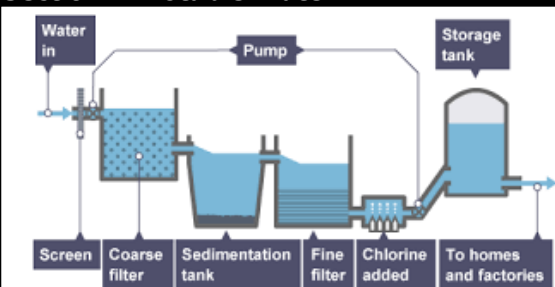


# Chemistry 10: Using Resources

## Section 1: Key Terms

1 Finite resource	A resource used by humans that has a <b>limited supply</b> e.g. coal.
2 Renewable resources	A resource used by humans that can be <b>replenished</b> e.g. trees. If not managed correctly, the resource may decrease.
3 Potable water	Water that is <b>safe to drink</b> . Has <b>low levels of dissolved salts</b> and <b>microbes</b> .
4 Fresh water	Water that has <b>low levels of dissolved salts</b> . Sea water is not fresh water.
5 Pure water	<b>Only</b> contains <b>water molecules</b> , nothing else.
6 Desalination	A process that <b>removes salt from sea water</b> to create potable water. <b>Expensive</b> as it <b>requires a lot of energy</b> . Only necessary in areas with small amounts of fresh water e.g. Spain.
7 Sewage	<b>Wastewater produced by people</b> . Contains potentially dangerous <b>chemicals</b> and large numbers of <b>bacteria</b> .

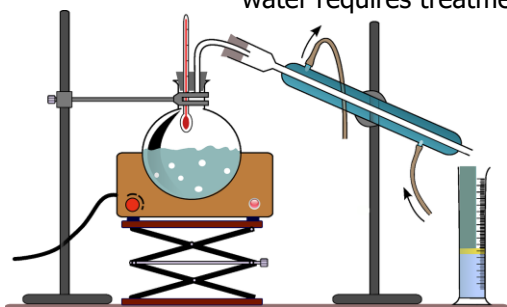
## Section 2: Potable Water



8 Obtaining potable water in countries with plentiful fresh water e.g. the UK

- Find a suitable source of fresh water (e.g. a **reservoir**).
- Pass through **filter beds to remove particles**.
- **Sterilise** to kill microbes e.g. by using **chlorine, ozone** or **ultraviolet light**.

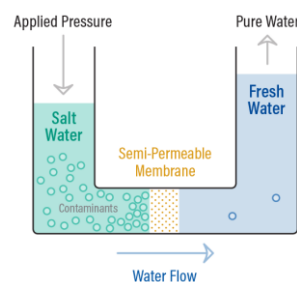
Obtaining potable water in countries with limited fresh water requires treatment of sea water:



### 9 Distillation:

- Water is heated to **100°C**.
- It **evaporates**, leaving the salt behind.
- A **condenser cools** the water to return it to the liquid state.

### Reverse Osmosis



### 10 Reverse osmosis:

- **Pressure** is applied to the water.
- The **water molecules** move through the **partially-permeable membrane**.
- **Other particles are too large** and are not able to move through.

## Section 3: Sewage Treatment

11 Screening and grit removal	<b>Removes rags, paper, plastics</b> etc. that may block pipes.
12 Sedimentation	<b>Suspended particles settle out</b> of the water and fall to the bottom of a sedimentation tank to <b>form the sewage sludge</b> .
13 Anaerobic digestion of sewage sludge	<b>Bacteria digest the sludge</b> in the <b>absence of oxygen</b> . This breaks it down. <b>Methane and carbon dioxide are produced</b> by the bacteria.
14 Aerobic biological treatment of sewage effluent	<b>Aerobic bacteria digest</b> more of the <b>organic matter in the effluent</b> (the treated waste water).

## Section 4: Alternative Methods of Metal Extraction

15 Bioleaching	<b>Bacteria</b> grow on <b>low-grade copper ores</b> . They produce a <b>leachate</b> (liquid) that <b>contains copper compounds</b> .
16 Phytomining	<b>Plants</b> are grown on <b>low-grade copper ores</b> . The plants <b>absorb the copper</b> and are then <b>burned</b> . The <b>ash contains copper compounds</b> .
17 Displacement using scrap iron	A method of <b>obtaining pure copper</b> from the copper compounds produced in phytomining and bioleaching. <b>Iron displaces copper</b> from its compounds as <b>iron is more reactive</b> . <b>Cheap</b> .
18 Electrolysis	A method of <b>obtaining pure copper</b> from the copper compounds produced in phytomining and bioleaching. <b>Copper compounds can be dissolved</b> and then the <b>positive copper ions would be attracted to the negative electrode</b> in electrolysis.

## Section 5: Life Cycle Assessment

19 Life Cycle Assessment	Life cycle assessments <b>assess the environmental impact of products</b> . A LCA assesses the use of <b>water, resources, energy sources</b> and <b>production of some wastes</b> during the following stages: <ul style="list-style-type: none"> <li>• <b>extracting</b> and <b>processing raw materials</b></li> <li>• <b>manufacturing</b> and <b>packaging</b></li> <li>• <b>use</b> and operation during its lifetime</li> <li>• <b>disposal</b> at the end of its useful life, including transport and distribution at each stage.</li> </ul>
20 Reuse	The <b>environmental impact</b> of products can be <b>reduced</b> by reusing the product. Only <b>suitable for some products e.g. glass bottles</b> .
21 Recycling	Some materials can be recycled e.g. metals. Metals can be <b>recycled by melting and recasting</b> or <b>reforming into different products</b> .