Percent Composition

**Purpose:** During today’s lesson, we will learn about percent composition, a concept that you are likely to be familiar with from math class and from your own life. It is a helpful mathematical concept to use in chemistry, because it allows us to determine just *how much of an element (by weight)* is present in a molecule or a mole of molecules. This knowledge will become increasingly important as we talk about *chemical reactions* and *how much of each reactant* will be needed to produce a certain amount of product. **This worksheet will be turned in the day of the test.**

**Task:** We will be working as a class to build the mathematical formula for percent composition. This will be done through class discussion and individual and pairs-work. Be prepared to use your problem-solving skills to determine a procedure for attacking problems involving percent composition!

## Bellwork:

## General formula for Percent Composition:

% by mass of an element present in a compound:

These questions will typically be written as, “What is the percent composition of (name a compound)?” This is asking you to determine the percentage of the mass of the compound that is made up by each type of element present.

## Percent composition of a molecule:

PCl5

Molar mass of P: 30.97 g/mol

Molar mass of Cl: 35.453 g/mol

Molar mass of PCl5: 30.97 g/mol + (5x35.453 g/mol) = 208.235 g/mol

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| --- | --- | --- | --- | --- | --- |
|  | Chemical Name | Drawing | Mole fraction  for each element | Molar Mass  for each element | Percent composition  for each element |
| NaCl | Sodium chloride | X \* | 1 mol Na: 1 mol Cl | Molar mass of Na: 22.99 g/mol  Molar mass of Cl: 35.453 g/mol  Molar mass of NaCl: 58.44 g/mol |  |
| FeSO4 | Iron (II) sulfate | X $ # # # # | 1 mol Fe: 1 mol S: 4 mol O | Molar mass of Fe: 55.85 g/mol  Molar mass of S: 32.07 g/mol  Molar mass of O: 15.9994 g/mol  Molar mass of FeSO4: 151.92 g/mol |  |
| H2SO4 | Sulfuric acid | X X $ # # # # | 2 mol H: 1 mol S: 4 mol O | Molar mass of H: 1.0079 g/mol  Molar mass of S: 32.07 g/mol  Molar mass of O: 15.9994 g/mol  Molar mass of H2SO4: 98.08 g/mol |  |