Name___Key___

Period___ Date _d_/__/__

3 • Molecules and Compounds

MOLAR MASS & % COMPOSITION

I. Molar Masses

Given a periodic table, you should be able to calculate the molecular mass (in u's) or the molar mass (in grams) for any element or compound.

Examples: (give answers to two decimal places)

H_2SO_4	Cl_2	$Ca(OH)_2$	$HC_2H_3O_2$
98.09 amu	70.90 amu	74.10 amu	60.06 amu
CO_2	N_2O	NaOCl	Al_2S_3
44.01 amu	44.02 amu	74.44 amu	150.17 amu

II. Fraction and Percent Composition

It is useful to determine how much of a compound's mass is made up of each element. Water, H_2O, for example has a molar mass of 18.02 g. The H's mass is $2(1.0079) = 2.02$ g. The O's mass is 16.00 g.

We can set up **fractions** for each element: $H = \dfrac{2.02}{18.02} = 0.112 = 11.2\%$. $\quad O = \dfrac{16.00}{18.02} = 0.888 = 88.8\%$.

This is called the **percent composition**. The fraction composition is a good in-between step.
Determine the fraction and percent composition of each element below (answer to one decimal place):

1. H_2SO_4	$H = \dfrac{2.02}{98.09} = 2.1\%$	$S = \dfrac{32.07}{98.09} = 32.7\%$	$O = \dfrac{64.00}{98.09} = 65.2\%$
2. $Ca(OH)_2$	$Ca = \dfrac{40.08}{74.10} = 54.1\%$	$O = \dfrac{32.00}{74.10} = 43.2\%$	$H = \dfrac{2.02}{74.10} = 2.7\%$
3. $HC_2H_3O_2$	$H = \dfrac{4.04}{60.06} = 6.7\%$	$C = \dfrac{24.02}{60.06} = 40.0\%$	$O = \dfrac{32.00}{60.06} = 53.3\%$
4. CO_2	$C = \dfrac{12.01}{44.01} = 27.3\%$	$O = \dfrac{32.00}{44.01} = 72.7\%$	
5. N_2O	$N = \dfrac{28.02}{44.02} = 63.7\%$	$O = \dfrac{16.00}{44.02} = 36.3\%$	
6. NaOCl	$Na = \dfrac{22.99}{74.44} = 30.9\%$	$O = \dfrac{16.00}{74.44} = 21.5\%$	$Cl = \dfrac{35.45}{74.44} = 47.6\%$
7. Al_2S_3	$Al = \dfrac{53.94}{150.17} = 35.9\%$	$S = \dfrac{96.21}{150.17} = 64.1\%$	