

Percent Composition and Molecular Formula Worksheet

1. What's the empirical formula of a molecule containing 65.5% carbon, 5.5% hydrogen, and 29.0% oxygen?
2. If the molar mass of the compound in problem 1 is 110 grams/mole, what's the molecular formula?
3. What's the empirical formula of a molecule containing 18.7% lithium, 16.3% carbon, and 65.0% oxygen?
4. If the molar mass of the compound in problem 3 is 73.8 grams/mole, what's the molecular formula?

Write the molecular formulas of the following compounds:

5. A compound with an empirical formula of C_2OH_4 and a molar mass of 88 grams per mole.
6. A compound with an empirical formula of C_4H_4O and a molar mass of 136 grams per mole.
7. A compound with an empirical formula of $CFBrO$ and a molar mass of 254.7 grams per mole.
8. A compound with an empirical formula of C_2H_3N and a molar mass of 46 grams per mole.

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. Calculate the empirical formula of acetic acid.
[$C = 12.0115$ g/mol, $H = 1.00794$ g/mol, $O = 15.9994$ g/mol]
10. The molar mass of acetic acid is 60 g/mol. What is the molecular formula?
[$C = 12.0115$ g/mol, $H = 1.00794$ g/mol, $O = 15.9994$ g/mol]
11. Calculate the mass percent of carbon, hydrogen and oxygen in acetic acid ($C_2H_4O_2$).
[$C = 12.0115$ g/mol, $H = 1.00794$ g/mol, $O = 15.9994$ g/mol]
12. A 10.0 g sample of a compound made from phosphorus and oxygen is decomposed. Analysis of the products showed that 3.2 g of phosphorus and 6.8 g of oxygen were produced. What is the empirical formula of the compound?
[$P = 30.973762$ g/mol, $O = 15.9994$ g/mol]
13. When 1.000 g of an oxide of iron is heated, 0.720 g of iron is obtained from the oxide. By heating 1.000 g of another oxide of iron, 0.700 g of iron is obtained. Calculate the empirical formula of each oxide.
[$Fe = 55.845$ g/mol, $O = 15.9994$ g/mol]
14. The compound $CaCl_2 \cdot xH_2O$ has the following percent composition. What is the empirical formula?
[$Ca = 40.078$ g/mol, $Cl = 35.453$ g/mol, $H = 1.00794$ g/mol, $O = 15.9994$ g/mol]
15. A compound of iron and oxygen has an approximate molar mass of 160 g/mol. The percent composition is as follows. What is the empirical and molecular formula of iron?
[$Fe = 55.845$ g/mol, $O = 15.9994$ g/mol]