# States of Matter

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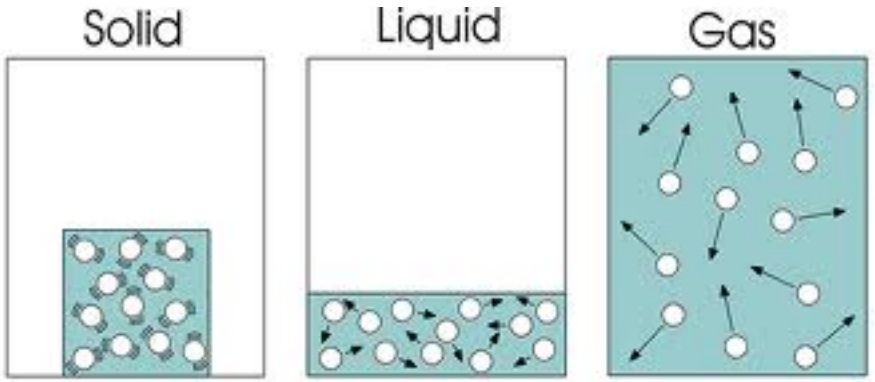
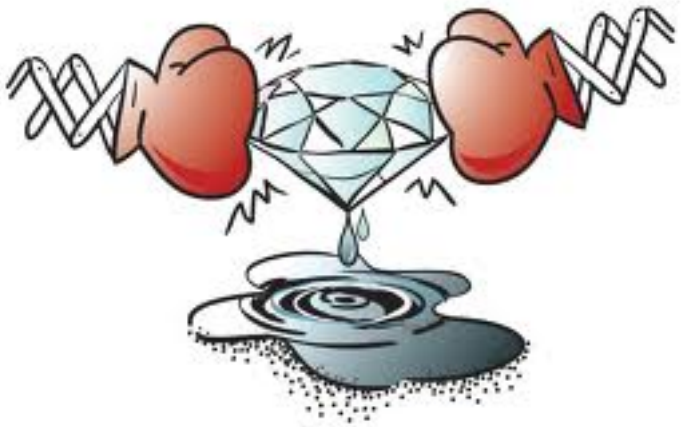
- All matter can exist in 3 states: solid, liquid, gas
- Changing from one state to another is a physical change



# Specific States of Matter

- Depends on the temperature and pressure of matter
- As the temperature of an object increases its state will change from solid to liquid to gas



# Solid

- Matter with a definite shape and volume
- Particles are bonded together in a crystal lattice
- Particles vibrate but do not move independently from each other

# Liquid

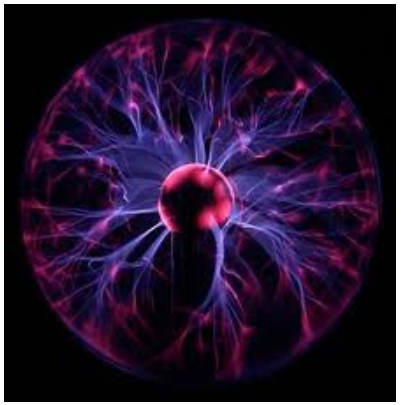
- Matter with a fixed volume but not a fixed shape
- The bond between particles are not strong enough to support the substance

# Gas

- Matter without a fixed volume or fixed shape
- Has a tendency to expand
- Example: oxygen, carbon dioxide

# Plasma

- Similar to gas but has charged particles that react strongly to magnetic fields
- Stars are made of plasma and it can be found in neon signs, lightning, and fluorescent bulbs
- Plasma is the most common state of matter in the universe but we seldom see it in daily life.



# Temperature

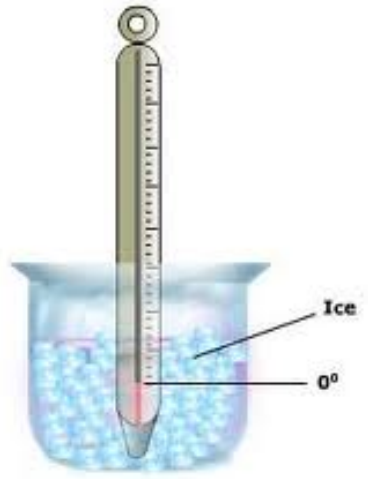
- Measurement of heat or how fast particles are moving in a substance
- The higher the temperature the faster particles move

# Temperature Scales

- Fahrenheit – based on typical conditions on Earth; 32$^{o}$ – water freezes, 212$^{o}$– water boils
- Celsius – Based on the change of states for water; 0$^{o}$ – water freezes, 100$^{o}$– water boils
- Kelvin – Based on the coldest possible temperature (absolute zero); 273K – water freezes, 373– water boils

# Melting Point

- The temperature at which a solid melts into a liquid
- Every material has its own unique melting point
- Bonds holding solid together are broken at the melting point



# Boiling Point

- The temperature at which a solid melts into a liquid
- Every material has its own unique boiling point
- Attraction between particles in a liquid are broken at the boiling point

# Sublimation

- Matter changing directly from a solid to a gas without going through a liquid phase
- Example of this is dry ice (solid carbon dioxide)