

# Chemistry Topic 10: Using resources

## 1. Keywords

Finite resources	Resources that will run out
Renewable resources	Resources that can be re-grown or will not run out
Sustainable development	Building things with depleting natural resources
Potable water	Water that is safe to drink
Pure water	Water without anything added to it Eg 100% H <sub>2</sub> O
Desalination	Removing salt by distillation or reverse osmosis
Sterilisation	Killing bacteria and microbes (eg chlorine, ozone or UV)
Distillation	Evaporation followed by condensation, uses a lot of energy
Reverse osmosis	A process using membranes to remove the salt. Uses a lot of energy
Effluent	Liquid waste sewage discharged into rivers and seas
Sludge	Solid sewage waste. Dried and used as fertiliser or burned to generate electricity
Life cycle assessments (LCAs)	A way of assessing the impact of the production transport use and disposal of a product on the environment

## 2. Waster water treatment

	Name	Description
1	Screening	Solid waste and grit removed by a metal grid
2	Primary treatment	Sediments are allowed to settle out from the mixture
3	Secondary treatment	Bacteria feed on the remaining organic waste. The tank has air bubbled through it so aerobic respiration can occur
4	Final treatment	Bacteria allowed to settle out. Water is sterilised and ready to drink

## 3. Alternative methods of extracting metals (HT ONLY)

Phytomining	<ol style="list-style-type: none"> <li>Plants absorb metal compounds</li> <li>Plants are harvested and burnt</li> <li>Ash contains metal compounds</li> </ol>
Bioleaching	<ol style="list-style-type: none"> <li>Bacteria absorb metal compounds</li> <li>Bacteria excrete a solution of metal called Leachate</li> <li>Electrolysis can extract the metal</li> </ol>

## 4. Corrosion and its prevention (TRIPLE ONLY)

Corrosion	Destruction of materials by chemical reactions. eg rusting	
Prevention method	Works by	Examples
Coating	Providing a barrier	Greasing Painting Electroplating
Sacrificial protection	Reacts with the oxygen instead of the metal	Galvanising by Zinc

5. Alloys (TRIPLE ONLY)		
Alloy	Made of	Use
Bronze	Copper and Tin	Coins and medals
Brass	Copper and Zinc	Musical instruments
18 carat Gold	75% gold, silver, copper, zinc	Jewellery
Steel	Iron and Carbon	High carbon: Knives Low carbon: Bridges
Stainless steel	Iron, Carbon and Chromium	Cutlery, medical instruments
Aluminium alloys	Aluminium and Scandium	Planes

6. Ceramics (TRIPLE ONLY)		
Ceramic	Made from	Use
Glass	Heating sand, sodium carbonate and limestone	Windows Lenses
Clay	Wet clay shaped and heated	Pottery Bricks

7. Polymers (TRIPLE ONLY)		
Polymer type	Property	Crosslinks present
Thermosoftening	Melts when heated	No
Thermosetting	Does not melt, just burns	Yes

8. Haber process (TRIPLE ONLY)	
Reaction	$\text{Nitrogen} + \text{Hydrogen} \rightleftharpoons \text{Ammonia}$ $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
Raw materials	Hydrogen: from natural gas Nitrogen: from air
Conditions	Temp: 450°C Pressure: 200atm Catalyst: Iron

9. Making fertilisers from phosphate rock (TRIPLE ONLY)	
Reagent	Product
Sulfuric acid	Calcium phosphate + Calcium sulfate
Nitric acid then ammonia	Ammonium phosphate
Phosphoric acid	Calcium phosphate