Determining Chemical Formulas Lab

1. What is a mole?

-represents the number of atoms of a substance (6.02 x 1023)

-for example, a dozen is 12 of something. 12 doughnuts or 12 cars. Same number, different masses. Think of chemical compounds in this way.

1. Formula mass (molecular mass)

-add the atomic mass of each individual atom together to find the mass of the compound

-formula mass is referring to ionic compounds and molecular mass to covalent compounds

1. Molar Mass of a compound. Use the coefficient (if there is one) and multiply it by the formula mass to find the molar mass.
2. Percent composition of a compound

* Molar mass of each element divided by the molar mass of the compound.
* Example: CO2 Carbon = 12 g, Oxygen = 32 g. Total mass of the compound is 44g.

Carbon = 12/44 so % is 27. Oxygen is 32/44 so % is 73.

1. Empirical Formula

-formula that shows the simplest whole number ratio for the elements that make up a compound

-can be shared by several different compounds

-Example-find the molecular formula given the empirical formula of CH2 and a molecular mass of 70 amu (g). C is 12, H2 is 2 so the mass is 14. Divide the molecular mass by the mass of the empirical formula. 70/14 = 5. Multiply the result (5) x CH2 and you get C5H10

-Example 2: Determine the empirical formula for a compound that is 71.5% Ca and 28.5% oxygen. Assume a 100gram sample. Use the mass of each individual element to find how many parts of each element are in the formula. So for Ca it would be 71.5 g/40.1 g/part = 1.78 parts and oxygen would be 28.5 g/16g part = 1.78 parts. Take the parts to construct a simple whole number ration 1.78:1.78 = 1:1. Use the simple whole number ratio as the subscripts of the empirical formula. This would be CaO.