***Reduction of Iron Ore to Pure Iron***

**Introduction**:

The steel making process was on toe the first major industries in the U.S. It was also the one of the oldest “industrial processes” dating back thousands of years. Steel is based on pure iron derived from iron III oxide.

How iron ore was discovered is thought to have been from a wood fire placed on an outcrop of metal ore, smelting some of it, and the pure metal was seen after the fire. The metal was probably lead since its melting point is 327oC while copper is 1084oC and iron is 1537oC.

**Objective**:

To reduce iron III oxide to pure iron and investigate the steel making process.

**Procedure:**

1. Grind a small amount of charcoal using a mortar and pestle to create carbon powder.
2. Tare a clean crucible and place a small scoop of iron III oxide powder. Record the mass.
3. To the same crucible and approximately 1.5 to 2.0 times the amount of carbon powder. Record the combined mass.
4. Place the crucible into a clay triangle over an intense burner flame.
5. Heat the mixture for 15-30 minutes occasionally moving the contents with a metal spatula.
6. The mixture will turn red hot and the color will slowly change from brown/black to red to grey.
7. Once the grey color of iron metal is throughout the mixture, turn off the heat and allow the crucible to cool for at least five minutes.
8. Mass the crucible on the balance.
9. Tare a magnet/plastic bag. Pass the magnet over the crucible, remove the iron, and place the magnet, plastic bag, and iron on the balance.

**Data**:

Create a data table to record the mass readings taken during the lab.

**Data Analysis:**

Iron III oxide is reduced to iron metal in the presence of carbon monoxide (formed by the reaction of carbon with oxygen) to form elemental iron and carbon dioxide

1. Write the balanced equation including states of matter.
2. Identify
3. What is oxidized
4. What is reduced
5. Oxidizing agent
6. Reducing agent
7. Calculate the amount of pure iron recovered
8. Calculate the theoretical amount of iron recovered
9. Calculate the percent yield for the reaction

**Conclusion:**

Using the lab as an example, describe the steel making process and be sure to include the terms oxidized, reduced, oxidizing agent, reducing agent, and materials used. Be sure to include and explanation as to why to mixture was mixed periodically.