**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Percent Composition and Empirical/Molecular Formula Calculations**

Percent Composition

**Directions**: Calculate the percent by mass of carbon for each of the following compounds.

1. NaHCO3

2. CCl4

3. Ni(C2H3O2)3

4. CH4

5. CaCO3

6. CS2

7. CO

8. CsHCO3

Empirical Formulas

**Directions:** Calculate the empirical formula for each compound below based on either percent composition data or mass of each element.

1. A sample contains 0.571 g carbon, 0.072 g hydrogen, and 0.333 g nitrogen. What is the empirical formula of this substance?

2. What is the empirical formula of a substance containing only selenium and chlorine, and is 52.7% selenium by mass?

3. A compound contains only carbon, hydrogen, and oxygen, and is 66.6% carbon and 11.2% hydrogen. What is the empirical formula of this substance?

4. What is the empirical formula of a compound that contains 0.139 g hydrogen and 0.831 g carbon?

Molecular Formulas

**Directions**: Calculate the molecular formula for each compound below based on either percent composition date or mass of each element.

1. What is the molecular formula of a compound with an empirical formula of CH2O and a molar mass of 90 g/mol?

2. Mandelic acid is an organic acid composed of carbon (63.15%), hydrogen (5.30%), and oxygen (31.55%). Its molar mass is 152.14 g/mol. Determine the empirical and molecular formulas of the acid.

3. A compound contains 62.0% carbon, 10.4% hydrogen, and 27.5% oxygen by mass, and has a molar mass of 174 g/mol. What is the molecular formula of the compound?

4. Monosodium glutamate (MSG), a flavor enhancer in certain foods, contains 35.51% C, 4.77% H, 37.85% O, 8.29% N, and 13.60% Na, and has a molar mass of 169 g/mol.