**Empirical Formula**

**Station #3**

How to Calculate Empirical Formula Given Mass or Percentage

Example: A compound undergoes elemental analysis and is made up of 32.38% sodium, 22.63% Sulfur, and 44.99% oxygen. What is the empirical formula?

1. Convert percentage to grams.

32.38 g of Na

22.63 g of S

44.99 g of O

1. Convert grams to moles.

Na = 32.38 g/23 g/mol = 1.41 mol

S = 22.63 g/32g/mol = 0.7 mol

O = 44.99 g/16g/mol = 2.8 mol

1. Identify smallest number of moles and divide that by all the other moles to find ratios.

The smallest above is 0.7 mol

Na = 1.41 mol/0.7 mol = 2

S = 0.7 mol/0.7 mol = 2

O = 2.8 mol/0.7 mol = 4

1. Round ratio to the nearest whole number. Make this ratio your subscript.

**Empirical Formula = Na2SO4**

**Practice Problems**

1. Analysis of a compound reveals that it is made up of 63.50% silver, 8.25% nitrogen, and the rest is oxygen. What is its empirical formula? Show all your work.

2. A compound is made up of 24.5% calcium, 1.2% hydrogen, 14.8% carbon, and 59.3% oxygen. Determine its empirical formula. Show all your work.