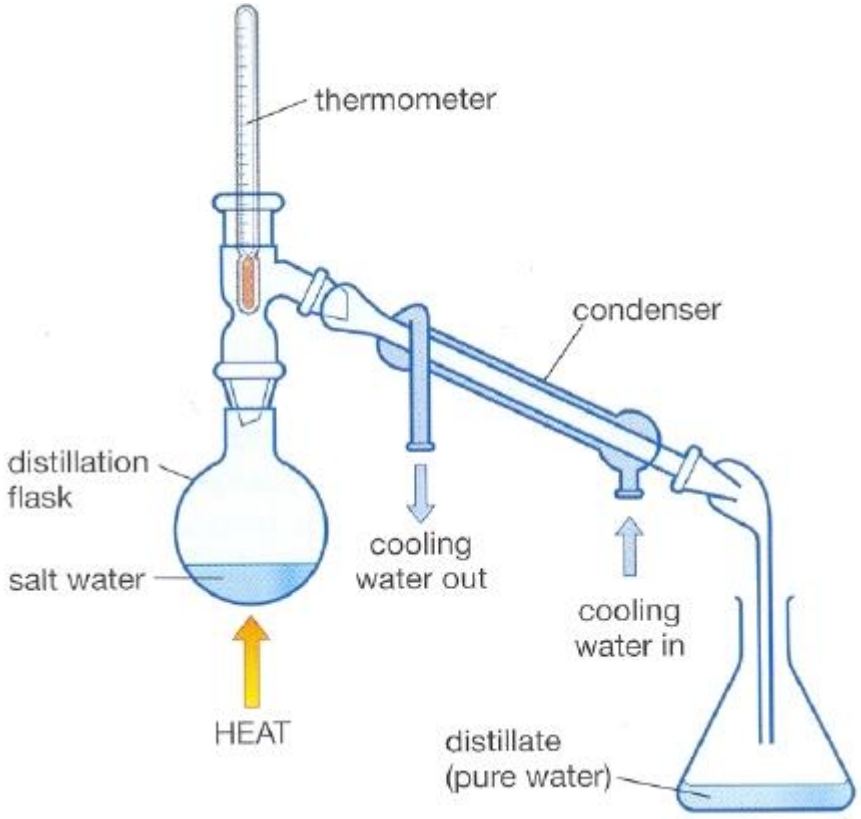
# Boiling & Condensing




**Outcomes:**

- Explain the process of freezing/melting, and sublimation/ deposition in terms of KMT. *Include: Freezing point*
- Use KMT to describe the process of evaporation/ condensation. *Include: IMF's, random motion, volatility, dynamic equilibrium.*

# Factors Affecting Changes of State:

There are various factors affecting melting and boiling points:

***1. Intermolecular Forces:***

- Molecules with **STRONGER IMF'S** will have **HIGHER MELTING** and **BOILING POINTS**.

***2. Molecular Size/Mass:***

- The **LARGER** the molecule, the **MORE ENERGY** it takes to make it move to **CHANGE STATES**.
- **HEAVIER** molecules → ***Higher m.p. & b.p.***

# Factors Affecting Changes of State:

***3. Ionic vs. Covalent:***

- **IONIC** substances have **HIGHER** melting and boiling points due to **STRONGER FORCES** of attraction between particles.

***4. Polar Compounds:***

- **MORE POLAR** molecules have **STRONGER IMF'S**, hence **HIGHER** melting and boiling points.

Using these factors, we can now rank compounds in order of boiling/melting points from data like **FORMULA MASS** or **BOND TYPE**.

# Factors Affecting Changes of State:

- **BOILING** occurs when molecules of a liquid get enough **ENERGY** to **OVERCOME** the **FORCE** of the **PRESSURE** of the **ATMOSPHERE**.

  → Therefore **PRESSURE** is also a factor.

- The **HIGHER** the **PRESSURE** of the atmosphere, the **HIGHER** the **BOILING POINT**, since it is more difficult for molecules to escape the liquid phase.

Ex) - Water in a **VACUUM** will boil at **ROOM TEMPERATURE**.

- Water at **1 ATM** (***standard pressure***) boils at 100°C

  → This is the **NORMAL BOILING POINT** of water

- Water at **3 ATM** will boil much **HIGHER** than 100°C