satin	
polyamide	

CANS AND FOIL - ALUMINIUM AND STEEL

What are aluminium and steel cans?

Cans are either made of:

aluminium, **or** tin-plated steel (steel cans are covered in a thin layer of tin).

Iron ore (for steel) and bauxite ore (for aluminium) are mined from the ground. At the steel-making factory or aluminium foundry these raw materials are separated from the rock and melted down. Various chemicals are added to strengthen the metal. The metal is rolled and pressed into the required shape and thickness. Cans are filled usually with food or drink products.

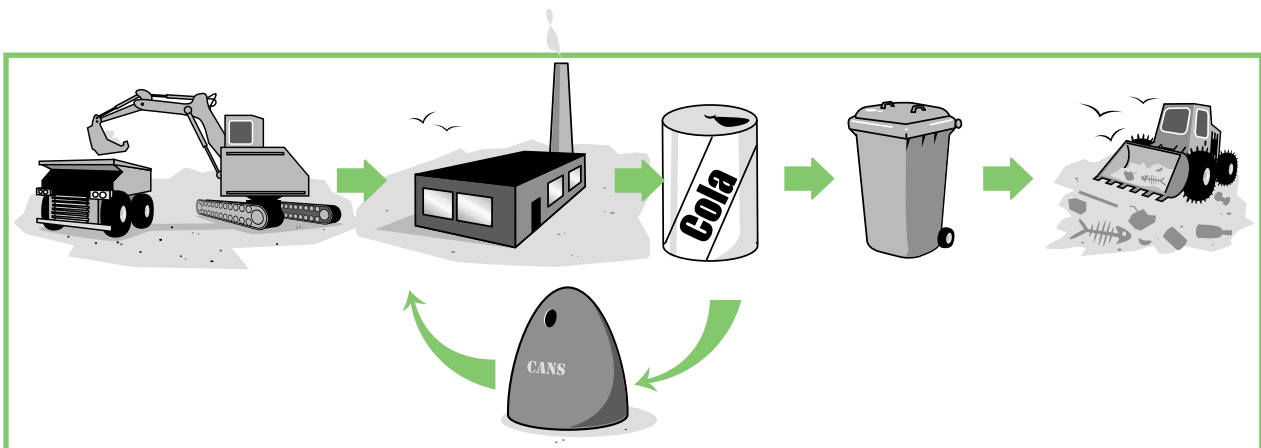
How many do we use?

About 8.5 billion cans are made in the UK each year and on average every person uses 240 steel cans a year. They make up 3% of household waste. After use they might end up in the dustbin and go to a landfill or incinerator, or they may be put into a can recycling bank.

Recycling aluminium and steel

After collection from the can bank, the cans are sorted magnetically (the steel cans stick to the magnet) before being melted down ready to make new cans. All of the cans we use could be recycled but only 36% of aluminium and 30% of steel cans actually are. What a waste! Aluminium and steel cans can be made into new cans or products in an almost unlimited cycle. Using recycled metal saves 75% of the energy needed to produce new cans.

Steel is the world's most recycled metal and the amount of steel and aluminium cans collected for recycling is increasing. Can banks are like bottle banks and can be found at Household Waste Recycling Centres and smaller recycling sites like those found at supermarkets.



Some differences between steel and aluminium

Tin-plated Steel

Steel is heavy and strong. It is used to make things like hammers, ships and food containers.

Steel is made from iron ore. Iron is one of the most common metals.

Steel is magnetic - it is attracted to magnets.

Steel rusts.

Aluminium

Aluminium is very light. It is used to make foil packaging, drinks cans, cars and aeroplanes.

Aluminium is made from bauxite ore. This is found mostly in South America.

Aluminium is not magnetic - it does not stick to magnets.

Aluminium will not rust.

Other items can be made from recycled aluminium and steel. Stainless steel, used for cutlery and sinks, can be made almost entirely from used steel, with hardly any new raw materials at all. Parts of car engines are made from recycled aluminium.

Save Waste and Travel

Car production consumes vast amounts of iron and steel. In the USA car production is responsible for one third of US iron and steel, one fifth of its aluminium and two thirds of its lead and rubber. Metals are valuable resources - they are expensive to mine and process so it makes sense to re-use and recycle metals whenever possible.

Some schemes such as car-sharing and improved public transport aim to reduce the number of cars on the road, while others aim to improve the recovery of the scrap metal after a car is scrapped. In Germany car parts are now bar-coded to help scrap-dealers identify the different metals used.

Why recycle aluminium and foil?

