

Empirical and Molecular Formulas: Competition Corner

Week 28 | Model data, then name the limits

Competition Corner

Use classroom calculation values from `audits/atomic_masses_v2024.1.json`, derived from CIAAW/IUPAC Standard Atomic Weights 2024 (accessed 2026-07-26). Show a ratio table and state evidence separately from certainty.

1. Fractional-ratio detective. A compound has 40.00% C, 6.71% H, and 53.29% O. A student rounds the normalized ratio 1 : 1.999 : 1 to 1 : 1 : 1. Identify the exact reasoning error and give the correct empirical formula.

2. Data quality. Two laboratories report a CH_2O -like material: Lab A, C 40.00%, H 6.71%, O 53.29%; Lab B, C 39.70%, H 6.95%, O 53.35%. Calculate/estimate both ratio sets and decide which report more strongly supports CH_2O . What data would improve the claim?

3. Formula versus structure. A material has empirical formula $\text{C}_2\text{H}_6\text{O}$ and molar mass 46.069 g/mol. Give its molecular formula, then explain why that result does not decide whether its atoms have one structural arrangement or another.