Conversion to Moles, grams, and Atoms Worksheet

Name_____
Hour_____

1. Calculate the molecular mass of the following compounds:
   a. acetone, CH_3COCH b. ethyl ether, $C_4H_{10}O$

3-C
4-H
1-O

56.07 g/mol

74.14 g/mol

2. Find the number of molecules in .846 moles of HF molecules. Factor Label.

$$\frac{6.02 \times 10^{23} \text{ molecules HF}}{1 \text{ mol HF}} \left| \frac{0.846 \text{ mol HF}}{} \right. = 5.09 \times 10^{23} \text{ molecules HF}$$

3. Calculate the mass in grams of 0.35 moles benzene, C_6H_6. Benzene is known carcinogen. Factor Label.

$$\frac{78.12 \text{ g } C_6H_6}{1 \text{ mol } C_6H_6} \left| \frac{0.35 \text{ mol } C_6H_6}{} \right.$$

27 g C_6H_6

4. Using Factor Labeling, convert the following to moles:

   a. 4.02×10^{23} atoms Fe

$$\frac{1 \text{ mol Fe}}{6.02 \times 10^{23} \text{ atoms Fe}} \left| \frac{4.02 \times 10^{23} \text{ atoms Fe}}{} \right. = 0.668 \text{ mol Fe}$$

   b. 6.41×10^{26} molecules HCl

$$\frac{1 \text{ mol HCl}}{6.02 \times 10^{23} \text{ molecules HCl}} \left| \frac{6.41 \times 10^{26} \text{ molecules HCl}}{} \right. = 1060 \text{ mol HCl}$$

5. Use Factor Labeling to find the following:

   a. the number of molecules in 125 g of CO_2.

$$\frac{6.02 \times 10^{23} \text{ molecules } CO_2}{1 \text{ mol } CO_2} \left| \frac{1 \text{ mol } CO_2}{44.01 \text{ g } CO_2} \right| \frac{125 \text{ g } CO_2}{} = 1.71 \times 10^{24} \text{ molecules } CO_2$$

   b. the number of grams in 9.23×10^{27} molecules of ammonia, NH_3.

$$\frac{17.04 \text{ g } NH_3}{1 \text{ mol } NH_3} \left| \frac{1 \text{ mol } NH_3}{6.02 \times 10^{23} \text{ molecules } NH_3} \right| \frac{9.23 \times 10^{27} \text{ molecules } NH_3}{} = 261{,}600 \text{ g } NH_3$$

   c. the number of atoms of Hydrogen in 25.3 g of Sulfuric Acid. H_2SO_4

$$\frac{2 \text{ atoms H}}{1 \text{ molecule } H_2SO_4} \left| \frac{6.02 \times 10^{23} \text{ molecules } H_2SO_4}{1 \text{ mol } H_2SO_4} \right| \frac{1 \text{ mol } H_2SO_4}{98.09 \text{ g } H_2SO_4} \left| \frac{25.3 \text{ g } H_2SO_4}{} \right. = 3.11 \times 10^{23} \text{ atoms H}$$