

Main Ideas

1. Transformations of Water

- Particles **do not** have the same amount of energy
- Adding or taking away energy (heat) causes a **change in state**
- A change in state is a **physical** change.

2. Boiling Point

- Boiling happens when **liquid particles break free** and change into a gas but is trapped in a **bubble**.
- The boiling point of water (100°C) is not absolute and can be **affected by other factors** (e.g. pressure)

3. Freezing Point

- Freezing occurs when molecules of a liquid **slow down** enough that their attractions cause them to arrange themselves into fixed positions as a solid. The molecules of a **liquid are attracted to each other by different amounts**. Substances attracted by weak forces need to be cooled to very low temperatures in order to condense to a liquid or freeze to a solid.

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4. Evaporation

- Evaporation happens when **atoms or molecules escape** from the liquid and **turn into a vapor**. Different liquids evaporate at different rates because molecules of a liquid are in constant motion, some moving fast, others slowly. Those with enough kinetic energy escape from the liquid's surface and become a molecule of vapor.
- The amount of heat required to vaporize a given amount of liquid **depends on the kind of liquid**. Some liquids have weaker forces that hold particles together allowing some particles to escape faster than others.

5. Sublimation

- The transition of a substance directly from **solid to gas** without passing the liquid phase. The opposite is called deposition.

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6. Solubility

- The property of a substance called **solute** to **dissolve** and form a **solution**.
- Stirring increases contact of solute with solvent (**increases surface area**). It helps speed up the formation of solutions by allowing the molecules to touch each other more often (by moving the molecules around) and form the intermolecular connections necessary to form solutions.