

### How much space does 1 mole of gas take up?

- 1 mole of ANY gas = \_\_\_\_\_ at STP
- How many liters does 2.8 moles of Helium take up?
  
- How many moles does 137.2 L have?

### How many moles in a given volume?

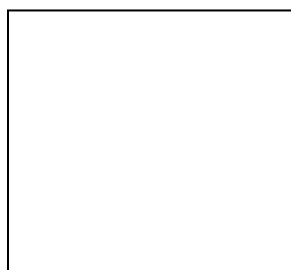
- You have 3 1 L flasks. #1 is filled with CO<sub>2</sub>, #2 is filled with H<sub>2</sub> and #3 is filled with C<sub>2</sub>H<sub>6</sub>.
  - Which flask has the most number of moles?

### Avogadro's Law

- You have gaseous helium in two separate containers at the same temperature and pressure. The volume of container #1 is 3.7 L and has 8.2 moles of the gas. The volume of container #2 is 19.4 L. How many moles are in container #2?
  
- You have gaseous helium in two separate containers at the same temperature and pressure. The volume of container #1 is 1.8 L and has 7.6 moles of the gas. The volume of container #2 is 3.58 L. How many moles are in container #2?

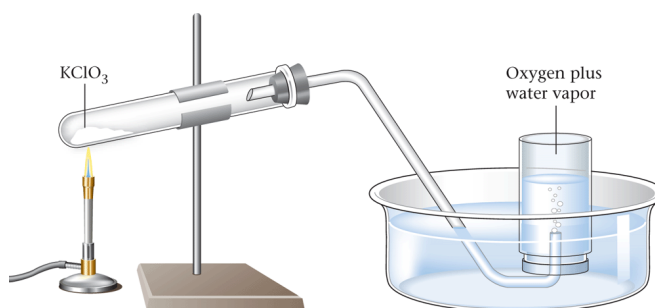
## Partial Pressures

- The total pressure of a gas mixture depends on the total number \_\_\_\_\_, not on the types of particles.



## Dalton's Law of Partial Pressures

- In a mixture of gases, the total pressure of the mixture equals \_\_\_\_\_ of the individual gas pressures
- When a gas is collected over water, you have a mixture of your sample gas as well as \_\_\_\_\_



- $P_{\text{gas}} =$  \_\_\_\_\_
- You get the pressure of the water vapor from a table
- You collect a sample of hydrogen gas over water at 40°C. The total pressure of the gas and the water vapor is 107 torr. What is the pressure of just the hydrogen gas?

### The Vapor Pressure of Water as a Function of Temperature

$T (^{\circ}\text{C})$	$P (\text{torr})$
0.0	4.579
10.0	9.209
20.0	17.535
25.0	23.756
30.0	31.824
40.0	55.324
60.0	149.4
70.0	233.7
90.0	525.8

- You generate hydrogen gas and collect it over a liquid whose vapor pressure is 20 torr at 20 °C. The volume is 1.7 L and total pressure is 0.91 atm. What is the partial pressure?

$$P_{\text{gas}} = P_{\text{Total}} - P_{\text{partial}}$$

- You generate hydrogen gas and collect it over a liquid whose vapor pressure is 20 torr at 20 °C. The volume is 1.7 L and total pressure is 0.91 atm. How many moles of hydrogen are in present in this mixture? Use P from above, solve  $PV = nRT$

**You can use mol ratios as if they were partial pressures**

- A gaseous mixture contains 2 mol Ar and 4.5 mol of CO<sub>2</sub>. It has a total pressure of 6.8 atm. What is the partial pressure of Ar?