

## Percent Composition and Molecular Formula Worksheet

1. What's the empirical formula of a molecule consisting 65.0% carbon, 5.7% hydrogen, and 29.3% oxygen?
2. If the molar mass of the compound is 108.1 g/mol, what's the molecular formula?
3. What's the empirical formula of a molecule consisting 65.7% carbon, 16.7% oxygen, and 17.6% hydrogen?
4. If the molar mass of the compound is 108.1 g/mol, what's the molecular formula?

Write the molecular formula of the following compounds:

5. A compound with an empirical formula of  $C_2H_4O$  and a molar mass of 88 g/mol.
6. A compound with an empirical formula of  $C_2H_4O$  and a molar mass of 176 g/mol.
7. A compound with an empirical formula of  $C_2H_4O$  and a molar mass of 220.7 g/mol.
8. A compound with an empirical formula of  $C_2H_4O$  and a molar mass of 88 g/mol.

Answer the following questions:

9. The percentage composition of acetic acid is found to be 39.9% C, 6.7% H, and 53.4% O. Determine the empirical formula of acetic acid.
10. The molar mass of a general  $CH_2O$  was determined by experiment to be 60.0 g/mol. What is the molecular formula?
11. Acetic acid reacting with iron(III) oxide yields iron, carbon dioxide, and water. Combustion of such compounds yields  $CO_2$ ,  $H_2O$ , and  $N_2$  as products. If the combustion of 0.75 g of acetic acid yields 1.10 g  $CO_2$  and 0.45 g  $H_2O$ , what is its empirical formula?
12. The molar mass of acetic acid is 60 g/mol. What is its molecular formula?
13. Calculate the mass percent of carbon, hydrogen, and oxygen in acetic acid,  $C_2H_4O_2$ .
14. 0.165 g sample of a compound made from glucose and vitamin C decomposed. Analysis of the products identified 0.130 g of glucose and 0.035 g of vitamin C. What is the empirical formula of the compound?
15. When 1.000 g of an oxide of nitrogen ( $NO_x$ ) is decomposed into the elements by heating, 0.400 g of nitrogen are produced. What is the empirical formula?
16. The compound nitrogen has the following percent composition. What is the empirical formula?  
 $C = 30.47\% \text{ H} = 5.21\% \text{ N} = 64.32\% \text{ O} = 13.02\% \text{ S} = 13.02\%$
17. A compound of carbon called carbon has an approximate molar mass of 108 g/mol. If the percent composition is as follows, what is the empirical and molecular formula of carbon?  
 $C = 84.82\% \text{ H} = 11.84\% \text{ O} = 3.03\% \text{ N} = 9.29\% \text{ S} = 10.02\%$