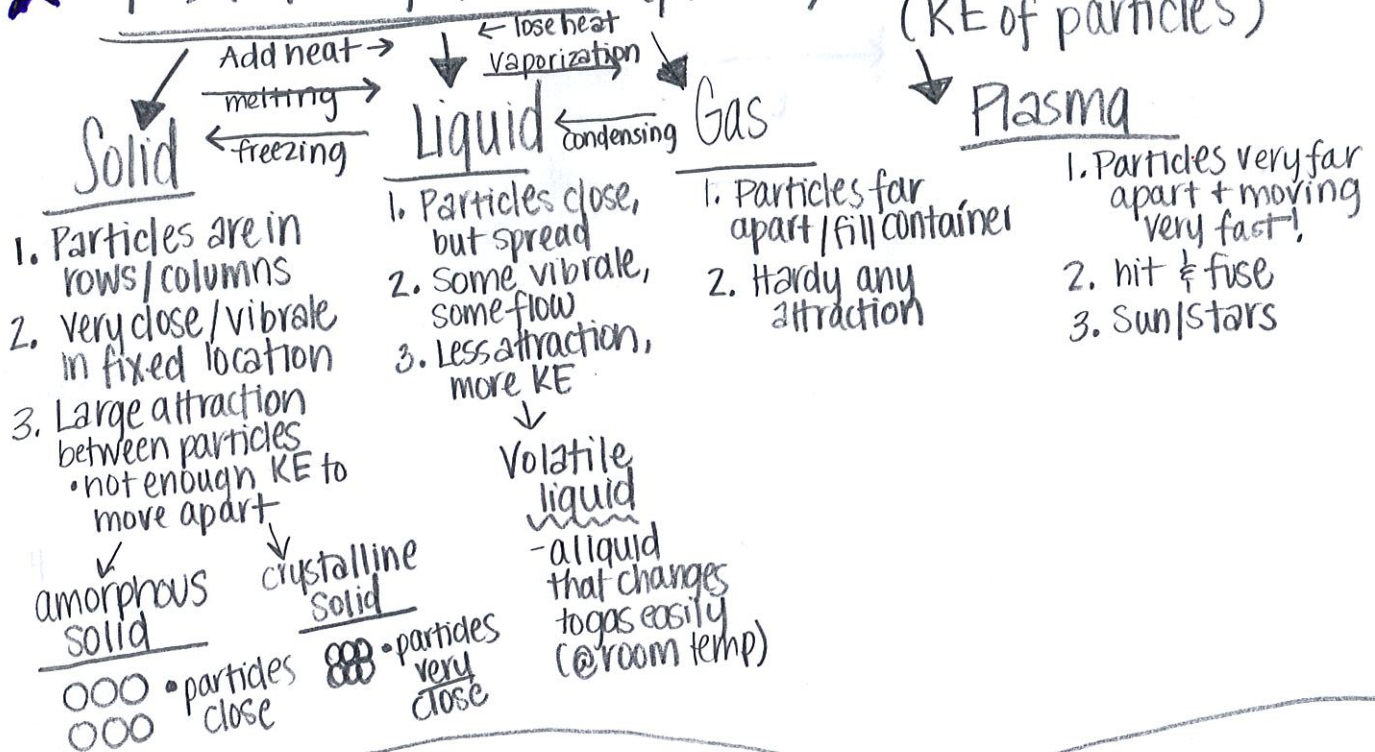


1. IA Notes

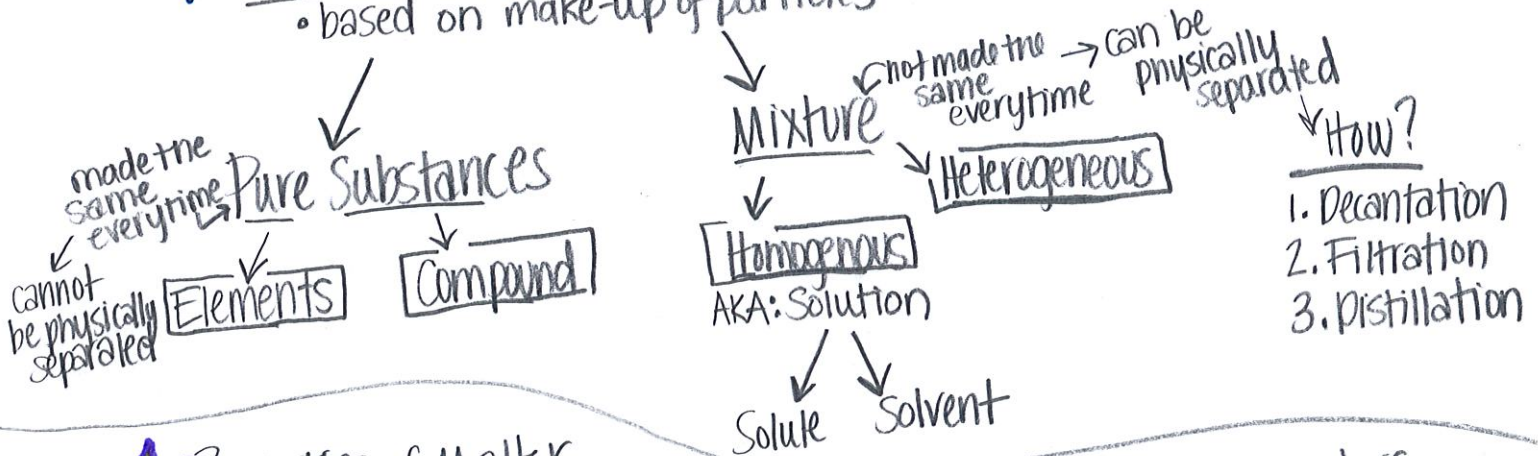
Matter - has mass & takes up space
 Not matter → light, heat, sound...

★ 4 States of Matter (phases) - depends on temperature (KE of particles)



★ Classify matter

• based on make-up of particles

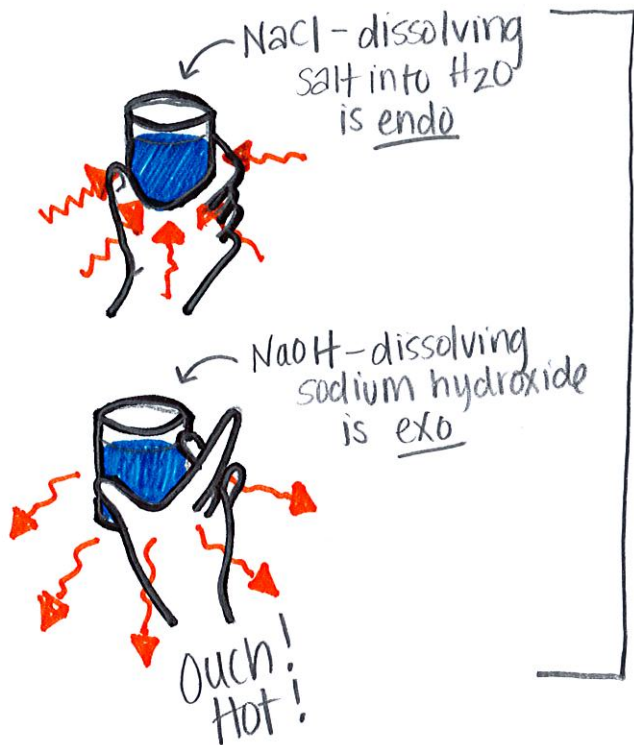


★ Properties of Matter

	Physical (PP)	Chemical (CP)	5 Indicators of CC's
Properties	<ul style="list-style-type: none"> observed or measured w/o changing identity 	<ul style="list-style-type: none"> describes substance's ability to undergo a change in identity 	
changes	<ul style="list-style-type: none"> a change, but identity does not change (PC) 	<ul style="list-style-type: none"> a change + <u>a new substance forms</u> (CC) 	
	ex...	ex... Efrid's Big 5 →	

1.1B Solutions

AKA - Homogenous Mixture



Making an Aqueous Solution (aq)

- when a solid, liquid, or gas is dissolved in H₂O
- ex → $K_2SO_4(aq)$
 - means an aqueous solution of Potassium sulfate
- Who can dissolve in H₂O?
 - Only polar compounds will dissolve in H₂O!
 - ex...

