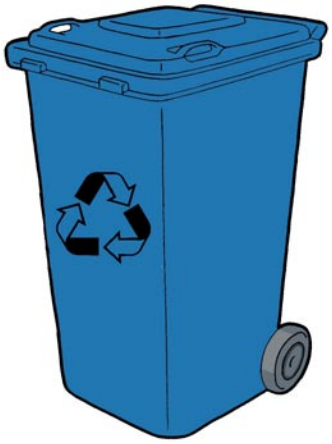
Mission 9: Recycling

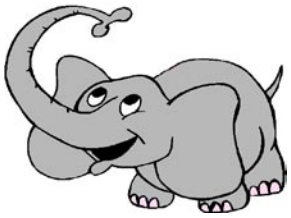


energy saving trust

Bryson Charitable Group

A Waste of Energy!

Factories use lots and lots of energy to make all the things we need in our everyday life, and most of this ends up in the bin. In Northern Ireland, we produce about 1 million tonnes of rubbish every year - thats roughly the same weight as 2 million baby elephants!



What a waste of energy!

If we could decrease the amount of unnecessary things we buy, and try to reuse and recycle things when possible, we could reduce the amount of energy used by industry. Have a look below to see what you can do:

REDUCE - Buy only what you need. If you do this, you will have fewer things to throw away. It also means that fewer goods are being made, so less energy is being used to manufacture them. When you are out shopping, look for things that don't have a lot of extra packaging. It takes a lot of extra energy to make things like shrink wrap and bubble wrap - and most of them can't be recycled.

REUSE - Buy things that can be used over and over again. You will save the energy used to make them, and will reduce the amount of rubbish going to the landfill site.

RECYCLE - Using recycled material almost always uses less energy than using new materials. It reduces the amount of energy needed for mining, and many other manufacturing processes.

A Waste of Energy!

Instead of all our rubbish going to the landfill site, we can do other things with some of it. **Fill in the blanks.**

_____ We can use some things over and over again. Things like _____

_____

_____ Some things, when we are finished with them can go to a factory and get remade into something new. Things like_____

_____

_____ We can buy things with less packaging, so that we do not have as much rubbish to put in the bin. Things like_____

_____

Most of the materials we use everyday have been ***manufactured***. This means that they have been made in a factory. They are made from ***raw materials*** - stuff that comes from the environment. Getting them causes damage to the earth, and uses lots of energy.

What raw material is used for the following?

Glass	
Paper	
Plastic	
Metals	

A Waste of Energy!

Complete the sentences:

Materials which occur naturally are known as _____

Materials made from raw materials are known as _____

Do you know which raw material these products have been made from?

