

# Lesson 112: Behavior of Gases Notes

Chemistry with Lab

## The Combined Gas Law

- Expresses the relationship between the \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ of a \_\_\_\_\_ amount of \_\_\_\_\_.
- \_\_\_\_\_ or \_\_\_\_\_

Ex: A sample of gas has a volume of \_\_\_\_L when its temperature is \_\_\_\_K and its pressure is \_\_\_\_mm Hg. What volume will the gas occupy at STP?

$V_1 =$  \_\_\_\_\_

$V_2 =$  \_\_\_\_\_

$T_1 =$  \_\_\_\_\_

$T_2 =$  \_\_\_\_\_

$P_1 =$  \_\_\_\_\_

$P_2 =$  \_\_\_\_\_

## Diffusion

- The \_\_\_\_\_ spreading of a \_\_\_\_\_

## Graham's Law of Diffusion

- Under the same conditions of \_\_\_\_\_ and \_\_\_\_\_, gases \_\_\_\_\_ at a rate \_\_\_\_\_ proportional to the \_\_\_\_\_ of their \_\_\_\_\_ (or molar \_\_\_\_\_).

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- \_\_\_\_\_ or \_\_\_\_\_

### Ideal Gas Equation

- \_\_\_\_\_
- New variables:
  - $n$  = \_\_\_\_\_ of gas in \_\_\_\_\_
  - $R$  = \_\_\_\_\_
    - ❖ \_\_\_\_\_ constant
    - ❖ value depends on \_\_\_\_\_ used for \_\_\_\_\_ and \_\_\_\_\_
    - ❖ value of  $R$  when using \_\_\_\_\_ and \_\_\_\_\_:  
 $R$  = \_\_\_\_\_

Ex: The average lung capacity for a female student is 3.9L. At normal body temperature, 37°C and 110kPa, how many moles of air could her lungs hold?

$P$  = \_\_\_\_\_       $V$  = \_\_\_\_\_       $T$  = \_\_\_\_\_

$n$  = \_\_\_\_\_       $R$  = \_\_\_\_\_

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### Avogadro's Law

- Equal \_\_\_\_\_ of different \_\_\_\_\_ under the \_\_\_\_\_ conditions have the \_\_\_\_\_ number of \_\_\_\_\_.
- Conversely, if samples of \_\_\_\_\_ at the same \_\_\_\_\_ and \_\_\_\_\_ contain the \_\_\_\_\_ number of \_\_\_\_\_, then the \_\_\_\_\_ of all the \_\_\_\_\_ must be \_\_\_\_\_.
- At \_\_\_\_\_, one \_\_\_\_\_ of any gas occupies a \_\_\_\_\_ of \_\_\_\_\_ L.
- \_\_\_\_\_ is the \_\_\_\_\_ of a gas.

Ex. 3.2 moles of  $\text{KNO}_3$  are heated, producing  $\text{O}_2$  and  $\text{KNO}_2$ . Calculate the volume of  $\text{O}_2$  in liters that could be obtained at STP.

### Dalton's Law of Partial Pressures

- The \_\_\_\_\_ of a gas \_\_\_\_\_ is the \_\_\_\_\_ of the \_\_\_\_\_ of each gas \_\_\_\_\_.
- \_\_\_\_\_

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Ex: Oxygen gas has been collected over water at a total pressure of 95.0 kPa and a temperature of 25°C. What is the pressure of the dry oxygen gas?

### **The Chemistry Quiz**

CR1. \_\_\_\_\_ CR2. \_\_\_\_\_ 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

4. \_\_\_\_\_ 5. \_\_\_\_\_