# Chemistry 10: Using Resources

## Section 1: Key Terms

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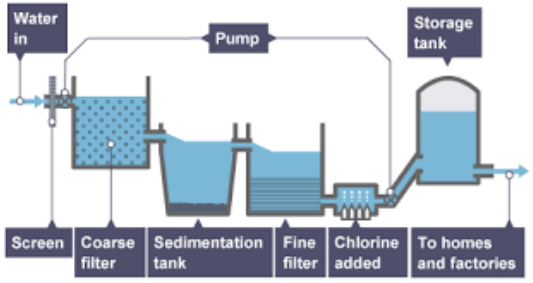
| 1 Finite resource | A resource used by humans that has a **limited supply** e.g. coal. |
| 2 Renewable resources | A resource used by humans that can be **replenished** e.g. trees. If not managed correctly, the resource may decrease. |
| 3 Potable water | Water that is **safe to drink**. Has **low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

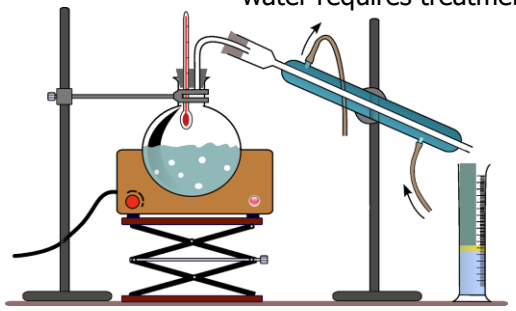
## Section 2: Potable Water




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

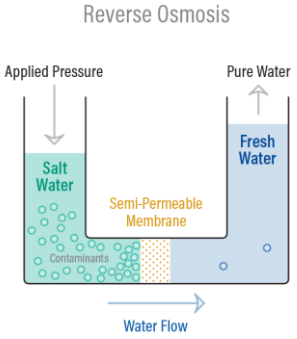
- Find a suitable source of fresh water (e.g. a **reservoir**).
- Pass through **filter beds to remove particles**.
- **Sterilise** to kill microbes e.g. by using **chlorine**, **ozone** or **ultraviolet light**.

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.




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

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

## Section 4: Alternative Methods of Metal Extraction

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

## Section 5: Life Cycle Assessment

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| 19 Life Cycle Assessment | Life cycle assessments **assess the environmental impact of products**. A LCA assesses the use of **water, resources, energy sources** and **production of some wastes** during the following stages:<br>• **extracting** and **processing raw materials**<br>• **manufacturing** and **packaging**<br>• **use** and operation during its lifetime<br>• **disposal** at the end of its useful life, including transport and distribution at each stage. |
| 20 Reuse | The **environmental impact** of products can be **reduced** by reusing the product. Only **suitable for some products e.g. glass bottles**. |
| 21 Recycling | Some materials can be recycled e.g. metals. Metals can be **recycled by melting and recasting** or **reforming into different products**. |