Phase Changes

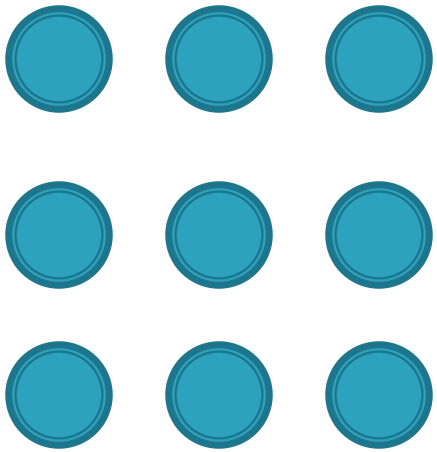
What is Heat?

- Heat is the transfer of energy from one system to another. We measure heat in *Temperature* (either Fahrenheit (Imperial) of Celsius (Metric SI).
- All objects have "heat." The more the molecules within a substance move, the more heat they have. Slower moving particles have less heat.
- In layman's term, we use the word cold to describe objects we perceive to have little to no heat. Objects cannot have, receive, or transfer cold.
- Remember, heat is a noun, cold is an adjective.

Phases of Matter

- **Solids**: Particles are tightly packed together and DO NOT move past each other. They vibrate in place.

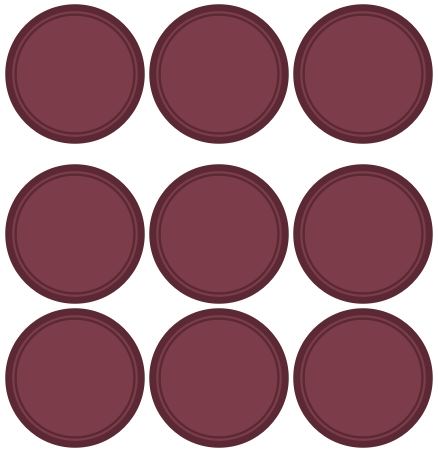
Solids have defined volume and defined shape.



Phases of Matter

- **Liquids**: Particles are still tightly packed together and they SLIDE move past each other.

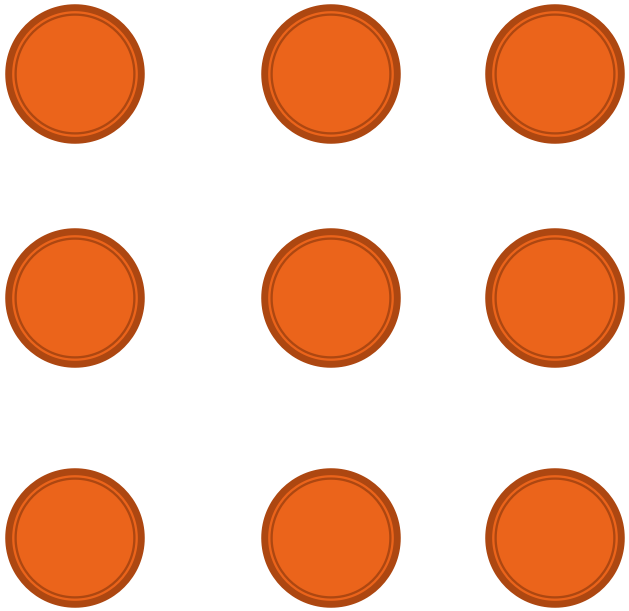
Liquids have defined volume but do not have defined shape.



Phases of Matter

- **Gases**: Particles are not tightly packed together, and have so much energy they slip past each other quickly.

Gases have neither defined shape nor defined volume.



Heat and Phase Change

- As heat enters or leaves a system, it has the ability to affect the state of matter an object is in.
- This is called a *Phase Change* (sometimes referred to as a Change of State)
- Each Phase Change has a different name and function.

Melting

- The change from a Solid to a Liquid

Freezing

- The Change from a Liquid to a Solid

Vaporization

- The Change from a Liquid to a Gas.

