

Molecular formula - the same or multiple
of the empirical formula and
is based on the actual (true)
of atoms of each element in the
compound.

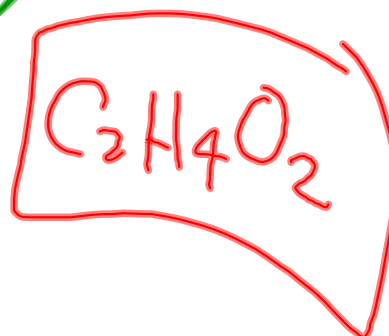
Emp. forms can be molecular forms, but
Molecular forms can NEVER be EF!

An unknown compound is found to consist of 40.0% carbon, 6.7% hydrogen, and 53.5% oxygen. If the molecular mass of the compound is 60 g/mol, what is the molecular formula of the compound?

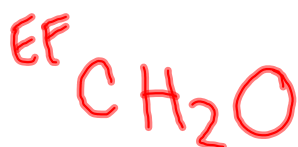
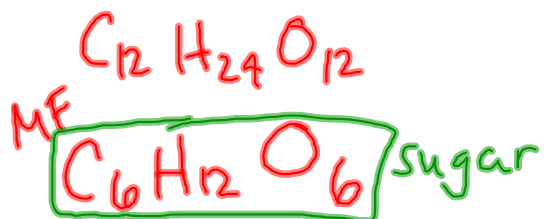
1) Find Empirical Formula

2) $\frac{\text{molecular mass}}{\text{empirical mass}} = n$

$$\frac{60}{30} = 2$$



Molecular formula -



shows the true or actual amount of atoms that make up a compound.

It is a multiple of the empirical formula.

1. Start with grams (Convert % comp to grams by assuming 100 g)

24.3 g C, 4.1g H, 71.6 g Cl

2. Convert grams to moles.

$$\frac{24.3 \text{ g C}}{12 \text{ g C}} = 2 \text{ mol C}$$

$$\frac{4.1 \text{ g H}}{1 \text{ g H}} = 4.1 \text{ mol H}$$

$$\frac{71.6 \text{ g Cl}}{35.5 \text{ g Cl}} = 2 \text{ mol Cl}$$

3. Find element with **smallest** number of moles.

2 mol smallest

4. Divide each amount of moles by smallest number of moles.

$$\frac{2 \text{ mol C}}{2} = 1$$

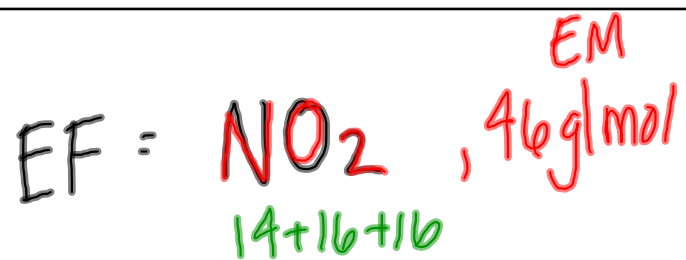
$$\frac{4.1 \text{ mol H}}{2} \approx 2$$

$$\frac{2 \text{ mol Cl}}{2} = 1$$

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.



$$\frac{\text{molecular mass}}{\text{empirical mass}} = n$$

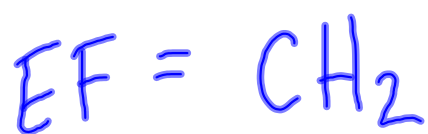


$$\frac{\text{MM}}{\text{EM}} = n$$



$$\frac{92}{46} = 2$$





$$\text{Emp. Mass} = 14 \text{ g/mol}$$

$$\text{Molec. Mass} = 70 \text{ g/mol}$$

$$MF = ?$$

Always whole #!

$$\frac{70}{14} = n = \boxed{5}$$

