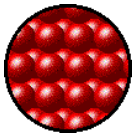
Molecules in Motion

- When a substance changes from one state to another, the molecules in the substance **do not change**.
- It's the arrangement of the molecules that changes.
- The **ARRANGEMENT** and **MOTION** of particles determine the state of matter.

SOLIDS

- A **solid** has a fixed volume and a fixed shape.



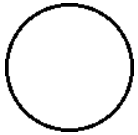
- Particles in solids:
  - are close together
  - form a regular pattern
  - vibrate in place

LIQUIDS

- A **liquid** has a fixed volume, but does **NOT** have a fixed shape.
- Particles in liquids:
  - are relatively close together
  - are not in a fixed place -they move
  - take on the shape of the container

GASES

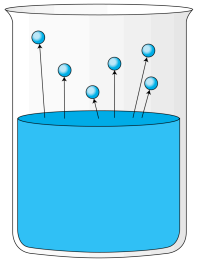
- A **gas** has **NO** fixed volume and **NO** fixed shape.
- Can take on both the shape and volume of its container.



- Particles in gases:
  - are not close together
  - move freely in any direction

Changing States

- Evaporation – liquid to gas
- Water turns to steam at 100°C
- Ex: water boiling on a stove



BOILING POINT

Changing States

- Melting– solid to liquid
- Freezing– liquid to solid

The melting and freezing points of water are **both** 0°C.

Changing States

- Condensation – gas to liquid

Example: dew forming on a leaf

Changing States

- Sublimation – solid to gas

Example: Dry ice

HEATING & COOLING

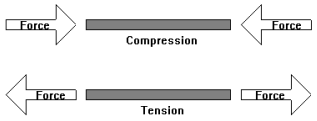
- When substances are **HEATED**, the molecules inside move faster and spread farther apart from each other
- When substances are **COOLED**, the molecules inside move slower and move closer together

Particle Theory of Matter

1. All matter is made up of tiny particles.
2. Particles are always moving.
3. There are spaces between particles.
4. Particles have an attraction between each other.
5. Particles of one substance are different from particles of another substance.

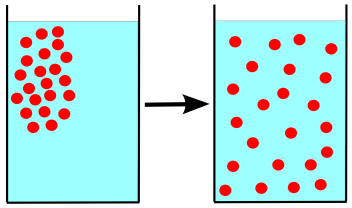
Compression

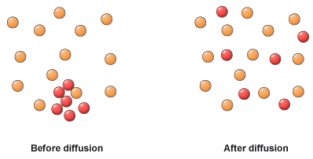
* the application of balanced inward forces to different points on a material or structure
* Pushing in on something



Diffusion

* Movement of a fluid from an area of higher concentration to lower concentration
* The particles mix until they are evenly distributed





Thermal Expansion

* The tendency of matter to change in volume in response to a change in temperature through heat transfer