

Name: _____

**Percent composition to Empirical and
Molecular formula
THESE PROBLEMS MUST BE DONE ON A
SEPARATE SHEET OF PAPER!!!**

- A. Determine the empirical formula for each compound.
1. A compound contains 0.0130 mol carbon, 0.0390 mol hydrogen, and 0.0065 mol oxygen.
 2. A compound consists of 72.2% magnesium and 27.8% nitrogen by mass.
 3. Glucose contains 40.0% carbon, 6.7% hydrogen, and 53.3% oxygen by mass.
 4. Phosphoric acid is found in some soft drinks. A sample of phosphoric acid contains 0.3086 g of hydrogen, 3.161 g of phosphorus, and 6.531 g of oxygen.
- B. Determine the molecular formula for each compound described.
5. A compound has an empirical formula of NO_2 and a molar mass of 92.02 g/mol.
 6. A compound has an empirical formula of $\text{C}_2\text{H}_3\text{O}$ and a molar mass of 172 g/mol.
 7. Ibuprofen, a common headache remedy, has an empirical formula of $\text{C}_7\text{H}_9\text{O}$ and a molar mass of approximately 215 g/mol.
 8. Nicotine is 74.1% carbon, 8.6% hydrogen, and 17.3% nitrogen by mass. Its molar mass is about 160 g/mol.
 9. Epinephrine (adrenaline) is a hormone secreted into the bloodstream in times of danger and stress. It is 59.0% carbon, 7.1% hydrogen, 26.2% oxygen, and 7.7% nitrogen by mass. Its molar mass is about 180 g/mol.
- C. Questions
10. Can the molecular formula of a compound ever be the same as the empirical formula? Explain your answer.
 11. What is the empirical formula of a compound that has three times as many hydrogen atoms as carbon atoms, but only half as many oxygen atoms as carbon atoms?
 12. Draw a Lewis dot structure for the molecule in problem 11 first assuming that the empirical and molecular formula are the same. Next try to draw the structure of the compound that would result if all the subscripts were doubled. Does it work?