Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hour \_\_\_\_\_\_\_\_\_

Using Atomic, Molecular, and Formula Masses to Calculate Molar Mass

Chemists have chosen one mole (mol) as the standard unit for large numbers of atoms, ions, or molecules. One mole of atoms, ions, or molecules is equal to the mass (in grams) of the particles present. We use the Periodic Table to get these masses.

EXAMPLE: The atomic mass of Carbon on the Periodic table is 12.01g so 1 mol of Carbon = 12.01g or we have 12.01g/mol

EXAMPLE: What if we have a molecule or compound?

Remember from our other worksheet that the molecular mass of I2 was 253.80g so …..1 mol of I2 = 253.80g or there are 253.80g/mol

Remember from our other worksheet that the formula mass of Al2(SO4)3 = 310.10g so……1 mol of Al2(SO4)3 = 310.10g or there are 310.10g/mol

**The mass of 1 mole of atoms, ions, or molecules is called the MOLAR MASS**

**Try some on your own!** Refer back to your “Calculating Molecular and Formula Masses using the Periodic Table” worksheet. You know the mass of 1 mol of each of these substances so use this information to calculate the following:

1. 2 mols of CH3OH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 3 mols of CO2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 4 mols of AlN \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. ½ mol of H2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. 2 mols of NaCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now that you know how to find the mass of one mole of a substance (molar mass) you can easily find the mass of several moles or the mass of a fraction of a mole using the factor-label technique.

EXAMPLE: What is the mass of 5.00 moles of water(H20)?

2 H = 2 x( 1.01) = 2.02 # grams H20 = 5.00 moles H20 x 18.02 g H20 = **90.10 g H2O**

O = 1 x(16.00) = 16.00 1 mole H20

H20 = 18.02 g

**NOW YOU TRY! - SHOW YOUR WORK!**

1. What is the mass of 0.50 moles of calcium carbonate(CaCO3 )?

Ca = #g CaCO3  =

C =

## 3O =

CaCO3 =

1. How many grams are there in 0.250 moles of sodium hydroxide?
2. How many grams are there in 2.50 moles of potassium nitrate?

**Extension question - Can you change the equation around to figure this one out?**

If I have 90.02g of C2H6, how many mols do I have?