The benefits are:

- Recycling saves energy - up to 95% less energy used than in primary production of aluminium. It takes 75% less energy to make steel from recovered metal than it does to make it from new materials.
- It reduces the impact on the environment caused by mining the raw materials and air pollution.
- Every tonne of steel cans recycled saves 1.5 tonnes of iron ore, 0.5 tonnes of coal and 40% of the water normally required in the production process.
- It creates a valuable new product that can be recycled over and over again.
- It keeps metal cans out of landfill sites where their value is lost.
- Many community groups collect aluminium cans as a way of raising money.

Aerosols

Each year the UK uses about 600 million aerosols - that's an average of 10 cans per person per year. Aerosols make up 4% of metal waste and it is estimated that there is about 25,000 tonnes of tinned steel and 4,500 tonnes of aluminium available if these aerosols were recycled.

Aerosols are best mixed with other metal waste such as food and drink cans. However, only empty aerosols should be put in the can banks and the cans should not be pierced or squashed. Some local authorities have different reprocessors for their collected material and therefore accept different things. All can banks at Hertfordshire Household Waste Recycling Centres accept empty aerosol cans and aluminium foil and some other can banks do too. Check on the bank or on www.wasteaware.org.uk before putting them in.

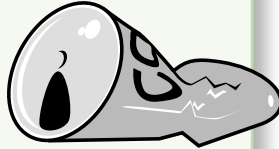


Checklist for collecting aluminium foil

- Foil containers such as pie cases, ready meal and takeaway trays
- Household wrapping and cooking foil (not crisp packets)
- Foil lids on yoghurts and milk bottle tops
- Chocolate foil

Recycling your Cans

Please rinse out cans and foil to remove food residues and therefore avoid bad smells and attracting vermin. This can easily be done by using the end of the washing up water as the recycling process will achieve sterilisation as well as removing any labels. It is important to crush your cans (except aerosols) where possible so that more can be collected in a container and therefore less vehicles and fuel are needed to transport them to the recycling facilities.



Useful websites

Alupro

www.alupro.org.uk

Steel Can Recycling Information Bureau

www.scrib.org

Can crushers

www.cancrush.co.uk

Plascan

www.plascancrusher.com

Cans & Foil and the three R's

REDUCE

- The amount of cans you buy and put in your bin.

RE-USE

- If it's clean, re-use aluminium foil a second or even third time.
- Use old food cans to wash your paint brushes out (be careful there are no sharp edges).

RECYCLE

- Look out for can banks and use them.
- Set up a school collection for drinks cans. Contact your local Recycling Officer for details.
- Aluminium foil can be recycled too. Every year 34,000 tonnes of aluminium foil is used in the UK. Many charities ask people to collect foil to help raise money for their work or you can put it in a can bank.



You (can) recycle

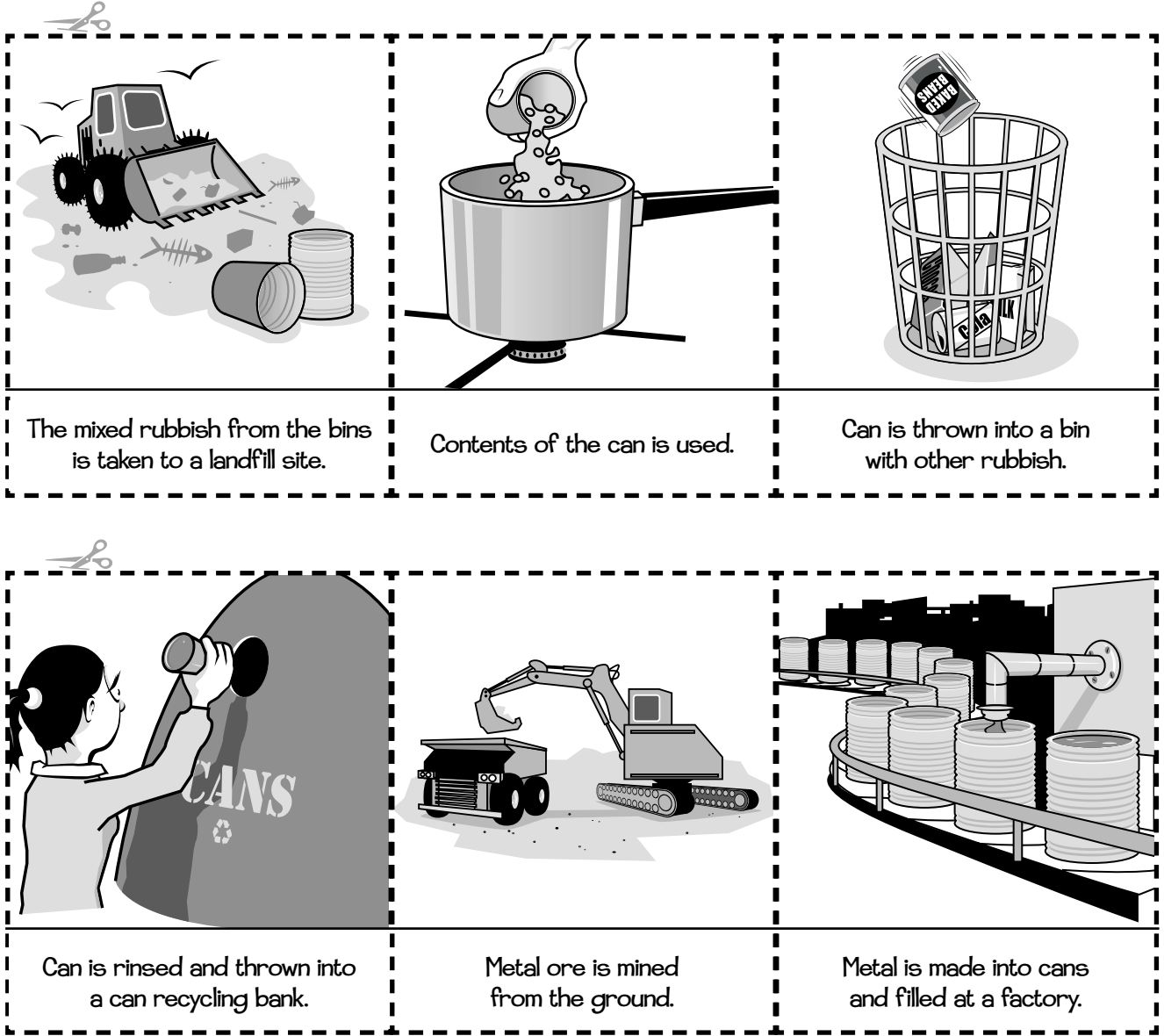
Recycling metal saves energy and raw materials.
Give your cans another lease of life!