- There are 2 types of Vaporization: Evaporation and Boiling

Evaporation

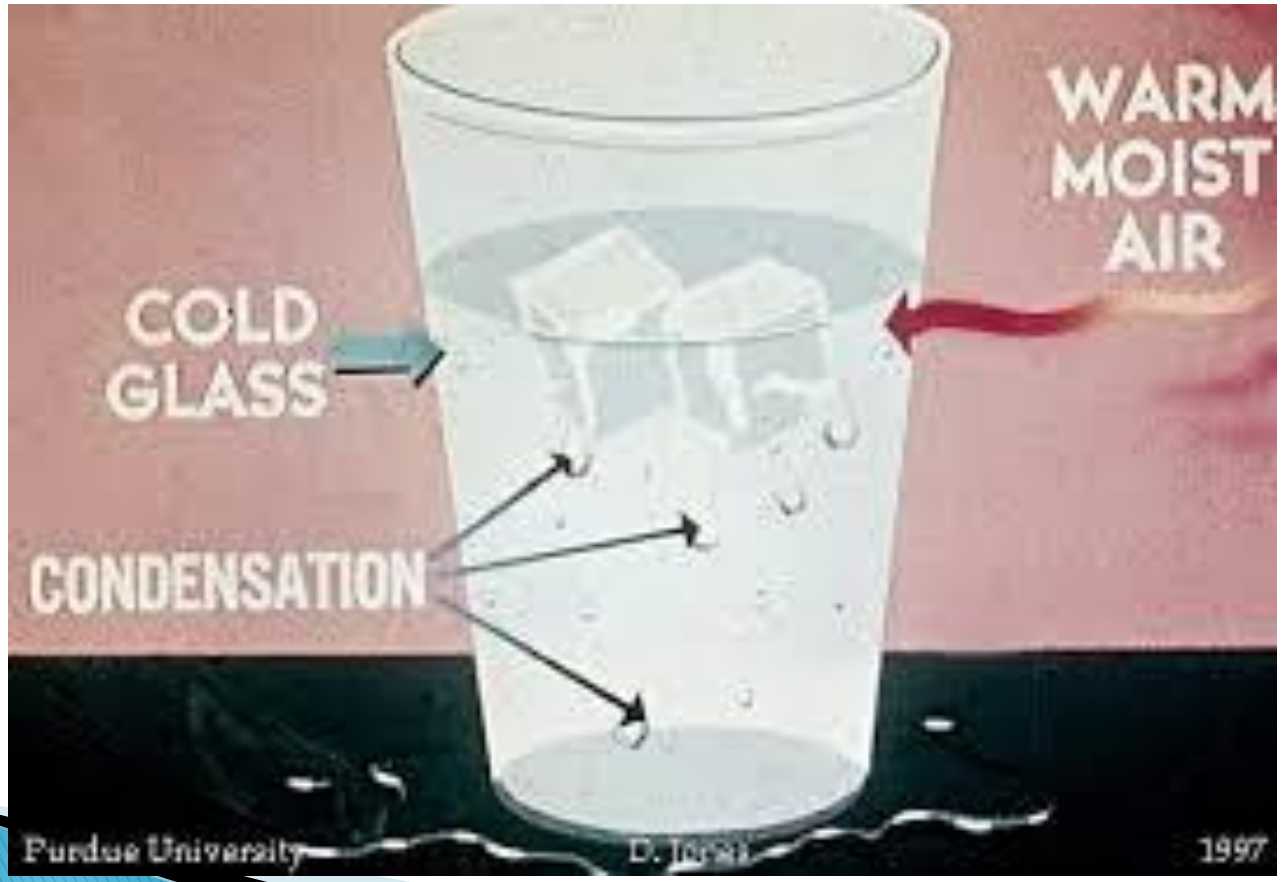
- Vaporization that occurs only at the surface of a liquid.

Boiling

- Vaporization that occurs throughout a liquid

Condensation

- Change from a Gas to a Liquid



Sublimation

- Change from a Solid to a Gas (Without becoming a liquid).

Endothermic vs. Exothermic

- Endothermic Reaction- When thermal energy is absorbed from the surroundings into a system. Heat ENters the system.

- Exothermic Reaction- When thermal energy is released from a system into the surroundings. Heat EXits the system.