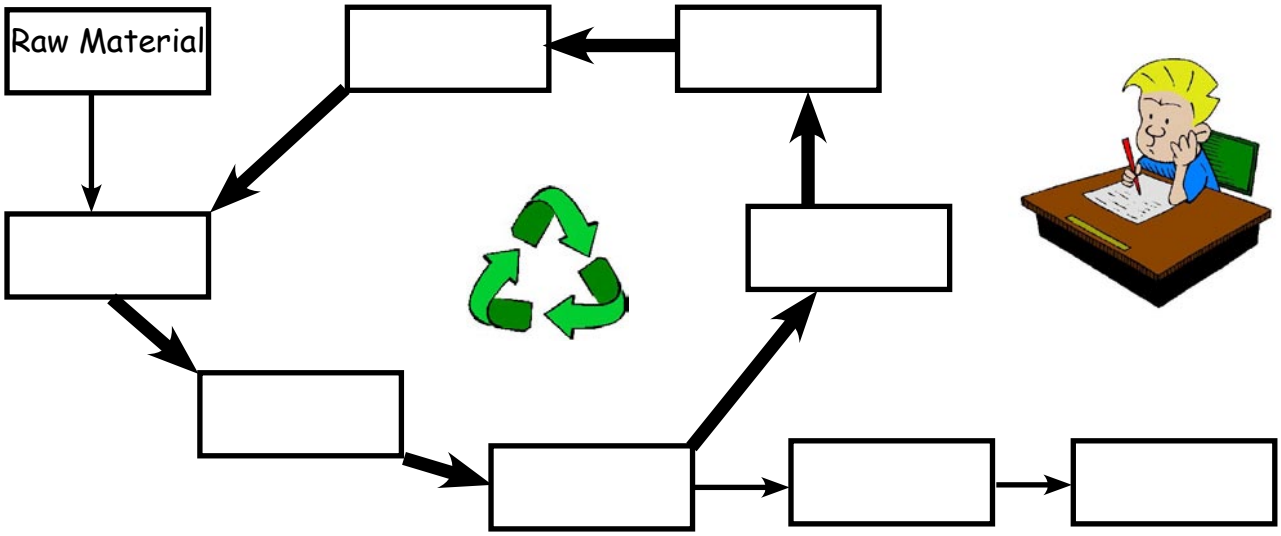
_____

_____

_____

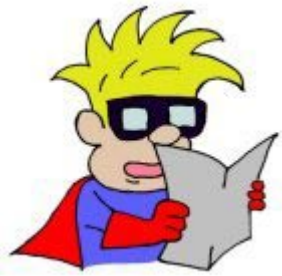
_____

Can you put the words from the box below into the right boxes in the recycling loop?



Recycle	Landfill	Factory	Recycling Bin
Shop	Bin	Home	Recycling Centre

Paper



Paper is the number one material that we throw away. Newspapers take up about 14% of the room in a landfill site, and paper packaging takes up about another 15 - 20%.

Paper is made from trees. Once they are cut down, they are delivered to a paper mill. Here they are chopped into tiny pieces so that they can be pulped. Pulping is a chemical process that separates the wood fibres from lignin and other parts of the wood. It is then bleached to make it whiter.

Paper mills need lots of energy to produce paper. About 50% of their energy comes from wood scraps that can't be used to make paper. The rest will be bought from local power companies or generated on site by the mill using other energy sources.

Draw a line from each word to the right description.

Pulp	The glue that holds pulp together
Lignin	A chemical process that separates wood fibres from other parts of the tree
Pulping	Soft spongy part of the tree

Paper

Recycled paper is usually made from waste paper, mixed with new wood pulp. Unlike other things that can be recycled, paper cannot be recycled over and over again. Over time, the paper fibres weaken, and eventually they become so weak that they can't be used.

Energy Facts

A paper mill uses 20% less energy to make paper from recycled paper than it does to make paper from trees.

One tonne of paper saves 7000 gallons of water and enough energy to heat the average home for 6 months.

One tonne of paper made from recycled fibres instead of new fibres saves 4000 KWh of electricity.

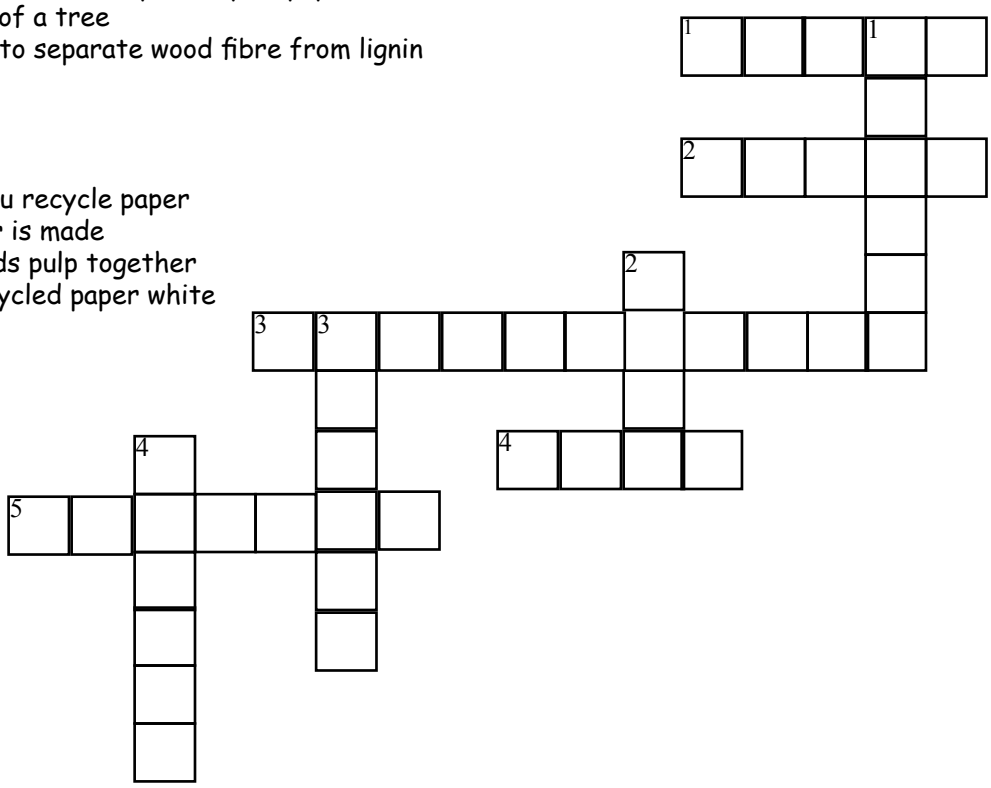
Use what you have learnt about energy and paper recycling to complete the crossword.

