Chemistry Chapter 10
Finite and renewable resources

Natural resources

- Natural resources come from the Earth sea or air
- example cotton, fuel , oil
- Some natural resources can be replaced by man made materials
- Example rubber from the trees now replaced by man made Polymers plastic
- Agriculture helps Natural Resources Grow better
- Example fertilizers help farmers get more crops

Renewable and finite non renewable resources

Renewable resources

They Reform quickly, same speed as we use them
for example Timber .freshwater .food
It will never run out

Non renewable resource. finite resources

- They do not Reform quickly so they will run out one day
- Example fossil fuels Oil gas coal

After extraction

- Finite resources need man made processes
- Like crude oil sectional distillation and that will make the petrol and diesel
- metal ores are reduced and they will produce Pure metals

- If a resource forms in 10 years It is renewable
- if are resource forms in one billion years so it is a Non renewable
- Timber has low energy density
- coal has high energy density

Problems of extracting finite resources

Extraction has good and bad sides

Good

- It gives useful products
- it gives jobs and money to local people

Bad

- It uses a lot of energy
- it damage is the environment
- it leaves holes and scars in the lands
- it makes the waste
- it destroys the habitat

Sustainability

What is sustainable development

- Using resources in a way that helps us today without harming future generations

Why is sustainability needed

Because many resources are finite and will run out

How chemist help sustainability

- It reduce use a finite resources
- create processes that useless energy
- it use catalyst to save energy

Copper rich ores are running out

- Copper is finite and rich Ores are limited
- so we use new methods

Bioleaching

- Bacteria change copper compounds into soluble copper compounds
- This solution contains copper ions
- Copper is extracted from Leechate by electrolysis or displacement

Phytomining

- Plants grow in copper rich soil
- copper build up in the leaves

- plants are harvested , dried burnt
- ash contains copper compounds
- copper extracted by electrolysis or displacement

1. Advantages of new method is they do less damaged to environment
2. disadvantages are that they are very slow

Recycling

Why recycling is important

- It uses less energy than mining
- it save finite metals
- it reduces land fill waste

Recycled materials are waste items—including plastics, metals, glass, paper, and electronics—repurposed into new products to conserve resources

Recycling metals

- Metals are melted and reshaped
- some metals can be recycled together

Glass recycling

- Save energy and reduces waste
- Some glass bottles are reused directly
- other glass is sorted by colour crashed and melted

- They are made into new bottles or insulation material

Life cycle assessments LCA

What is an LCA

- A study that checks the products total environmental impact from start to end

Stages of LCA

Getting raw materials

- Extraction damages land and uses a lot of energy
- processing raw materials also uses energy and makes the waste

Manufacturing and packaging

- It uses a lots of energy
- it releases pollution
- it produces the waste
- some waste can be harmful and can be turned into useful chemicals

Using the product

- It can harm the environment example burning fuels greenhouse gases
- some products are used for long so they create less waste overall

Product disposal

- It can harm the environment
- example burning fuel such as greenhouse gases
- some products are used for long so they create less waste

Problems with LCAs

- Some impact cannot be measured exactly
- lca depend on the persons opinion so can be biased
- companies make create selective lca to make their product look good

Comparing lcs plastic versus paper bags

Plastic bags

- Plastic bags are made from the crude oil
- uses less energy to make
- it can be reused
- it is recyclable

Paper bags

- it is made from the timber
- it uses a lot of energy to make
- it is usually used one
- it is recycling

Plastic bags may cause pollution but overall use less energy than paper bags

Potable water in water treatment

- Portable water is a water that is safe to drink
- it is not pure
- it has a pH of 6.5 to 8.5
- it has no harmful microbes
- it has low levels of salts

To make freshwater potable

Filtration

- Wire mesh removes big objects
- sand and Gravel remove small particles

Sterilization

- kills bacteria using chlorine gas Ozone or UV light

Desalination for very dry countries

Methods

- Distillation
- Reverse osmosis

Problems

uses huge energy so very expensive

Wastewater treatment

waste water comes from

- Homes from bath toilets sink
- farms from animal waste
- industry chemicals

Wastewater must be cleaned before it enters river or lakes

Stages of sewage treatment

- **Remove big objects such as twigs plastics**
- **heavy solids Remove from the bottom**
- **lighter liquid is removed from the top**
- **air is pumped**
- **aerobic bacteria breakdown the organic matter**
- **bacteria breakdown sludge without oxygen**
- **it makes Methane Gas**
- **the left over waste is called fertilizer**

Sewage treatment uses less energy than destination

some countries reuse treated wastewater as drinking water