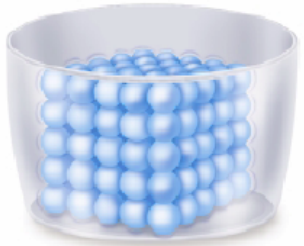
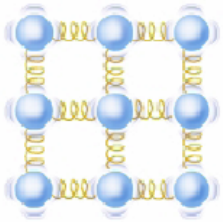
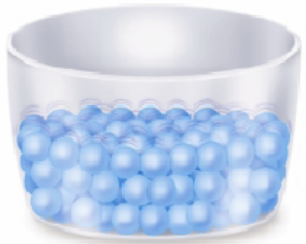
Unit 2 Part 2 Notes (states of matter)



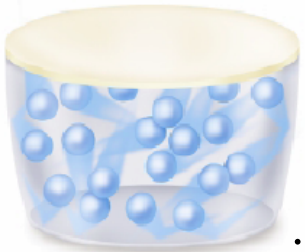
Solid



Solid



Liquid



Gas

5 States of Matter

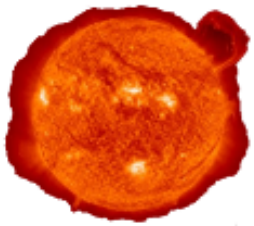
increasing energy

1) ***Bose-Einstein Condensate***-occurs near absolute zero (very low energy state)
2) ***Solid*** ☆
3) ***Liquid*** ☆
4) ***Gas*** ☆
5) ***Plasma***-occurs when electrons are separated from their atoms or molecules (very high energy state)
   ☺ most common state of matter in the universe

Plasma Examples

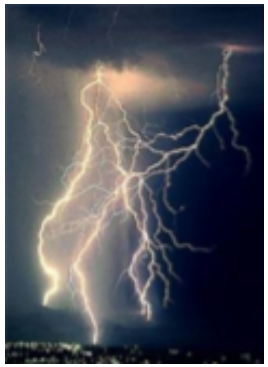
Plasma Ball

Aurora's



Sun / Stars

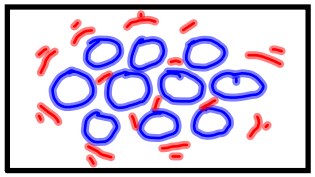
Lightning



http://www-spof.gsfc.nasa.gov/Education/FAQs7.html#q97

Solid

- Tightly packed in "fixed "positions
- Vibrate in place



- Fixed shape
- Fixed volume

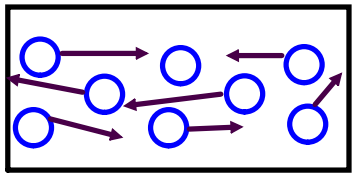
Amorphous Solids (have no exact boiling or melting points) (glass)

Crystalline Solids

- Have def. melting and boiling points
- Have regular repeating shape

Liquid

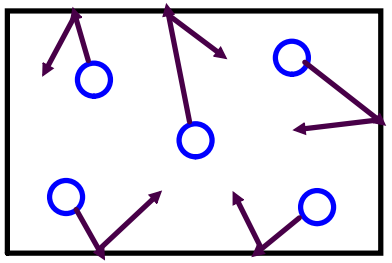
- particles can slide past one another.
- A little farther apart than solids



- Take shape of container
- Fixed volume

Gas

- particles are very spread apart
- very energetic (bounce around)

