# Changes of State Notes

As we have discussed, matter can exist in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ different forms: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The three forms we observe in the 8th grade science lab are:

When a substance changes from one state (form) to another, this is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

During a change of state, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a substance changes. The energy is related to the movement of particles.

Which particles have the most energy: those in a solid, a liquid, or a gas? \_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Movement** | **Energy** | **Temperature** |
| Fast |  |  |
| Slow |  |  |

If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is added to a material, then the particles will move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the temperature will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is taken away from the material, then the particles will move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the temperature will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**5 Examples of Changes of State**

**1) Melting** – a change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **Melting point** – temperature at which a substance changes from a solid to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* When something to melts, heat is \_\_\_\_\_\_\_\_\_\_\_\_\_ and the particles begin moving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Draw the particles’ change: **melting**

**2) Freezing** – a change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **Freezing point** – temperature at which a substance changes from liquid to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* When something to freezes, heat is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the particles begin moving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Draw the particles’ change: **freezing**

“-ization” means \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3) Vaporization** – a change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* There are two ways for a material to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Boiling – vaporization that occurs throughout a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **Boiling point—**temperature at which a liquid becomes a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Evaporation – vaporization that occurs at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a liquid when the liquid is below its boiling point
* When something to vaporizes, heat is usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the particles begin moving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Draw the particles’ change: **vaporization**

**4) Condensation** – a change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* **Condensation point** – temperature at which the gas becomes a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The condensation point of a substance is the same as its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* When something to condenses, heat is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the particles begin moving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



Examples: mirror after a shower, breathing in the winter time

Why do water vapor particles condense when they travel from the shower and hit the glass of a mirror?

Why does your breath cloud up when you breath outside in the winter?

Draw the particles’ change: **condensation**

**5) Sublimation** – change from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ directly to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (skipping the \_\_\_\_\_\_\_\_\_\_\_\_\_ state).

* Sublimation causes particles to move much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Draw the particles’ change: **sublimation**

**Summary:**

