Chapter 1. THE ORGANIZATION OF MATTER

-Matter is anything that has mass and volume

-The Particle Model is based on the idea that matter is made up of small particles.

-Phases of Matter:

- Solid particles have a strong force of attraction. They have a definite structure and shape
- Liquid particles have a weaker force of attraction. They have a defnite volume but no definite shape.
- Gaseous particles are not bound by a force of attraction. They don't have any definite shape or volume.

-Atoms/Molecules… Elements/Atoms/Molecules…

-Mixtures contain 2 or more different particles or substances

- Heterogeneous VS Homogeneous (colloids or solutions)
  Unevenly mixed Uniformly (evenly) mixed (diff. parts are visible in microscope / Diff. parts not vis. in microscope)
- Solutions (Solute vs. Solvent)
  - Concentration, C (units: g/L or %m/v or %v/v or %m/m) (FORMULA C=m/v)
  - Dilution (↓ C by by adding solvent and ↑ total Volume of solution) (FORMULA $C_1V_1=C_2V_2$)
  - Solubility: Saturation is the maximum C of solute in solution. If more sulute is added, a precipitate will be seen. For solids (like salt), increasing the temperature will ↑ the solubility (raises saturation conc.). For gases, increasing the temperature will ↓ the solubility (lower saturation conc.)
  - Hydrophilic is a substance that is soluble in water, while lipophilic is a substance that is soluble in oil.

%m/v (100mL)
%v/v (100mL)
%m/m (100g)
% solute / solution

- Separating Mixtures
  - Decant: Pour off liq., leaving solid
  - Centrifuge Spin to bring solid to bottom, then decant.
  - Filtration Filter paper catches solid
  - Evaporation Separates liq. solvent from solid solute (salt).
  - Distillation Separates liq. solvent from liquid solute (alcohol & water) that have different boiling temperatures
  - ✗ Chromatography

-Pure Substances contain only one type of particle

- Elements can be ATOMS, such as copper Cu or MOLECULES such as hydrogen H_2
- Periodic Table (atomic # and mass)

- Characteristic Physical Properties:
  - boiling point, melting point, density, solubility
- Characteristic Chemical Properties
  - Litmus paper: colour change for acids, bases, or neutral substance
  - Cobalt chloride paper colour change for water
  - Limewater becomes milky if there is CO_2
  - glowing splint, reignites if there is O_2
  - burning splint explodes, indicating an explosive gas, ex: Hydrogen H_2
  - open flame purple → potassium K
    green → barium Ba
    red → strontium Sr