Part ONE: Empirical Formula

1. Convert the grams of each element to moles.
2. To find the simplest ratio, divide each element's mole value by the smallest mole value. This will ensure a something to 1 ratio.
3. If the mole ratios are NOT all whole numbers, you must multiply a whole number in order to obtain a whole number ratio.
4. It is helpful to recognize decimal forms of common fractions and multiply by the denominator.

   Ex. 2.49 is close to 2 $\frac{1}{2}$ so multiply by 2 to get 5.

1. Give the decimal forms (to two decimal places) of the following common fractions:

a. $\frac{1}{5}$ b. $\frac{1}{4}$ c. $\frac{1}{3}$ d. $\frac{1}{2}$ e. $\frac{2}{3}$ f. $\frac{3}{4}$

Practice

Directions: Solve the following problems in your journal. Be sure to show all work.

2. What is the empirical formula of the compounds below?

   a.   75.0% C, 25.0 % H

   b. 53.70% iron and 46.30% sulfur.

   c. 52.7% K, 47.3%Cl

   d. 36.48% Na, 25.41% S, and 38.11% O

PART TWO: Molecular Formula

The relationship between a compound's empirical and molecular formula can be written as:

> x(empirical formula) = molecular formula
>
> also
>
> x(empirical formula mass) = molecular formula mass

1. To determine the molecular formula of a compound, you must know the compound's molar mass.

2. Divide the molecular mass by the empirical formula mass to determine the whole number multiple (x). You may have to find the empirical formula in order to obtain the empirical formula mass.

Practice

Directions: Solve the following problems in your journal. Be sure to show all work.

1. Determine the molecular formula of a substance is the empirical formula is NH_2 and has a molecular mass of 32.06g/mol.

2. The empirical formula of a compound is CH. It has a molecular mass of 78 g/mol. What is the molecular formula?

3. A compound containing 5.93% H and 94.07%O has a molar mass of 34.01 g/mol. Determine the empirical formula and molecular formula?