CONCEPT: MOLECULAR FORMULA

- Recall, the molecular formula gives the _____ number of different elements in a given compound.

Compound	Empirical Formula	n-factor	Molecular Formula
Glucose	CH_2O		
Octane	C_4H_9		
Salicylic Acid	$C_7H_6O_3$		

Calculating the Molecular Formula

- Once the empirical formula is determined, the molecular formula can be obtained if the _____ is also known.

EXAMPLE: Ibuprofen ($\mathcal{M}$ = 206.3 g/mol) works by reducing the production of prostaglandins, the chemical components responsible for pain. If its percent composition is 75.70% carbon, 8.80% hydrogen and 15.50% oxygen, determine its molecular formula.

STEP 1: Repeat the steps necessary to determine the empirical formula of the compound.

STEP 2: Calculate the _____ mass of the compound.

STEP 3: Divide the **molar mass** of the molecular formula by the **empirical mass** to determine the **n-factor**.

STEP 4: Multiply the _____ of the empirical formula by the **n-factor** to get the molecular formula.

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PRACTICE: Use the given empirical formula and molar mass to determine the molecular formula.

Empirical Formula: NH_2 **Molar Mass:** 32.052 g/mol

a) NH_4 b) N_4H c) NH_2 d) N_2H_4

PRACTICE: Glyceraldehyde ($\mathcal{M}$ = 90.078 g/mol), a simple monosaccharide, is comprised of 39.999% C, 6.714% H, and 53.297% oxygen by atomic weight. What would be its molecular formula?

a) $C_3H_6O_3$ b) CH_2O c) C_3HO_3 d) $C_2H_8O_2$

PRACTICE: Elemental analysis of a pure compound indicated that the compound had 72.2% C, 8.50% H and the remainder as O. If 0.250 moles of the compound weighs 41.55 g, what is the molecular formula of the compound?