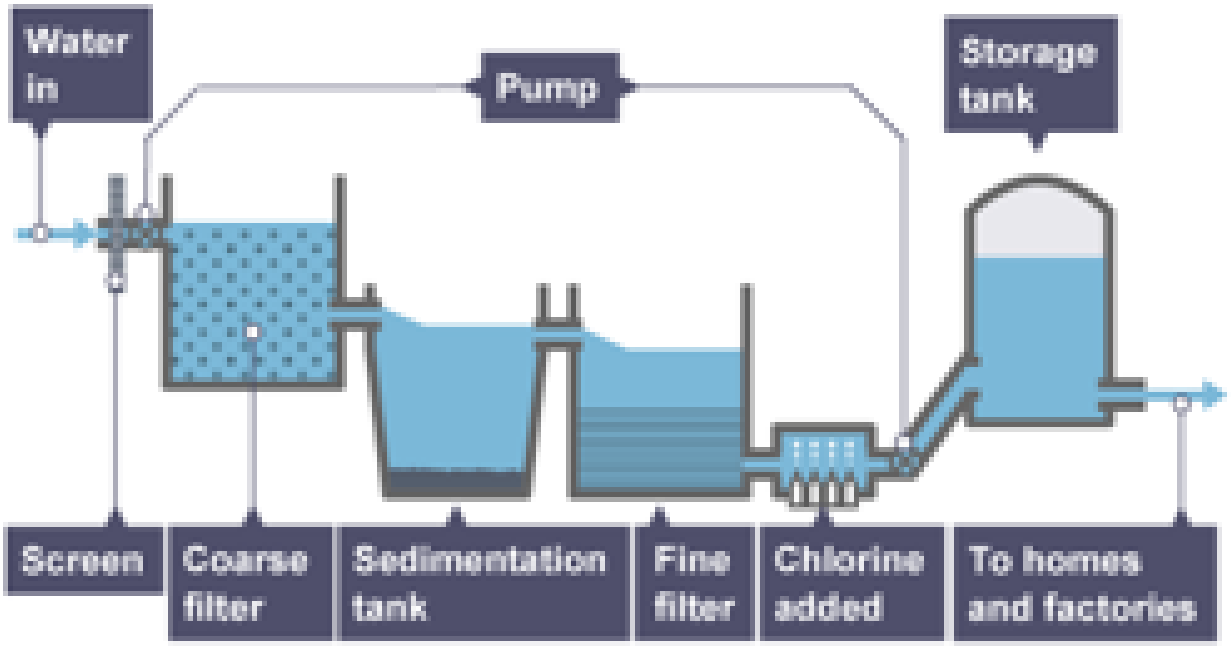
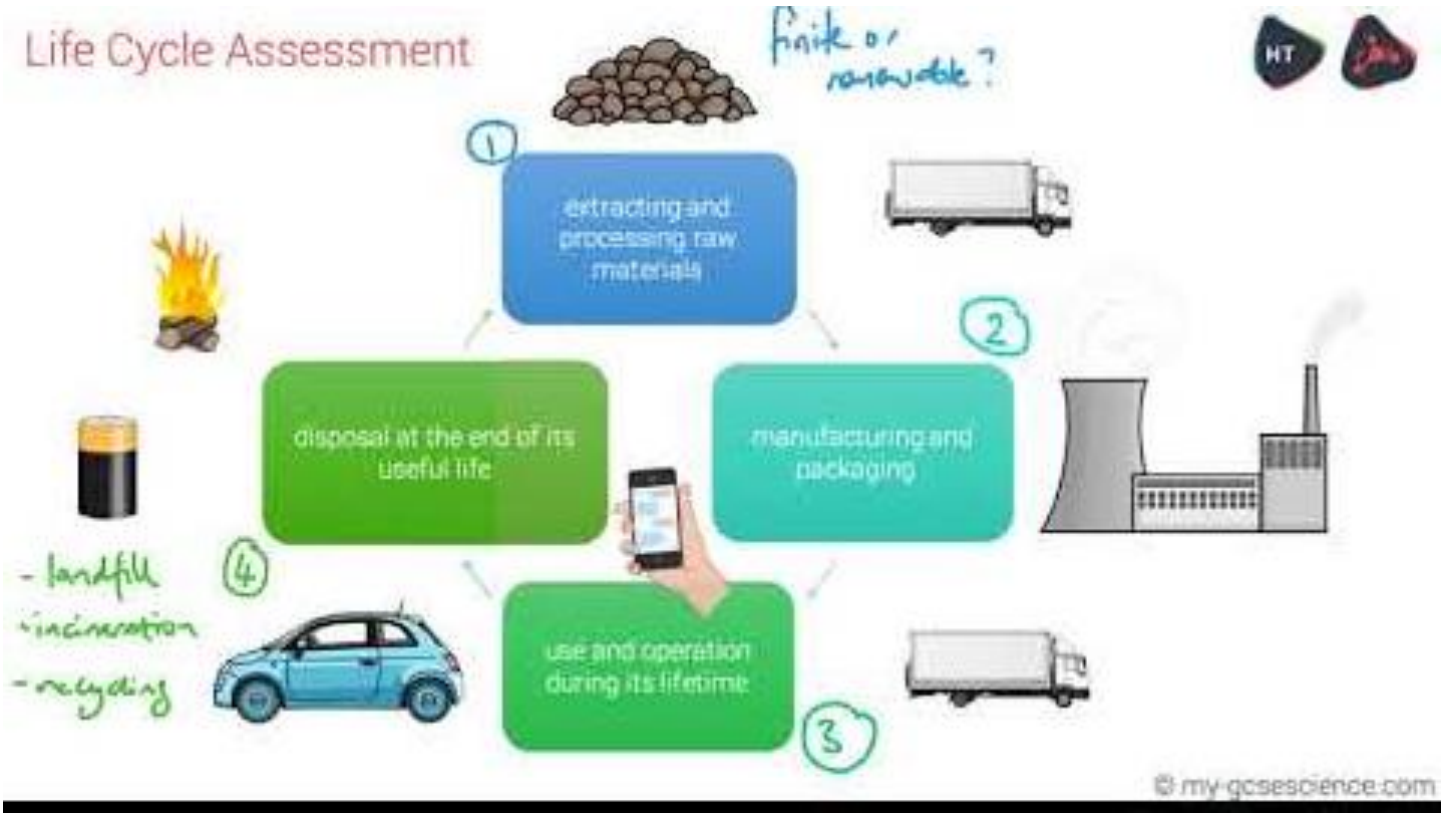
Water Treatment





