

EMPIRICAL FORMULAS

EVIDENCE NOTEBOOK

KEY IDEAS

1. Empirical Formula vs Molecular Formula

a. A formula that shows the kind and _____ of _____ in a molecule is known as the **molecular formula**.

b. The **empirical formula** gives the _____ of the elements BUT not necessarily the _____ or _____ of atoms.

c. Examples:

Molecular Formula	Empirical Formula
P_4O_{10}	
H_2O	
N_2O_4	
$C_{10}H_{22}$	
$C_5H_{12}O$	
$C_6H_{12}O_6$	

d. Summary: The empirical formula is _____ version of the molecular formula.

e. Carbohydrate is a common term used for sugars because the empirical formula is:

2. Steps for determining an empirical formula:

a. Step 1:

b. Step 2:

c. Step 3:

d. Step 4:

i. Rounding to the nearest tenth should form a whole number. Example round 1.99 to the nearest tenth:

ii. Examples for when you do not get a whole number:

Value	Multiple Everything By	New Value
1.5		
1.25		

NAME: _____ **DATE:** _____ **PERIOD:** _____

3. Example problem: A compound was analyzed and found to contain 13.5 grams calcium, 10.8 grams oxygen, and 0.675 grams hydrogen. What is the empirical formula of the compound?

a. Step 1 - Given Information:

b. Step 2 – Convert the mass of each element to moles using the molar mass:

c. Step 3 – Divide each mole value by the smallest number of moles calculated and round to the nearest whole number.

d. Step 4 – Write the empirical formula

