U6LM1B-WS Percent Composition **Name: _____KEY_____**

1. In order to calculate the percent composition of a compound such as oleic acid, one needs to look up _the chemical formula_. The percent composition of a sample of 20.0 g oleic acid will be (higher, lower or the same) as a sample of 50.0 g oleic acid.

2. Calculate the percent by mass of phosphorous in sodium phosphate.

   Na_3PO_4 molar mass = 3(22.99) + 1(30.97) + 4(16.00) = 163.94 $^g/_{mol}$

   $$\text{Percent mass} = \frac{\text{mass of component}}{\text{Total mass}} \times 100\%$$

   $$= \frac{30.97 \text{ g P}}{163.94 \text{ g } Na_3PO_4} \times 100\% = 18.89\% \text{ phosphorous}$$

3. Calculate the percent by mass of nitrogen in ammonium sulfate.

   $(NH_4)_2SO_4$ molar mass = 2(14.01) + 2(1.01) + 1(32.06) + 4(16.00) = 126.10 $^g/_{mol}$

   $$\text{Percent mass} = \frac{28.02 \text{ g N}}{126.10 \text{ g } (NH_4)_2SO_4} \times 100\% = 22.22\% \text{ nitrogen}$$

4. Calculate the percent composition of glucose, $C_6H_{12}O_6$.

   $C_6H_{12}O_6$ molar mass = 6(12.01) + 12(1.01) + 6(16.00) = 180.18 $^g/_{mol}$

   $$\text{Percent C} = \frac{72.06 \text{ g C}}{180.18 \text{ g } C_6H_{12}O_6} \times 100\% = 39.99\% \text{ carbon}$$

   $$\text{Percent H} = \frac{12.12 \text{ g H}}{180.18 \text{ g } C_6H_{12}O_6} \times 100\% = 6.73\% \text{ hydrogen}$$

   $$\text{Percent O} = \frac{96.00 \text{ g O}}{180.18 \text{ g } C_6H_{12}O_6} \times 100\% = 53.28\% \text{ oxygen}$$

   Note: all percents should total 100% and masses should total up to your total (or molar) mass

5. A substance is 35.7% carbon by mass. How many grams of this substance are needed to obtain 4.50 moles of C?

   Figure out how many grams of C you should have: 4.50 moles of C x 12 g/mol = 54.0g of C

   Manipulate percent mass equation to solve for total mass:

   $$\text{Total mass} = \frac{\text{mass of component}}{\text{Percent mass}} \times 100\%$$

   $$= \frac{54.0\text{g C}}{35.7\%} \times 100\% = 151 \text{ g of substance needed}$$

6. A substance is 52.02% chlorine and 47.98% zinc by mass. What mass of this substance contains 83.00 g of chlorine?

   $$\text{Total mass} = \frac{83.00 \text{ g Cl}}{52.02\%} \times 100\% = 159.6 \text{ g of substance needed}$$