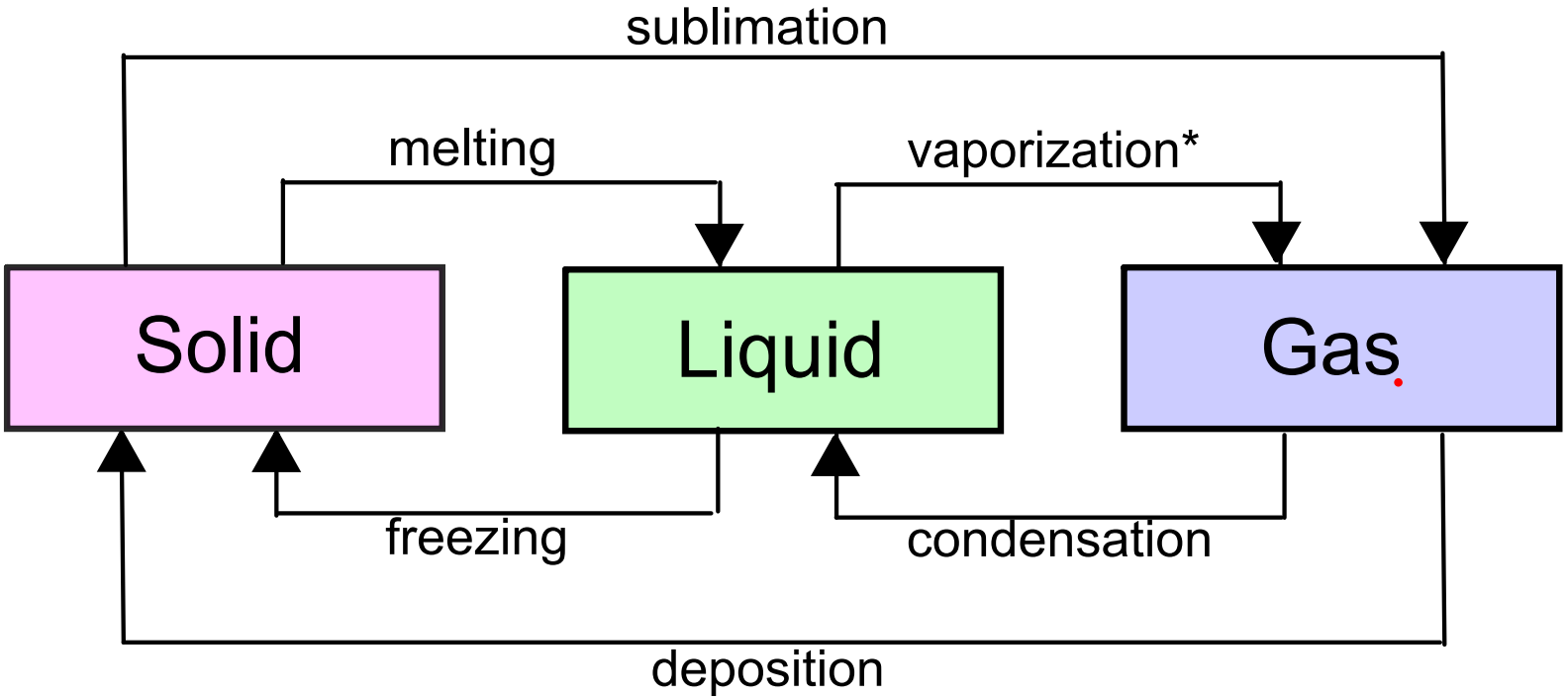


- - take shape of their container
- - take the volume of their containers

Pressure:

