Stoichiometry 3.6
Empirical and Molecular Formulas
Worksheet

1) What is the empirical formula for C_8H_{18}?

2) What is the empirical formula for H_2O?

3) What is the empirical formula for C_4H_{10}?

4) What is the empirical formula for $C_2H_4O_2$?

5) Is CO_2 an empirical formula, a molecular formula, or both? Explain.

6) A hydrocarbon (a compound that contains only hydrogen and carbon) is found to be 74.5 % carbon by mass.
   a. Find the empirical formula for the compound.
   b. If the molar mass of the compound is 16.05 g/mol, find its molecular formula.

7) It was found that a compound contained 68.1% carbon, 13.7% hydrogen, and 18.2% oxygen by mass.
   a. Find the empirical formula for the compound.
   b. If the molar mass of the compound is 176.34 g/mol, what is its molecular formula?

8) A sample of a hydrocarbon was analyzed and found to contain 12.00 g of carbon and 1.5 g of hydrogen.
   a. Find the empirical formula of the compound. (Hint: As the masses are known, you do not need to assume you have a 100 g sample.)
   b. If the molar mass of the hydrocarbon is found to be 54.10 g/mol, what is its molecular formula?

9) A sample of a compound was analyzed and found to contain 6.00 g of carbon and 1.100 g of hydrogen.
   a. Find the empirical formula of the compound.
   b. If the molar mass of the compound is found to be 142.36 g/mol, what is its molecular formula?

10) A sample of a hydrocarbon was analyzed and found to contain 12.59 g of carbon and 1.41 g of hydrogen.
   a. Find the empirical formula of the compound. (Hint: As the masses are known you do not need to assume you have a 100 g sample.)
   b. If the molar mass of the hydrocarbon was found to be 40.07 g/mol, what is its molecular formula?

11) A 1.357 gram sample of a compound containing only carbon, hydrogen, and oxygen was burned in excess oxygen gas. The combustion produced 1.989 g of carbon dioxide and 0.8143g of water.
    a. Find the empirical formula of the compound.
    b. If the molar mass of the compound is found to be 60.06 g/mol, what is its molecular formula?

12) A 1.0857 gram sample of a compound containing only carbon, hydrogen, and oxygen was burned in excess oxygen gas. 3.190 g of carbon dioxide and 0.9360g of water were produced. Find the empirical formula of the compound.

13) A 1.638 gram sample of a compound containing only carbon, hydrogen, and oxygen was burned in excess oxygen gas. 3.117 g of carbon dioxide and 1.911g of water were produced. Find the empirical formula of the compound.

