Guide Sheet for Moles Problems

I. Calculating Molar Mass

1. multiply atomic mass of each element by number of atoms of that element in the formula (shown by the subscript)
2. find the sum of all the atomic masses --this is formula mass or molecular mass (unit is a.m.u.)
3. express formula mass or molecular mass in grams (unit is g/mol). This is the **Molar Mass.**

II. Calculating % Composition (from formula)

1. calculate formula mass
2. divide the **total** atomic mass of each element by the formula mass and multiply by 100

III. Calculating % Composition (from masses of each element)

1. divide the mass of each element by the total mass of the compound and multiply by 100

IV. Calculating Empirical Formula (from % Composition)

1. convert % of each element to grams based on 100 grams of the compound
2. multiply grams of each element by 1/molar mass that element
3. compare ratio of moles of each element and divide each by the smallest
4. if result in step 3 gives a ratio with decimal equivalent to 1/4, 1/3, 1/2, 2/3, 3/4 instead of whole numbers, convert to the fraction and multiply all ratios by the denominator or the fraction

V. Calculating Empirical Formula (from experimentally determined masses)

1. multiply the mass of each element (in grams) by 1/molar mass of that element
2. continue with steps 3 & 4 from IV above.

VI. Finding Molecular Formulas (when molar mass is known)

1. calculate the empirical formula
2. find the mass of the empirical formula
3. use the equation : (empirical formula mass) * a = molar mass
4. find value for a: a = molar mass/empirical formula mass
5. multiply each subscript in empirical formula by value for a