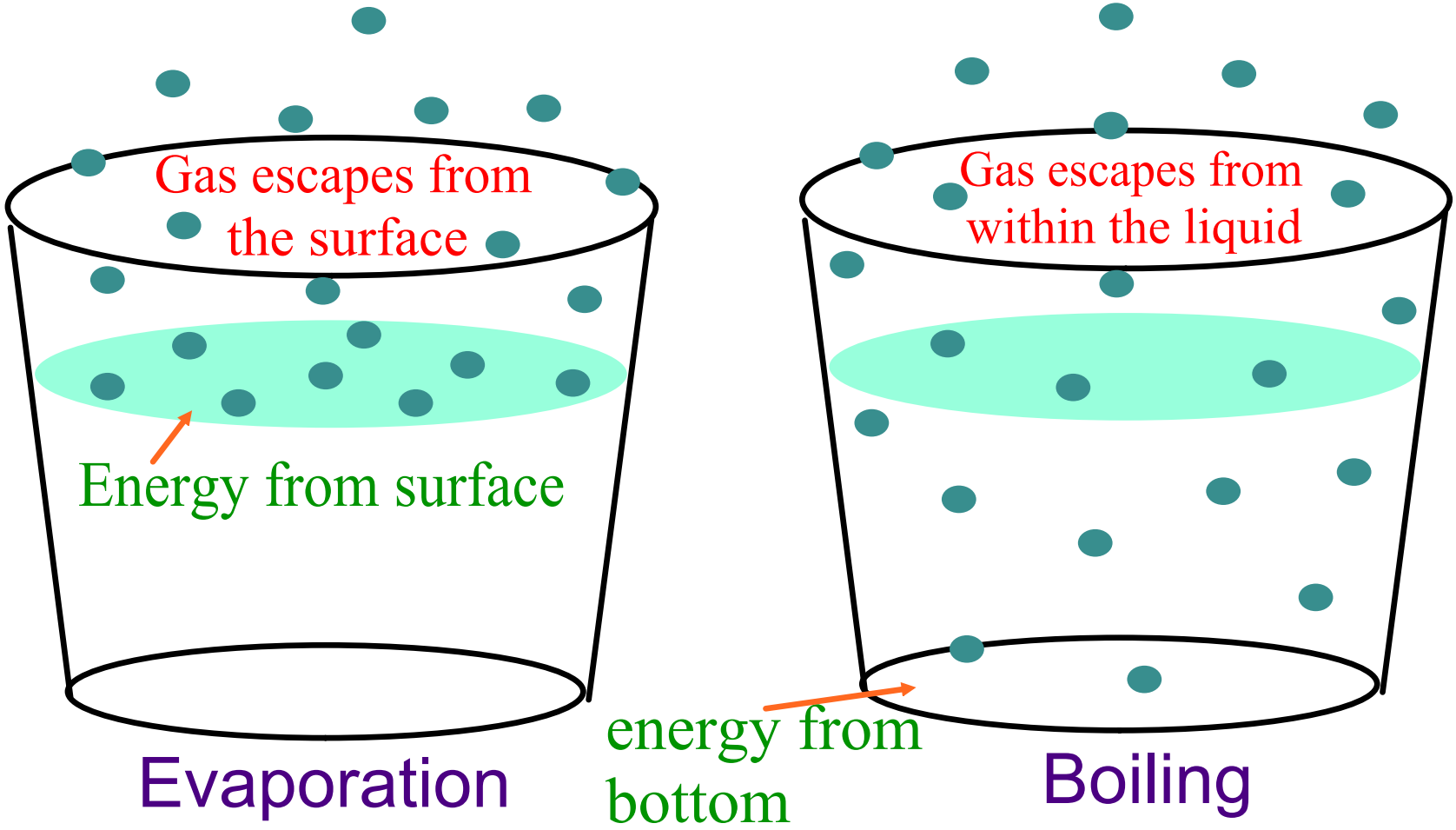
The force that gas particles exert over the area of their containers

