

Molecular Formula vs Empirical Formula

- Different compounds can have the _____ empirical formula but _____ molecular formulas.
- Empirical Formula is a _____ form of Molecular formula
- Molecular Formula and the empirical formula can be the same.

An empirical formula is:

A molecular formula is:

CH_2O is a _____

$\text{C}_6\text{H}_{12}\text{O}_6$ is a _____

Empirical Formulas

Step 1: Change ___ sign to ___ - if you are given grams, skip this step

Step 2: Convert masses to moles using _____

Step 3: _____ all # of moles by the _____ value.

Step 4: If dividing gave you _____, then multiply by _____

Step 5: If dividing gave you _____ or _____, then multiply by _____

Step 6: If step 5 or 6 do not apply, then _____ step 3 values to a _____ number

Step 7: Once you know the _____, place them as _____ in the formula

Practice Problems:

- Find the empirical formula of a compound that is 33.38% Na, 22.65% S, and 44.90% O.
- A compound contains 3.26g of arsenic and 1.04g of oxygen. What is the empirical formula?
- What is the empirical formula of a compound that is 62.10% C, 13.80% H, and 24.10% N?

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Molecular Formulas

To find the molecular formula you must:

1. Find the _____ if not given
2. Determine the _____ of the _____
3. **MM molecular formula** = X
MM empirical formula
4. _____ each _____ in the empirical formula by “X”

Practice Problems

4. The empirical formula of a compound is CH; the molecular molar mass is 78.11 g/mol. What is its molecular formula?
5. A compound has an empirical formula of CH_3O and a molecular mass of 62.00 g/mol. What is its molecular formula?
6. A compound is 26.70% C, 2.20% H, and 71.10% O. Its molecular mass is 90.00 g/mol. What is its molecular formula?

Summary

Determine the molecular and empirical formula for each:

- a. C_6H_8 b. N_2O_6 c. $\text{C}_6\text{H}_{12}\text{O}_6$ d. BCl_3

Explain why some compounds do not have an empirical formula:

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