

## EMPIRICAL AND MOLECULAR FORMULA WORKSHEET

1. An oxide of chromium is found to have the following % composition: 68.4 % Cr and 31.6 % O. Determine this compound's empirical formula.
2. The percent composition of a compound was found to be 63.5 % silver, 8.2 % nitrogen, and 28.3 % oxygen. Determine the compound's empirical formula.
3. A 170.00 g sample of an unidentified compound contains 29.84 g sodium, 67.49 g chromium, and 72.67 g oxygen. What is the compound's empirical formula?
4. A 60.00 g sample of tetraethyl lead, a gasoline additive, is found to contain 38.43 g lead, 17.83 g carbon, and 3.74 g hydrogen. Find its empirical formula.
5. A compound containing 5.9265 % H and 94.0735 % O has a molar mass of 34.01468 g/mol. Determine the empirical and molecular formula of this compound.

6. The empirical formula for trichloroisocyanuric acid, the active ingredient in many household bleaches, is  $\text{OCNCl}$ . The molar mass of this compound is 232.41 g/mol. What is the molecular formula of trichloroisocyanuric acid?
  
7. Determine the molecular formula of a compound with an empirical formula of  $\text{NH}_2$  and a formula mass of 32.06 amu.
  
8. The empirical formula of a hydrocarbon (compound that contains only C and H) is found to be  $\text{CH}$ . Laboratory procedures have found that the molar mass of the compound is 78 g/mol. What is the molecular formula of this compound?
  
9. The molar mass of nicotine is 162.1 g/mol. It contains 74.0 % carbon, 8.7 % hydrogen, and 17.3 % nitrogen. Determine nicotine's empirical formula and molecular formula.
  
10. Phenyl magnesium bromide is used as a Grignard reagent in organic synthesis. Determine its empirical and molecular formula if its molar mass is 181.313 g/mol and it contains 39.7458 % C, 2.77956 % H, 13.4050 % Mg, and 44.0697 % Br.