- measured in:
  - Pascals
  - atmospheres
  - torr



vaporization*= 1. boiling
2. evaporation

Types of Vaporization



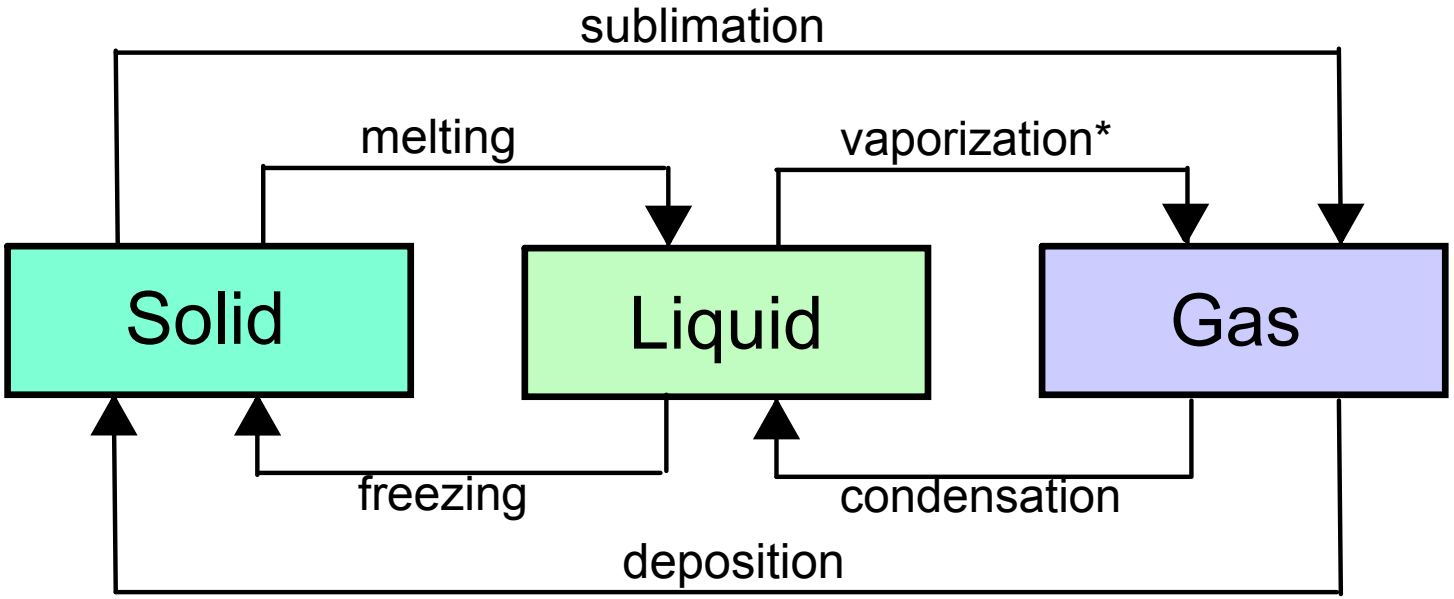
Exothermic- process *releases* energy

energy "**ex**its" the system

Endothermic- process *absorbs* energy

energy "**en**ters" the system

Endothermic

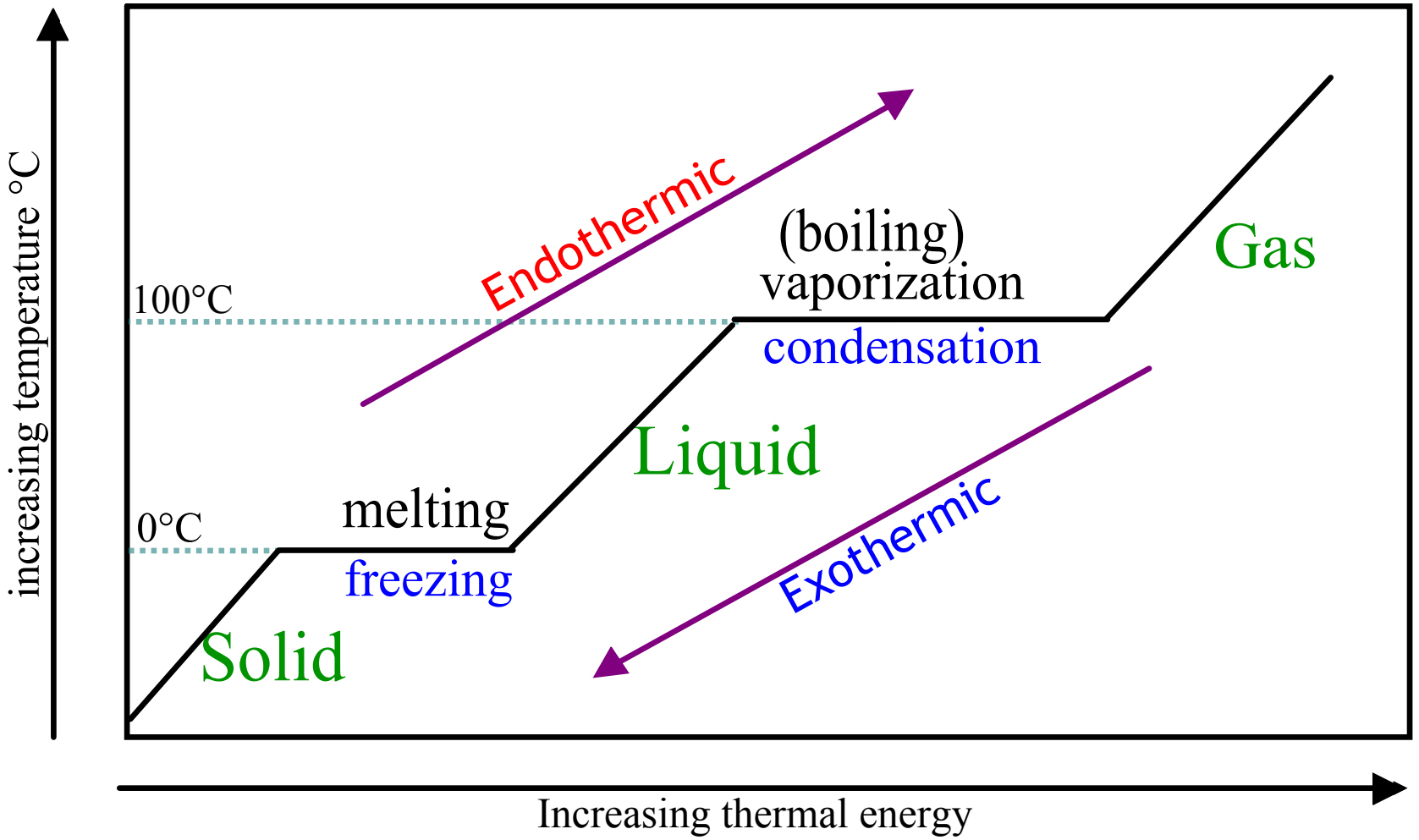


Exothermic

---

vaporization*= 1. boiling happens at the boiling point
2. evaporation-happens below the boiling point

Water(State changes)



☆ Questions ☆

1. A solid *gains / loses* energy when it becomes a liquid

   gains-liquids have more energy than solids

2. How many states of matter exist at 0˚C? At 100˚C?

   2, solid and liq. exist at 0°C & 2, liq. and gas exist at 100°

3. What happens to to the thermal energy of the water while it changes from solid to liquid?

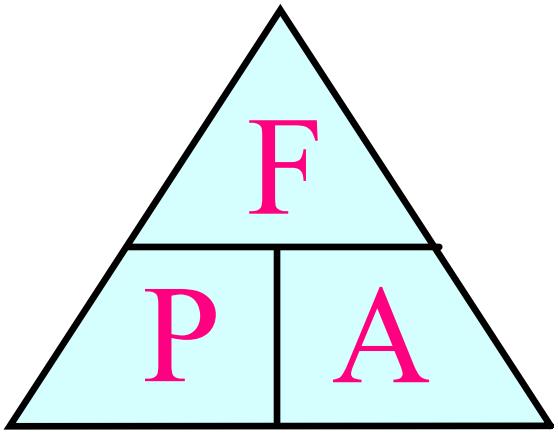
   it rises steadily

4. What happens to the temperature of the water while it changes from solid to liquid?

