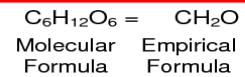## Lesson 5 - Empirical and Molecular Formulas

Empirical Formula = simplest formula
Molecular Formula = actual number and kind of atoms in a molecule
Example:

$C_6H_{12}O_6$ =	CH_2O
Molecular Formula	Empirical Formula

1) Give the empirical formula of the following compounds:
   a. $N_2O_4 \rightarrow NO_2$
   b. $C_6H_{12} \rightarrow CH_2$
   c. $P_2O_3 \rightarrow P_2O_3$
   d. $C_6H_6 \rightarrow CH$

2) What is the empirical formula for a compound that contains 21.6% sodium, 33.3% chlorine, and 45.1%
   a. Assume that you have 100g of the substance
      Na= 21.6g
      Cl = 33.3g
      O = 41.5g
   b. Find the # of moles of each element

   Na $\quad n = \dfrac{m}{M}$

   $\qquad n = \dfrac{21.5g}{22.99\,g/mol}$

   $\qquad n = 0.940$

   Cl $\quad n = \dfrac{m}{M}$

   $\qquad n = \dfrac{33.3g}{35.45\,g/mol}$

   $\qquad n = 0.939\,mol$

   O $\quad n = \dfrac{m}{M}$

   $\qquad n = \dfrac{45.1g}{16.00\,g/mol}$

   $\qquad n = 0.2.82\,mol$

   c. Divide each mole value by the smallest mole value to get the ratio

   Na = $\dfrac{0.940}{0.939}$ $\qquad$ O = $\dfrac{2.82}{0.939}$

   $\quad = $ 1 $\qquad\qquad = $ 3

   Cl = $\dfrac{0.939}{0.939}$

   $\qquad\qquad$ $\therefore$ The empirical formula is $NaClO_3$

   $\quad = $ 1