

# Chemistry Worksheet 1

## Mass-Moles-Particles

Gchemmolsoiws11.doc

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

### Concept Questions:

1. One mole is defined as \_\_\_\_\_  
\_\_\_\_\_
2. The mole only applies to chemistry, in other words you couldn't have a mole of sand or a mole of stars. (Circle one) True / False
3. The mole is a \_\_\_\_\_ unit, whereas grams is a \_\_\_\_\_ unit.
4. The coefficients in a balanced chemical equation can be used with which of the following for setting up ratios (Circle all that apply)  
Moles                  Grams                  Molecules/Atoms
5. To convert from grams to moles of a substance you must \_\_\_\_\_
6. To convert from moles to grams of a substance you must \_\_\_\_\_
7. To convert from moles to molecules of a substance you must \_\_\_\_\_
8. To convert from molecules to atoms of a substance you must \_\_\_\_\_  
\_\_\_\_\_
9. The molar mass of a compound is found by \_\_\_\_\_
10. The mole has the numerical value of \_\_\_\_\_ and is known as \_\_\_\_\_.

**Problem Solving:** Perform the following calculations using the example below as a guide:

**Example Problem:** Convert 20.0g of HCl to moles of HCl

**Answer:**  $20.0\text{gHCl} \frac{1\text{molHCl}}{36.46\text{g}} = .55\text{mol HCl}$

Molar mass  
of HCl

**Convert to moles:**

1. 15.5g of H<sub>2</sub>O  $\left[ \frac{\text{mol}}{\text{g}} \right] =$                   2. 125.0g of H<sub>2</sub>SO<sub>4</sub>  $\left[ \frac{\text{mol}}{\text{g}} \right] =$

3. 16.10g of lithium nitrate

4. 100.0g of dinitrogen tetraoxide

**Convert to grams:**

1.  $.0024 \text{ mol NH}_3 \left[ \frac{\text{g}}{\text{mol}} \right] =$

2.  $6.5 \times 10^{-4} \text{ mol CO} \left[ \frac{\text{g}}{\text{mol}} \right] =$

3. 4.0mol carbon tetrachloride

4. 2.5mol nitrogen gas

**Synthesis Questions:**

1. How many grams of HCl contain the same number of units as there are in 60.0g of CaCl<sub>2</sub>?

2. How many moles of HCl contain the same number of grams as there are in .45mol of CaCl<sub>2</sub>?

3. How many times more particles are there in 10.0g of H<sub>2</sub>O than in 10.0g of CO<sub>2</sub>?

4. If you wanted a 2 to 1 ratio of H<sub>2</sub>O molecules to CO<sub>2</sub> molecules and you had 50.0g of H<sub>2</sub>O, how many grams of CO<sub>2</sub> would you need (Hint: It isn't 25!)?

5. Which element has a molar mass of 126.9g/mol?

6. For which element does 2.5 moles have a mass of 518g?

7. You performed an experiment on a diatomic element and found that .25g of the substance contained  $6.58 \times 10^{-3}$  moles. What is the element?