   it stays at 0°C and does not rise until it is completely melted

5. Does it require more energy for ice to become liquid OR liquid to become vapor(gas)?

Pressure = $\frac{\textbf{Force}}{\textbf{Area}}$



- collisions that occur between container walls and other particles
- measured in kPa (kilopascal)

What Can affect Pressure?

A change in-

1. Temperature
2. Volume (space in container)
3. # of Particles
   ex: adding air to a tire

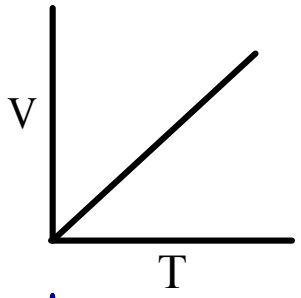
GAS LAWS

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$ *Combined Gas Law*

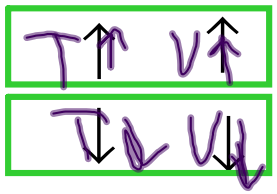
CHARLES' LAW

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

P = CONSTANT



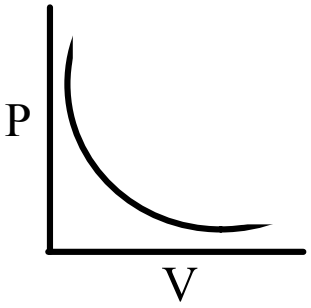
Direct Relationship



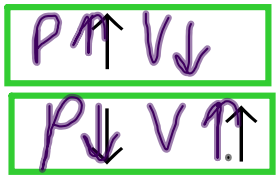
BOYLE'S LAW

$$P_1 V_1 = P_2 V_2$$

T = CONSTANT



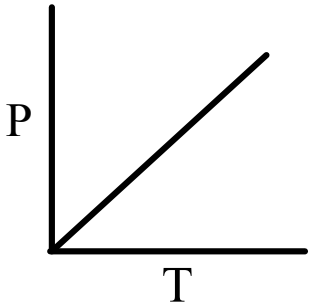
Inverse Relationship



GAY-LUSSAC'S LAW

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

V = CONSTANT



Direct Relationship