Potable Water

- Water of appropriate quality is essential for life. Drinking water should have low levels of dissolved salts and microbes. Water that is safe to drink is called **potable water**.
- Most potable water is made using
    - A suitable fresh water source
    - Passing water through filter beds
    - Sterilising – using chlorine, UV
- If there is not enough fresh water then salty water is used and this process involves **desalination.** The salt is removed by distillation and requires large amounts of energy

Recycling

- Many of the resources are finite – will run out – examples like crude oil and metals
- We must ensure we recycle resources as extracting them requires high energy and damages environment
- Metals can be recasted or reformed into different products
- Some products like bottles can be reused. The process involves crushing and melting.

Alloys and useful materials

- Pure copper, gold, iron and aluminium are too soft for many uses and so are mixed with other metals to make them harder for everyday use
- Bronze is an alloy of copper and tin and is used to make statues and decorative objects. Brass is an alloy of copper and zinc used to make water taps and door fittings
- High carbon steel is strong but brittle. Low carbon steel is softer and more easily shaped. Steels containing chromium and nickel (stainless steels) are hard and resistant to corrosion.

Ceramics, Polymers and composites

The properties of polymers depend on what monomers they are made from and the conditions under which they are made. For example, low density (LD) and high density (HD) poly(ethene) are produced from ethene using different catalysts and reaction conditions.
Thermosoftening polymers consist of individual, tangled polymer chains and melt when they are heated. Thermosetting polymers consist of polymer chains with cross-links between them and so they do not melt when they are heated.

C4.10 Using resources - Knowledge organiser

Name		Group	
1	Earth's resources give: **warmth, shelter, food, transport**	24	**Glass** and **metal** can be **melted** to make new products
2	**Finite** – **limited** supply	25	**Corrosion**: destruction of a substance by the **environment**
3	Chemistry helps **produce new products**	26	Only **Iron rusts** (Iron oxide)
4	Chemistry helps **sustain products**	27	**Coating** materials **protects** them: paint, grease, electroplate
5	**Potable** water = **safe** to drink	28	**Sacrificial protection**: using another metal to react wit h are to protect the metal underneath
6	**Sterilise** water by: **chlorine, ozone, Ultra-violet light**	29	Most everyday metals are **alloys**
7	**Desalination** of sea water = **removing the minerals**	30	**Bronze** = copper + tin
8	Desalination: **distillation** or **reverse osmosis**	31	**Brass** = copper + zinc
9	**Industrial** and **sewage** water is **cleaned** after use	32	**Gold** quantity in jewellery is measured in **carats** (24 is pure)
10	Sewage is cleaned by:	33	**Steel** = Iron + carbon
11	- **Screening**	34	**High** carbon steel = **strong** but **brittle**
12	- **Sedimentation**	35	**Low** carbon steel = **soft** and easily shaped
13	- **Anaerobic digestion** of sludge	36	Steel + chromium/nickel = **stainless steel**
14	- **Aerobic treatment** of effluent	37	Common glass (soda glass) = sand + sodium carbonate + limestone
15	**Copper ores** are **depleting**	38	Polymers can be high density (HD) or low density (LD)
16	**Phtyomining** uses **plants** to extract metals from soil	39	**Thermosoftening** = **melt** when heated
17	**Bioleaching** uses **bacteria** to isolate metal compounds	40	**Thermosetting** = have cross links and will **burn**
18	**Copper** can be **isolated** using **displacement** reactions	41	**Composites** are products made of **different materials**
19	Life-cycle assessment (**LCA**) = **impact of products**	42	**Ammonia** is made in the **Haber process** (reversible reaction)
20	LCA include: **water, energy, pollution, raw materials, packaging, disposal**	43	Hydrogen + nitrogen ⇆ ammonia
21	**Recycling** reduces the use of raw materials	44	Optimum conditions: **450°C** and **200atm** with **iron catalyst**
22	**Quarrying** and **mining** have environmental impacts	45	**NPK** fertiliser contains: **nitrogen, phosphorus, potassium**
23	Some raw materials are **limited**: **metal, glass, plastics**		