ACROSS

1. 7000 gallons of this are saved if you recycle paper
2. Trees are used to make this
3. 4000KWh of this is saved if you recycle paper
4. Soft spongy part of a tree
5. Chemical process to separate wood fibre from lignin

DOWN

1. This is saved if you recycle paper
2. Place where paper is made
3. The glue that holds pulp together
4. Used to make recycled paper white



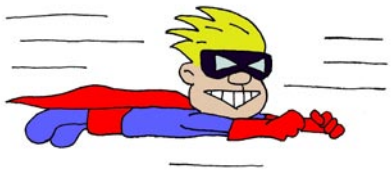
Glass

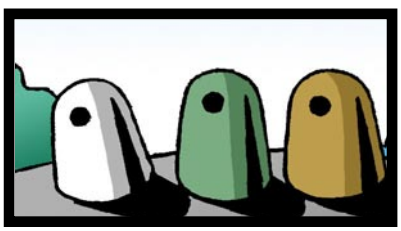
Glass was discovered over 5000 years ago. It is used to make all sorts of bottles and jars for packaging food and drinks. Glass makes up about 5% of all the waste we produce.

Use the words in the box below to fill in the blank spaces, and learn more about glass.

Glass is made by melting a particular type of _ _ _ _ in a fire. This is sand with a lot of silica in it. It also needs _ _ _ _ _ _ _ _ _ _ , soda ash and some other additives. The production of glass uses _ _ _ _ _ _, both during the extraction of sand as well as during transportation and processing. Large amounts of _ _ _ _ _ _ fuels are used during these phases, which produce the Greenhouse Gas, _ _ _ _ _ _ _ _ _ _ _ _ _ _ _.

