FLINN SCIENTIFIC

Name_____

Pre-Laboratory Assignment

A piece of iron weighing 85.65 g was burned in air. The mass of the iron oxide produced was 118.37 g.

1. Use the molar mass of iron to convert the mass of iron used to moles.

2. According to the law of conservation of mass, what is the mass of oxygen that reacted with the iron?

3. Calculate the number of moles of oxygen in the product.

4. Use the ratio between the number of moles of iron and number of moles of oxygen to calculate the empirical formula of iron oxide. *Note:* Fractions of atoms do not exist in compounds. In the case where the ratio of atoms is a fractional number, such as ½, the ratio should be simplified by converting it to the nearest whole number ratio.

Data Table

	Trial 1	Trial 2	Trial 3
Mass of crucible and lid, g			
Mass of crucible, lid, and silver oxide, g			
Mass of crucible, lid, and silver metal, g			
Appearance of product			

Post-Laboratory Review Questions

Create a Data Results Table for each trial with the following categories: the mass of silver oxide in grams, the mass of silver metal produced in grams, the mass of oxygen gas produced in grams, the percent composition of silver, the percent composition of oxygen, the moles of oxygen in the silver oxide sample, the moles of silver in the silver oxide sample, the mole ratio of Ag/O in silver oxide, and finally, the empirical formula of Ag_xO_y.

1. Calculate the mass of silver oxide and the mass of the silver metal product. Use the law of conservation of mass to calculate the mass of oxygen that combined with the silver. Enter the answers in your Data Results Table.

2. What is the percent composition of silver and oxygen in silver oxide? Enter the answers in your Data Results Table.

3. Use the molar masses of silver and oxygen to calculate the number of moles of each product. Enter the answers in your Data Results Table.

4. Calculate the ratio between the number of moles of silver and the number of moles of oxygen in the product. What is the empirical formula of silver oxide? Enter the answers in the Data Results Table.

5. Write a balanced chemical equation for the decomposition of silver oxide to form silver metal and oxygen.

6. The *theoretical yield* of a product in a chemical reaction is the maximum mass of product that can be obtained, assuming 100% conversion of the reactant(s). Calculate the theoretical yield of silver metal in this experiment. *Hint:* Calculate the molar mass of silver oxide.

7. The percent yield reflects the actual amount of product formed versus the maximum that might have been obtained. Use the following equation to calculate the percent yield of silver metal produced in this experiment.

$$\%\ \text{yield} = \frac{\text{actual mass of product (g)}}{\text{theoretical mass (g)}} \times 100\%$$

8. Discuss sources of error in this experiment that might account for a percent yield lower or higher than 100%. Be specific!