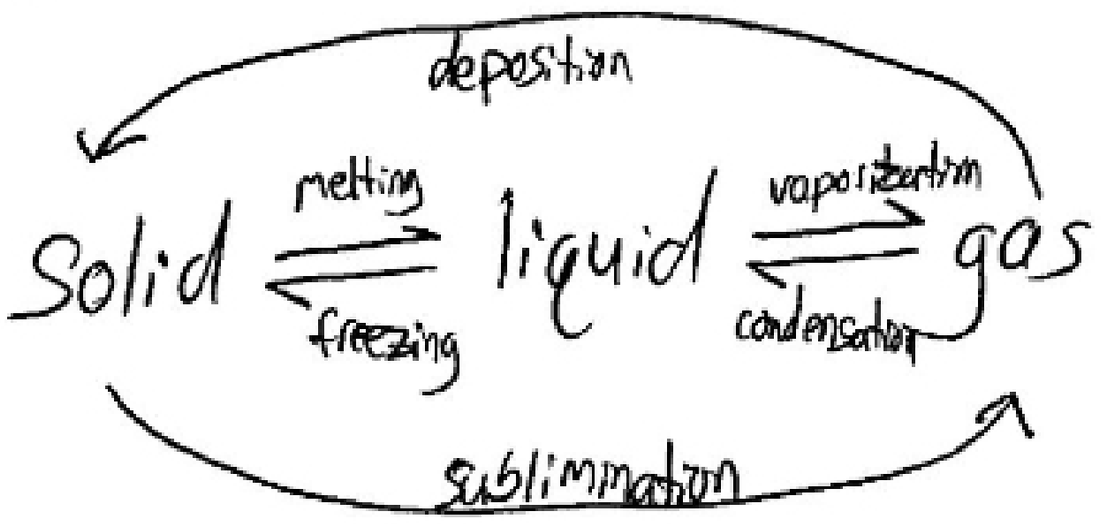
Everything I Need To Know About Liquids & Solids

States of Matter - gases, liquids, & solids are interchangle through Phase transitions

Melting - solid → liquid
Freezing - liquid → solid
Vaporization - water liquid → gas
Sublimination - solid → gas
condensation - gas → liquid
deposition - gas → solid



Vapor pressure - at a given temp, the measure of the partial pressure of a liquid @ equilibrium caused by motion of gas particles above liquid; motion = pressure ← collisions

vapor pressure increases with temperature because temperature causes collision which causes

boiling point - when vapor pressure = atmospheric pressure
freezing point = melting point
ΔH_{fus} = heat of fusion = melting solid
ΔH_{vap} = heat of vaporization = vaporizing a liquid

Clausius-Clapeyron Equation: $\ln \frac{P_2}{P_1} = \frac{\Delta H_{vap}}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$ where R = 8.31 J/K mol, ΔH_{vap} = J/mol, P = mm Hg, T = K

On a phase diagram:
far right is gas
middle is liquid
far left is solid

if solid/liquid division line slope is:
negative - liquid more dense than solid
positive - solid more dense than liquid

Critical temp = temp above which the liquid state of substance no longer exists
critical pressure = P_{vap} pressure at critical temp

Liquids

surface tension - floating
viscosity - syrupy

intermolecular forces:
van der Waals Forces → dipole-dipole - unsymetrical molecules align according to dipoles
→ London forces - electrons spend more time on one side of molecule than other - dipoles created - attraction (increase w/ weight)

Hydrogen bonding - tendency of hydrogen to attract F, O, or N (based on dipoles)
* (stronger bonds = lower vapor pressure) *

Solids

Types:

Molecular Solids - held together by Lodn london, dipole, hydrogen bonds

Metallic Solids - metals bonding with themselves

Ionic Solids - held together by ionic bonds (NaCl, CsCl, ZnS)

Covalent Network Solids - large chains of non-metals (Carbon, Silicon)

to melt, inter molecular forces must be broken

in order by strength:

- molecular - low melting - soft, brittle - non conducting
- metallic - low-high - malleable - conducting
- ionic - High - brittle, hard - conducting liquid
- covalent network - very high - very hard - nonconducting