energy	**limestone**	**sand**
Carbon Dioxide	**fossil**	

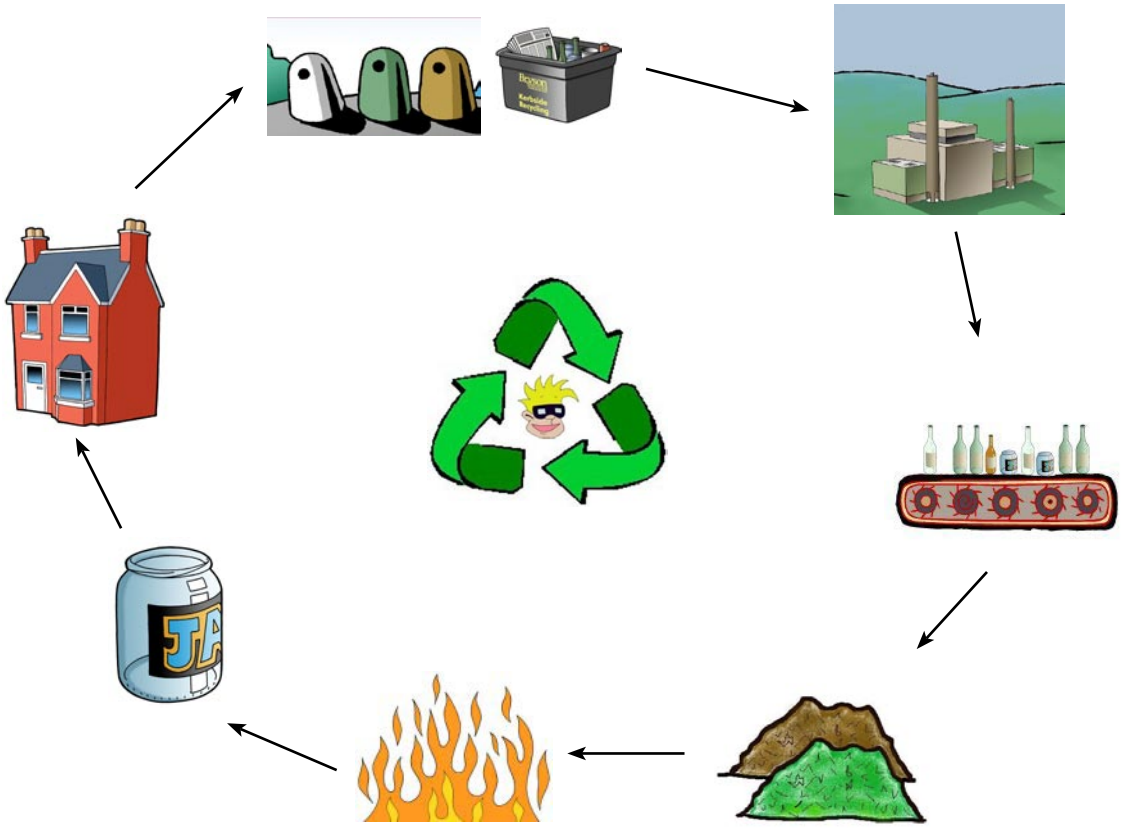




Energy Saving!

Recycling glass is a good energy saver. Using recycled glass to make new glass uses 30% less energy than making it from new materials. It saves energy because crushed glass melts at a lower temperature than the raw materials used to make new glass.

Recycling Glass



Use the information you have learned so far about glass, as well as the diagram above to arrange the sentences below into the right order. Re-write them on the next page.

Contamination is then removed - this means things like metal caps, corks and plastic sleeves are taken out.

The molten glass is then moulded into new bottles and jars.

The glass is then collected and taken to a recycling centre. From here, it is taken to a glass recycling factory.

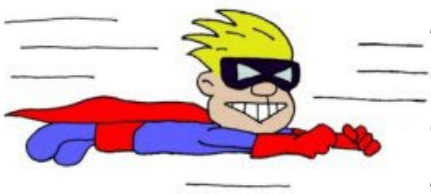
The glass is then crushed into small pieces called cullet. This is mixed with other materials (sand, limestone, and soda ash) and melted in a large furnace.

We can recycle glass by putting it in a kerbside box or in recycling banks.

Recycling Glass

How Glass is Recycled

Glass



Recycling glass is a great energy saver. Can you unjumble the words below to discover how much energy is conserved by recycling?

Using recycled glass to make new glass products uses 30% less _____ than making it from new materials. **GREENY**

Crushed glass melts at a lower _____ than the raw materials used to make new glass, so lots of energy is saved.

ATEETERMRUP

By recycling glass, in one year we can _____ enough energy to launch ten space shuttle missions. **VASE**

Every tonne of recycled _____ saves 345kwh of energy.

LAGSS

Recycling a ton of glass saves the equivalent of nine gallons of _____ oil. **FLUE**

Recycling of one glass container saves enough energy to light a 100-watt bulb for 4 _____. **HORUS**

Cans

Cans are made from metal which can be recycled. Usually, cans are made either from **steel** or **aluminium**.

Aluminium is a very useful and valuable material. It is used a lot to make drink cans because it is light and unbreakable, and is quick to chill.