"Like dissolves Like"

• How much solute is dissolved in solvent?

★ Qualitative

- Unsaturated -
- Saturated -
- Supersaturated -

★ Quantitative

- Solubility - how much solute will dissolve in a solvent (100g) @ the solubility point!

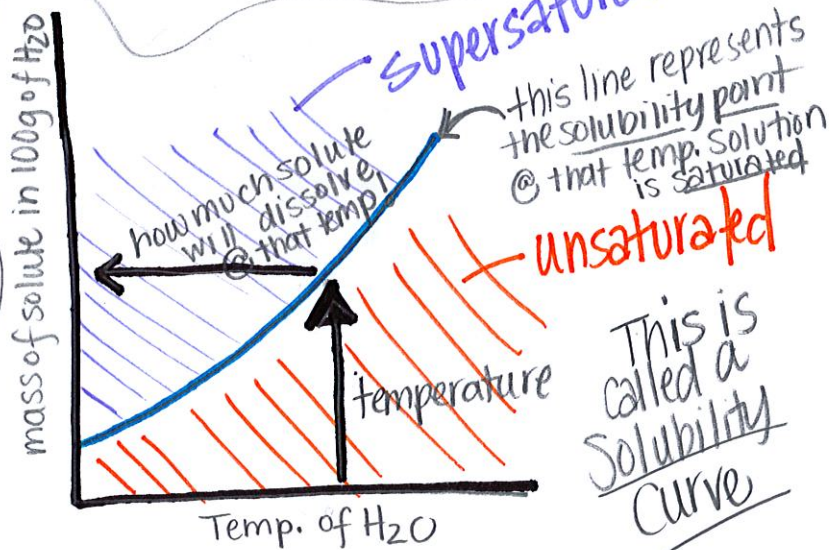
Salt =

Sugar =

How can I increase solubility?

- ↑ temp (stir + crush)
- ↑ pressure

However! If ↑ temp. of a gas, I will ↓ solubility!
Why?



• How does "boiling" work?

1. Particles heat up \rightarrow go faster \rightarrow more pressure!
2. liquid \rightleftharpoons gas ; they reach equilibrium
3. When pressure of particles = atmospheric pressure
the the vapor can escape + "boil."
(@ 1 atm + 100°C for H₂O)
(\downarrow 1 atm \rightarrow ? °C for H₂O)
(\uparrow 1 atm \rightarrow ? °C for H₂O)

• What is a colligative property? \rightarrow Property of a solution that changes depending on the concentration of solute in it.

1. Freezing point depression - Presence of solute decreases the freezing point as compared to a pure solvent.
Ahh! This is why we put salt on frozen roads!
*The salt separates the H₂O particles causing them to melt! (freeze @ a much lower temp!)

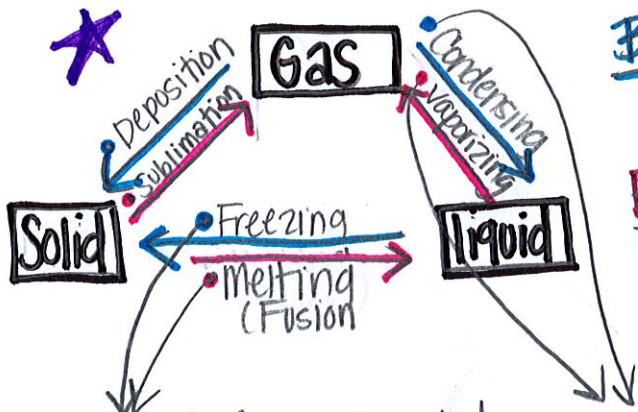
2. Boiling Point Elevation - the solute lowers the vapor pressure thus raising the BP of the solution (verses the pure H₂O.)

Ahh! Putting salt in H₂O causes it to boil @ higher temperature, thus cooking noodles faster!

