

Chemistry Bell Work, April 23 – April 26

KMT 2: Kinetic Molecular Theory, Proportionality, $P \propto n$, $P \propto 1/V$, $P \propto T$, $V \propto T$, P-V-n-T graphs, Absolute/ Kelvin Temperature Scale, Absolute zero, Phase Energy, Thermal Energy





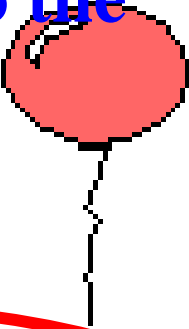
1. The pressure exerted by a gas in a container depends on

- a. the space between the molecules.
- b. the instrument used to measure the pressure.
- c. the number of collisions between gas molecules and other gas molecules.
- d. the number of collisions between gas molecules and the walls of the container.**

2. The evening before a birthday party, you fill several balloons with helium gas. The birthday party occurs on a hot summer day.

A guest at the party dives into the swimming pool holding an inflated balloon. The balloon gets smaller when she dives to the bottom of the pool. Which of the following explains this observation?

- a. Some of the helium particles escaped through pores in the latex.
- b. The helium particles became smaller than before.
- c. The helium particles lost their strength.
- d. The particles moved closer to each other.**



3. The evening before a birthday party, you fill several balloons with helium gas. The birthday party occurs on a hot summer day. The next day the temperature is hotter, but the latex balloons are noticeably smaller. Which of the following explains this observation?

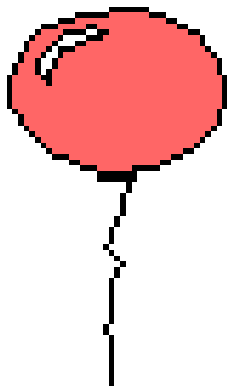
- a. Some of the helium particles escaped through pores in the latex.
- b. The helium particles became smaller than before.
- c. The helium particles lost their strength.
- d. The particles moved closer to each other.

4. When a sample of gas is heated, its kinetic energy,

- a. increases
- b. decreases
- c. remains the same
- d. varies depending on the pressure
- e. varies depending on the volume

Heating the gas causes the molecules to speed up. $V =$ velocity (speed).

$$KE = \frac{1}{2} mv^2$$



Bell Work, Tuesday, 4/24/18 (Front) 6 questions

1. Explain the following: $P \propto n$, $P \propto \frac{1}{V}$, $P \propto T$, $V \propto T$

P = pressure, T = temperature, V = volume, n = number of particles

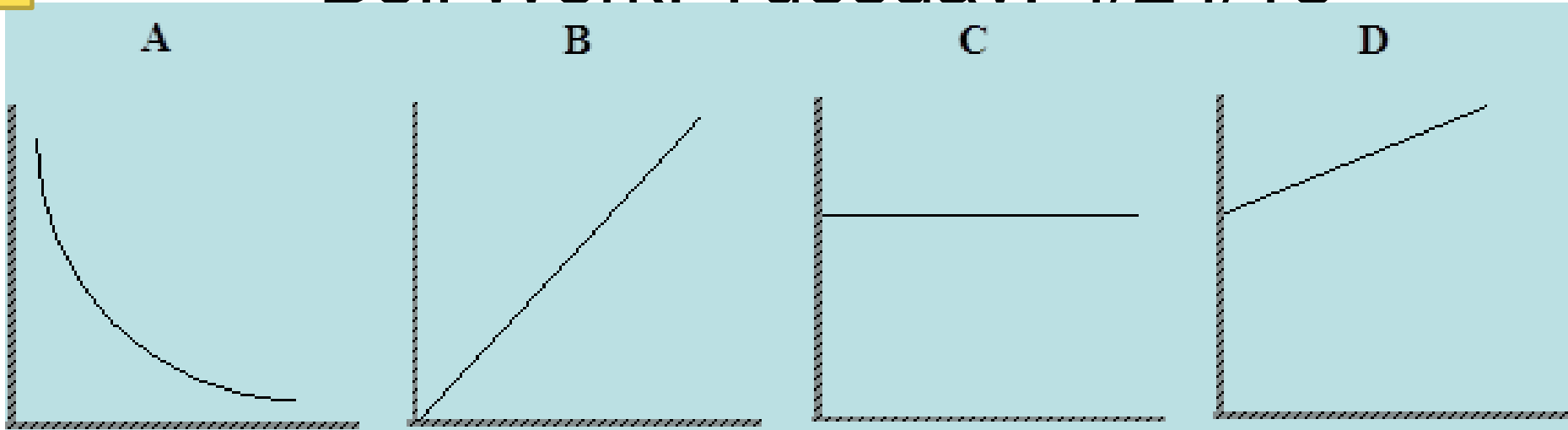
\propto means “proportional”,

a) $P \propto n$ pressure is directly proportional to number of particles:
 P & n both increases or decreases by the same ratio.

b) $P \propto T$ Pressure is directly proportional to temperature:
 P & T both increases or decreases by the same ratio.

c) $V \propto T$ volume is directly proportional to temperature:
 V & T both increases or decreases by the same ratio

d) $P \propto \frac{1}{V}$ pressure is inversely proportional to volume:
If P increases, V decreases by the reciprocal of that amount
If V increases, P decreases by the reciprocal of that amount.



2. Which graph represents the relationship between the pressure of a gas and its volume? **A**
3. Which graph represents the relationship between the pressure of a gas and the absolute (Kelvin) temperature? **B**
4. Which graph represents the relationship between the pressure of a gas and the Celsius temperature? **D**
5. Which graph represents the relationship between the pressure of a gas and the number of particles? **B**
6. Which graph shows constant pressure? **C**

Bell Work, Wednesday, 4/25/16



Objective: Explain the basis for the Kelvin temperature scale.

1. Compare and contrast temperature measured in the Celsius scale (C) and the absolute scale aka: Kelvin scale, (K).



$$1^{\circ}\text{C} = 1^{\circ}\text{K}$$

Coldest Celsius temp = -273, coldest kelvin temp = 0,

	Celsius (C)	Absolute/ Kelvin (K)
Boiling point of water	100	373
Room temperature	25	298
Freezing Point of Water	0	273
Absolute zero (no particle motion)	-273	0

Chem Bell Work, Thursday, 4/26/18

1. Predict the effect of changing pressure (P), volume (V), number of particle (n), or temperature (T) on any of the other variables.

$$P \propto \frac{1}{V}, P \propto T, P \propto n, V \propto T$$

- a. If P doubles the V will decrease $\frac{1}{2}$ ($\div 2$),
- b. If V doubles the P will decrease $\frac{1}{2}$ ($\div 2$),
- c. If P decreases by $\frac{1}{2}$ the V will double
- d. If V decreases by $\frac{1}{2}$ then P double
- e. If P triples the V will decrease by $\frac{1}{3}$ ($\div 3$)
- f. If V decreases by $\frac{1}{4}$, P will quadruple
- g. if T doubles then V will double
- h. if T decreases $\frac{1}{3}$ then V will decrease by $\frac{1}{3}$
- i. if n *triples* then P will triple
- j. if P quadruples then n will quadruple ($\times 4$)



2. What is thermal energy

Thermal Energy is due to the motion of the particles.

Thermal energy is a form of kinetic energy.

3. What is phase energy?

Phase Energy is due to the arrangement of the particles in solid, liquid and gaseous phases. This arrangement is due to attractions between the particles. Phase energy is stored energy or potential energy.

4. A sample of water is brought to a boil. Inside a bubble are(is)

- a. particles of hydrogen gas and oxygen gas,
- b. empty space
- c. particles of air.
- d. particles of water