Aluminium can also be rolled into very thin sheets, called foil. Aluminium foil is used to make takeaway containers, pie cases, milk bottle tops, chocolate wrapping and lids for dairy products. Many people also use foil in their kitchens for cooking and wrapping up food.

Steel is a very common type of metal. Every day we use many things that are made from it, including cans. These are the most common steel items in our homes.

Steel cans are used to hold food, for aerosols, paint, and jam jar lids.

Steel is often used for packaging because it is very strong and light- and easy to recycle.

Answer the following questions using the information above.

1. What metal are drinks cans usually made from? _____

2. What type of metal would a food can be made from? _____

3. Steel can be rolled into sheets to make foil. True or false? _____

4. Aluminium is not very useful as it breaks easily. True or false? _____

5. What metal can be used to make takeaway containers? _____

Aluminium Cans

Aluminium is an ore. An ore is a mineral that is mined as it contains valuable materials. Getting aluminium out of the ore is quite difficult. It has to be heated up in a very hot oven. An electrical current is then passed through it, which separates the aluminium from the other materials in the ore. This uses huge amounts of energy. Aluminium ore is found in places like Brazil. Once it has been taken out of the ground, it is transported 1000's of miles to factories for the aluminium to be extracted. This uses up even more energy. Sometimes this is done in Ghana, Africa. The metal is then sent to England to be shaped into cans, and then comes to Northern Ireland, where the cans are filled with drink. There is a factory in Lambeg which does this.

E	O	S	A	I	A	L	N	B	A	N	K
H	M	R	G	L	S	B	A	E	G	S	O
P	U	A	E	N	U	U	I	M	I	T	A
O	S	I	G	L	W	M	K	H	B	E	N
L	E	N	J	H	J	E	I	M	U	E	K
L	N	F	O	L	A	O	L	N	G	L	G
U	I	O	U	S	E	N	C	F	I	B	M
T	Y	R	E	N	G	L	A	N	D	U	E
I	U	E	M	H	A	O	N	S	W	O	M
O	H	S	G	R	E	C	Y	C	L	E	S
N	A	T	O	F	I	N	U	G	E	N	I
M	E	U	B	R	A	Z	I	L	M	U	A

Find these words -

Aluminium
Rainforest
Ore
Pollution
Brazil
Ghana
England
Lambeg
Recycle
Can
Bank
Steel

Aluminium Cans

Use the words in the box at the bottom of the page to fill in the blanks, and discover how recycling aluminium cans saves energy.

For each pound of aluminum recovered, Americans save the energy r _ _ _ _ _ _ _ _ to generate about 7.5 kilowatt-hours of electricity. That's enough energy to meet the electric needs of a c _ _ _ the size of Pittsburgh for six years.

You can r _ _ _ _ _ _ 20 cans for every one you would make from scratch.

Recycling one a _ _ _ _ _ _ _ _ _ can saves enough energy to run a TV for three hours - or the equivalent of a half a gallon of gasoline.

Recycling aluminum cans saves 95 p _ _ _ _ _ _ of the energy used to make aluminum cans from virgin ore

Using recycled a _ _ _ _ _ _ _ _ _ beverage cans to produce new cans allows the aluminum can i _ _ _ _ _ _ _ to make up to 20 times more cans for the same amount of energy.

Recycling 1 ton of aluminum saves the equivalent in e _ _ _ _ _ of 2,350 gallons of gasoline. This is equivalent to the amount of e _ _ _ _ _ _ _ _ _ _ used by the typical home over a period of 10 years.

The energy s _ _ _ _ _ each year through recycled cans could light the city of Washington, DC for 3.7 years.

city	recycle	aluminum	percent
industry	energy	saved	
resources	electricity	aluminum	

Steel Cans

Steel is the most recycled metal in the world. It is made in a similar way to aluminium - it must be extracted from the ore, using a great deal of energy. Steel recycling therefore saves lots and lots of energy.

The sentences below are all mixed up. Re-write them in the right order to discover how steel is recycled. There is more room to write on the next page.

The liquid metal is poured into a mould and then left to cool down.

