



## Earth's resources 1

- Natural resources provide shelter, food, clothing
- Finite resources are processes to provide energy and materials
- **Finite resources – Only a certain amount. Will run out**
- **Renewable resources – More can be made. Will not run out**

## Waste water treatment 4

- **Sewage waste water require removal of organic matter and microbes.**
- Treatment includes:
- **Screening and grit removal**
- **Sedimentation** to produce sludge and effluent
- **Anaerobic digestion** of sewage sludge
- **Aerobic biological treatment** of effluent

## Reducing use of resources



**Glass** – Can be re-used.  
Can also be crushed and melted to make new glass products

**Metals** – Can be recycled by re-melting and recasting into a new product

**Re-melting and sorting materials** requires energy which releases **Carbon dioxide** into the atmosphere

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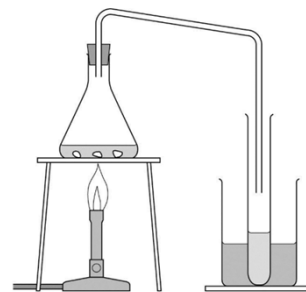
## Potable water 2

- Water that is safe to drink
- **Potable water is not pure water as it contains dissolved salts and other substances**
- Ground water is collected and passed through a **filter bed to remove solid substances then sterilised to kill bacteria**
- Salt water is desalinated by distillation or by reverse osmosis

## Alternative methods of extracting metals (HT) 7

- Copper resources are running out. Low-grade ores are now being used to extract copper
- **Phytomining – Uses plants to absorb copper compounds. Plants are then harvested and burned to produce ash that contains copper**
- **Bioleaching – Uses bacteria to break down copper compounds**
- **Displacement – React copper compounds with a more reactive metal**

## Analysis and purification of water samples (RP) 3



1. **Test pH** by adding a few drops of Universal indicator and record colour
2. **Collect dissolved solids** by heating sample on a watch glass over a beaker of water until all water is evaporated. Weigh the watch glass to record the mass of dissolved solids
3. **Desalination of sea water.** Use the set up in the diagram to heat the sample and collect the pure water sample in the test tube surrounded by an ice bath

## Life Cycle Assessment (LCA) 5

Life cycle assessments (LCAs) are carried out to assess the environmental impact of products in each of these stages:

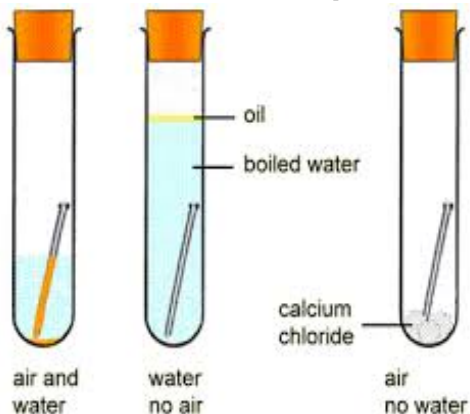
- extracting and processing raw materials
- manufacturing and packaging
- use and operation during its lifetime
- disposal at the end of its useful life, including transport and distribution at each stage.

Material	Advantages	Disadvantages
Paper bag	<ul style="list-style-type: none"> <li>• Can be made from recycled paper</li> <li>• If sent to landfill they biodegrade quicker</li> </ul>	<ul style="list-style-type: none"> <li>• Requires deforestation</li> <li>• Requires more energy to make bags from trees than recycled paper</li> <li>• Short life span</li> </ul>
Plastic bag	<ul style="list-style-type: none"> <li>• Can be re-used</li> <li>• Stronger than paper bags so have a longer life span</li> </ul>	<ul style="list-style-type: none"> <li>• Uses non-renewable resources for production</li> <li>• Most waste goes to landfill</li> </ul>

Remember to use numerical values from the data given to you in the question to make comparisons, e.g. Plastic produces 2.3 times more carbon dioxide during manufacture than paper bags

# C10 Knowledge Organiser – 4.10.1 – Using resources (Chemistry only)

## Corrosion and it's prevention 1



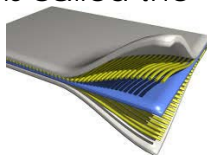
- Rusting is an example of corrosion.
- **Both air and water are necessary for iron to rust**
- Corrosion can be prevented by applying a coating that acts as a barrier, such as greasing, painting or electroplating.

## Ceramics 3

- Soda-lime glass is made by heating a mixture of sand, sodium carbonate and limestone.
- Borosilicate glass, made from sand and boron trioxide, melts at higher temperatures
- Clay ceramics are made by shaping wet clay and then heating in a furnace.

## Composites 4

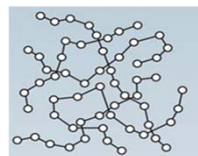
Most composites are made of two materials, a matrix or binder surrounding and binding together fibres or fragments of the other material, which is called the reinforcement.



## Alloy 2

Alloy	Composition	Notes
Bronze	Copper, tin	Used for statues
Brass	Copper, zinc	Used for coins
Gold	Silver, copper, gold	Proportion of gold relates to carats. 24 carats = 100% gold, 18 carats = 75% gold
Steel	Iron, carbon	High carbon steel is strong but brittle Low carbon steel is soft and easily shaped Stainless steel is resistant to corrosion (cutlery)

## Polymers 5



Thermosoftening

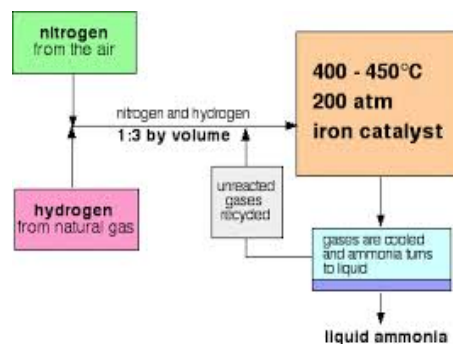


Thermosetting

- The properties of polymers depend on their monomers and the conditions.
- E.g. low density (LD) and high density (HD) poly(ethene) are produced from ethene at different temperatures with different catalysts
- **Thermosoftening polymers melt when they are heated.**
- **Thermosetting polymers do not melt when they are heated because they have cross links holding the polymer chains together, which require more energy to break**

## Haber process 6

- Used to manufacture ammonia
- The reaction is reversible so some of the ammonia produced breaks down into nitrogen and hydrogen:
- **nitrogen + hydrogen  $\rightleftharpoons$  ammonia**
- On cooling, the ammonia liquefies and is removed. The remaining hydrogen and nitrogen are recycled.
- Conditions are a compromise to maintain a high yield but low energy costs at equilibrium



## Production of NPK fertilisers 7

- Compounds of nitrogen, phosphorus and potassium are used as fertilisers to improve agricultural productivity.
- NPK fertilisers contain compounds of all three elements.
- Industrial production of NPK fertilisers can be achieved using a variety of raw materials in several integrated processes.
- **NPK fertilisers are formulations of various salts containing appropriate percentages of the elements.**
- **Ammonia can be used to manufacture ammonium salts and nitric acid.**
- Potassium chloride, potassium sulphate and phosphate rock are obtained by mining, but phosphate rock cannot be used directly as a fertiliser.
- Phosphate rock is treated with nitric acid or sulfuric acid to produce soluble salts that can be used as fertilisers