3. Vapor Pressure - VP will \downarrow when a solute is added.
The more you add, the more VP will \downarrow !

4. Osmotic Pressure - Osmosis is the process by which H₂O flows from \uparrow concentration to \downarrow concentration
- Causes H₂O to flow in and out of cells
• adding salt to diet helps retain H₂O in cells
• no electrolytes = dehydration

Phase Change - ↑ temp - particles move faster, further away, lose attraction, change state



Blue - Getting cold - particles moving closer - energy going out = exothermic

Pink - Getting hot - particles moving further apart - energy going in = endothermic

amount of energy needed to melt a substance or amount of heat released when a substance freezes

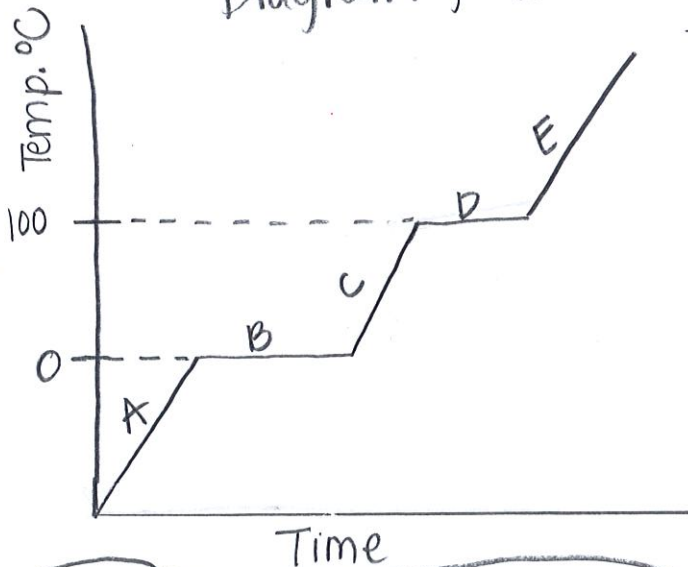
★ = Heat of fusion for H₂O = 334 J/g → $q = mH_f$

amount of energy needed to boil a substance or amount of heat released when a substance condenses

★ = Heat of vaporization for H₂O = 2260 J/g → $q = mH_v$

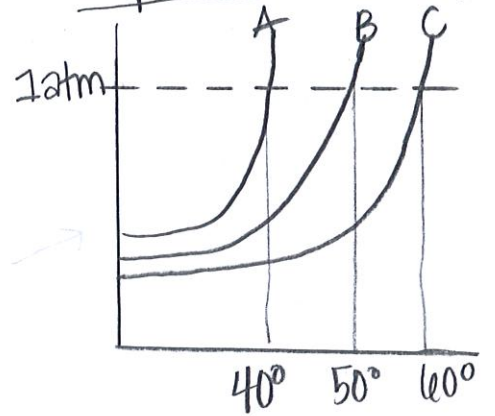
★ What if the temp. changes but phases don't!
 $q = mC_p\Delta T$
 C_p ice = 2.05
 liquid = 4.18
 gas = 2.02

★ Phase Change Diagram of H₂O

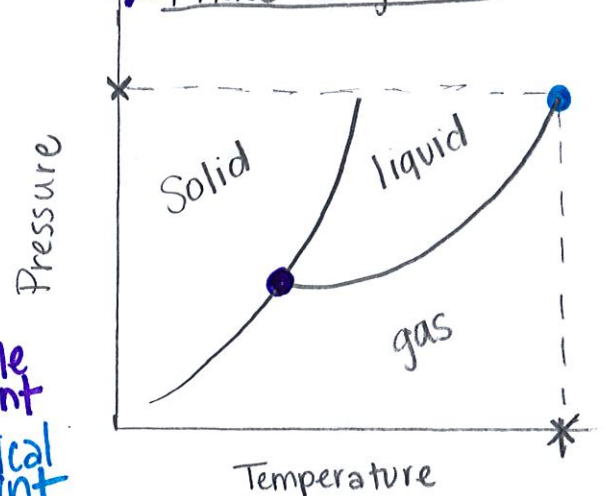


When:
 ↑ temp = ↑ KE
 Temp. stays same = PE changes

★ Vapor Pressure Diagram



★ Phase Diagram



★ Temperature Conversions

$^{\circ}\text{C} + 273 = \text{K}$
 $\text{K} - 273 = ^{\circ}\text{C}$

• triple point
 • critical point