These are taken away to be made into new steel products.

Steel objects for recycling are collected from can banks, or from kerbside recycling boxes.

When it's hard enough, a machine chops it into big blocks.

Steel is melted down, together with other ingredients called iron ore and limestone.

They are sorted and then returned to the steelmaking plant.

Steel Cans

Continue.....

DID YOU KNOW.....

Producing steel from recycled materials saves 75 per cent of the energy needed to make steel from virgin materials

Making steel for steel cans uses about half the energy required to make aluminium for a comparable aluminium can

Through recycling each year, the steel industry saves enough energy to power 18 million homes

If all aluminium drinks cans were replaced with steel drinks cans, the energy saved would be equivalent to that required to light every home in Britain for four weeks.

Plastic

We use plastic every day. We cover our food in plastic wrap, wear clothes made from man-made fibres like polyester, and even buy things with plastic credit cards! We use plastic hundreds of times a day.

Plastic bottles are collected from your kerbside box or recycling bin, or from plastic bottle banks. They are taken to a recycling centre where they are sorted in a big machine called a MRF - material reclamation facility.

The bottles are squashed into tightly packed blocks or bales. Before they are squashed, they have holes pierced in them so that they do not burst.

The bottles are then taken to a factory where they are cut up into small flakes – a bit like plastic corn flakes! They are then washed to remove any dirt and labels and then they are dried.

The clean plastic flakes are then sent to different factories where they are melted down and made into new items.

Recycled plastic bottles can make all sorts of new things including new bottles, fleece clothes, garden furniture, kerbside collection boxes, and drain pipes.



Can you unjumble the words to complete the sentences? Use the information above to help.

You can recycle plastic bottles by putting them in a kerbside _____. **xbo**

_____ have holes pierced in them, then they are squashed. **beltots**

Bottles are taken to factories and chopped up into _____. **askelf**

The flakes are melted down to be made into new _____. **catlips**

Recycled plastic bottles can be made into _____. **aspidernip**

They can also be made into _____ clothes. **celfee**

Plastic

Quite often, people think that plasti0.c bottles are a big waste of energy - but its not true! They are actually quite energy efficient. It takes less energy to manufacture a plastic bottle than a glass bottle. Plastic is also very light, so it takes less energy to transport a lorry load of plastic bottles, than it does to transport a lorry load of glass bottles. Squashing the plastic before it is transported also saves energy, as you can fit more into the lorry. Recycling plastic bottles means that we use less of the raw material - oil - to make new plastic. We are therefore saving a valuable energy resource.

True or False? **Write your answer on the line after the statement.**

Plastic bottles are a big waste of energy. _____

It takes less energy to make a plastic bottle than a glass bottle. _____

Plastic is very light. _____

Find the answer in information above.

Why does squashing plastic bottles save energy?

_____

What raw material is used to make plastic? _____

WOW!

Recycling just one plastic bottle can save the same amount of energy needed to power a 60 watt lightbulb for 6 hours!

Recycling plastic saves twice as much energy as burning it in an incinerator.

The energy saved by recycling 1 bottle will power a computer for 25 minutes.

Recycling plastic bottles uses 8 times less energy than making them from oil.

Key Words and Definitions

CONTAMINATION	items which are not supposed to be there - e.g. crisp bags in a bottle bank is contamination
LANDFILL	a big hole in the ground where all the rubbish from our ordinary bins goes
MANUFACTURED	materials that have been made in a factory
RAW MATERIAL	materials that come from nature
RECYCLE	to sort and send materials to a factory where they are made into new materials e.g. paper, cans, glass, plastic and clothing
RECYCLING CENTRE	a centre where materials for recycling get sorted, baled (squashed into blocks) and sent to a reycling factory
RUBBISH	things that we are finished with that we put in the bin

Key Words and Definitions

RECYCLING FACTORY	a factory where old materials are processed into new materials
REDUCE	to make less rubbish, so that not as much is going into your bin
RESOURCE	a material that we can make use of
REUSE	to use something over again in stead of throwing it away e.g. re-filling a plastic bottle with water or using plastic bags again