It's only rubbish if you throw it away!

www.wasteaware.org.uk Tel: 08457 425000


WasteAware
 Herefordshire Partnership

Life of an aluminium can



Cut out each square and arrange as many pieces as needed to show:

1. The lifecycle of a can from the mining of the raw materials to make the metal, to its disposal in a landfill site.
2. The lifecycle of a can which is made from recycled materials and is not disposed of in a landfill site.

ELECTRICAL AND ELECTRONIC PRODUCTS

What is WEEE?

Waste from **E**lectrical and **E**lectronic **E**quipment is known as **WEEE**.

The production of electrical and electronic equipment is one of the fastest growing areas of industry. New technologies and the replacement of out-dated equipment has accelerated the amount of WEEE we produce - it is estimated it is growing three times faster than the growth of ordinary domestic waste. About 1 million tonnes of waste electrical and electronic equipment are discarded each year in the UK.

Why repair or recycle?

Dealing with this waste is now a major problem, especially as many of the products are complex and combine many different materials. For example, a television may contain metal, plastic and glass and computer circuit boards can contain over 20 different substances. Some of the products also contain toxic materials such as mercury, arsenic, cadmium and lead.

Repairing broken equipment makes sense. It means you reduce the need to obtain raw materials for the new equipment, give employment to a person to repair the equipment and save space in a landfill site.

Increasingly, electrical equipment is being saved from the dump by being refurbished or recycled. For example, old computers are refurbished and sold for a fraction of the price of a new one. In recycling, the useful bits are removed and used again and the remainder is dumped.

At present there are not many take back schemes, however the European Union has agreed the Waste Electrical and Electronic Equipment Directive (WEEE) which aims to minimise the impacts of electrical and electronic equipment on the environment during their life times and when they become waste. It applies to a huge spectrum of products. It encourages and sets criteria for the collection, treatment, recycling and recovery of waste electrical and electronic equipment. Legislation is due to be introduced by the UK government in 2006 which states that:

- It makes producers responsible for financing most of the above activities (producer responsibility)
- Private householders are able to return WEEE without charge

The WasteAware website will have details of the collection schemes when they are introduced.

Mobile phones

There is no need to throw away unwanted mobile phones. There are a number of schemes that will take your old phones and either re-use or send them for recycling and give the proceeds to charity. Search on the Internet using "mobile phone recycling" or visit the WasteAware website for information on the Household Waste Recycling Centres which have a specific container for mobile phones.

N.B. Remove the simcard before sending the phone for re-use or recycling.



Useful websites

Recycling appeal

www.recyclingappeal.com

Cartridges for Charity

www.cartridges4charity.co.uk

Electrical and electronic products and the three R's

REDUCE

- Question whether you really need to get the latest model. If your current one still works - use it.
- Try to avoid batteries by using mains power, or, if necessary, use rechargeable batteries rather than disposable ones

RE-USE

- Repair broken items for use again.
- Upgrade your computer equipment rather than throw it out and start again
- There are now several schemes for refurbishing and re-using old computers in schools, charities and community groups, see www.wasteaware.org.uk for further information.

- If the item still works, there may be a local Furniture Recycling Scheme who will pass it onto a new owner - details can be found on www.wasteaware.org.uk

RECYCLE

- Rather than put small electrical items in the bin, take them to your local Household Waste Recycling Centre where a large proportion of the waste is taken out for re-use and recycling.
- Household batteries can now be taken to Household Waste Recycling Centres for recycling.
- Send old toner and ink cartridges for recycling. Visit www.wasteaware.org.uk for details of companies.

OTHER MATERIALS

What can be done with...?

Books: As books tend to be a composite material of paper, board and glue they are currently difficult to recycle. Re-use is the best option for books. Share unwanted books with friends or give them to a charity shop, jumble sale or book bank. Even better is to make more use of your local library, which stocks a wide range of books.

Cardboard: is collected at all Hertfordshire Household Waste Recycling Centres (HWRCs). All types are accepted except drinks cartons. Flatten all cardboard before putting it into the container. Some councils also collect cardboard from your house.

Fridges or freezers: these can be taken to all HWRCs. From here they are taken off-site for degassing. The coolant gases (CFCs) are removed and stored by a specialist for recycling. Some of the other materials, such as metals and plastics, may be recycled. Councils can collect used fridges and freezers (there may be a charge for this). Local Furniture Schemes may be able to re-use old fridges or freezers, provided these are clean and in good working order.

Household batteries: are collected for recycling at all HWRCs. Batteries can be found in a wide range of everyday appliances such as torches and electric toys. However, they tend to contain heavy

metals that can leak out and pollute the environment if disposed of to a landfill site. Nickel Cadmium (NiCd) rechargeable batteries are also common in the household, found in equipment such as camcorders and laptop computers. Rechargeable batteries can be used many times before they finally need disposal - through a recycling collection scheme!

Household furniture: furniture recycling schemes in Hertfordshire will take many household items including working 'white goods' and pass them on to community groups or low income families. See the WasteAware website www.wasteaware.org.uk for details of any in your area.

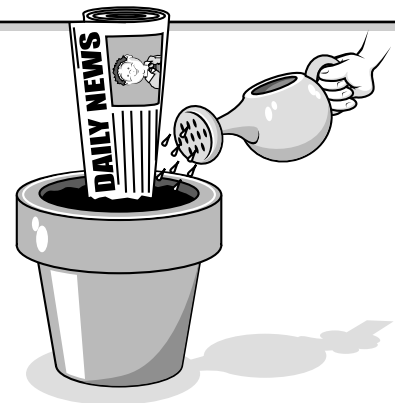
Scrap metal: is collected at all HWRCs. There is a designated area for their collection.

Wood: is collected at some HWRCs. The wood containers accept clean timber which has not been treated or painted. Any glass must be removed. Nails, hinges or screws are extracted magnetically.

MDF, chipboard, treated or painted wood cannot be accepted in the wood container and must be put in the normal waste container.

For further information on any other items contact the WasteAware Helpline on 08457 425000 or look on www.wasteaware.org.uk

Re-using and Recycling Words



Beginnings and ends

Cut out the phrases in the two columns. Place a 'beginning' on the desk in front of you. Find the best 'end' and place it next to it. Carry on until all the phrases have been used. If you think two endings fit with a beginning, choose the one you think fits best.

Beginning	End
Glass is made from bauxite (ore)
Paper is made mainly cotton plants
Wool comes from sand
Aluminium is made from wood
Cotton grows on from sheep
Green Waste from the garden can be recycled
Paper can be composted

Fill in the missing words

Choose the best words from the list to fill the gaps in the passage below and write them in the gaps.

COMPOST

Garden waste such as _____ from trees and potato _____ can be composted. The leaves and peelings _____ and form _____. This can be sprinkled on the _____ in the garden to make the _____ grow better. You can save money because you do not need to buy _____

rot down peelings plants fertiliser leaves soil humus

GLASS

_____ is used to make glass. Glass is used to make windows, _____, jars and dishes as well as many other things. Glass bottles and jars are good _____ materials because the glass does not change the taste of the _____ inside. When a glass bottle is empty it can be taken to the _____ for recycling. From there the glass is taken back to the _____ where it can be made into more glass bottles and jars. Less sand needs to be dug out of the ground and there is not so much rubbish to go into _____.

packaging bottles food bottle bank landfill factory sand food



Get the most from your paper

Use both sides!