**MOLE to MOLE LAB**

**Problem:** To determine the moles of products produced in different reactions.

**Background Information:**

\*A mole of any substance contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles.

\*A mole of lead will be **heavier or lighter** than a mole of oxygen because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\*The mass of a mole of a substance can be found using the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the substance.

\*The units of molar mass are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Part A: Prelab**

1. Balance the reaction below and name the reaction type on the line provided

\_\_\_\_\_ Mg (s) + \_\_\_\_\_ O2(g) → \_\_\_\_\_ MgO (s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. List 3 possible mole ratios using the above equation:

**Part A: Lab**

3. Get a strip of magnesium metal and record its original mass (g): \_\_\_\_\_\_\_\_\_\_\_\_\_

4. Look at your strip of magnesium. How many moles do you think it is? \_\_\_\_\_\_\_\_

5. Convert the mass of your magnesium metal into moles. (show your work below)

6. Calculate how many grams of MgO will be produced when you complete the reaction. Use the mass of your magnesium from #3 and the balanced equation in #1. (show your work below)

**Part A: Procedure**

1. Get an evaporating dish, wash and dry it. Then find its mass: \_\_\_\_\_\_\_\_\_\_\_\_\_(g)
2. Place the evaporating dish near the base of the Bunsen burner.
3. Using crucible tongs, hold the magnesium in the burner flame until it starts to burn.
4. DO NOT LOOK DIRECTLY AT THE FLAME. HOLD THE BURNING MAGNESIUM AWAY FROM YOU AND DIRECTLY OVER THE EVAPORATING DISH.
5. When the ribbon stops burning, put the remains in the evaporating dish. Examine this product carefully.
6. Weigh the evaporating dish with the reacted MgO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part A: Analysis**

1a. Calculate the mass of the MgO using your data from part a and part f. \_\_\_\_\_\_\_\_\_\_\_\_ (g)

b. How does the mass of MgO that you produced in the reaction compare to the mass of MgO that was calculated above in the prelab section (#5)?

3. Calculate the percent yield of MgO

*Actual yield is measured in the lab (Analysis 1A answer)*

*Theoretical yield you found above using the balanced equation (Part A: Prelab #5 answer)*

**Percent yield = actual yield x 100**

**theoretical yield**

**Part B: Prelab**

1. Balance the reaction below and name the reaction type on the line provided

\_\_\_\_\_ CuCO3 (s) → \_\_\_\_\_ CuO (s) + \_\_\_\_\_ CO2(g) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part B: Lab**

2. a) Get a clean dry test tube and find its mass. \_\_\_\_\_\_\_\_\_\_\_\_\_\_(g)

b) Place one small scoopula of CuCO3 in the test tube and find the mass\_\_\_\_\_\_\_\_\_\_\_\_\_ (g)

c) subtract to calculate the mass of the CuCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_(g)

3. Look at the CuCO3 in the test tube. How many moles do you think it is? \_\_\_\_\_\_\_

4. Convert the mass of your CuCO3 into moles. (show your work below)

5. Calculate how many grams of CuO will be produced when you complete the reaction. Use the mass of CuCO3 from #2 and the balanced equation in #1. (show your work below)

**Part B: Procedure**

1. Using a test tube holder, heat the CuCO3 strongly for about 1 minute. HOLD TESTUBE AT AN ANGLE AWAY FROM EVERYONE.
2. Once the reaction is complete, let the test tube cool. Place in test tube rack if needed
3. Weigh the test tube with the reacted CuO. \_\_\_\_\_\_\_\_\_\_\_\_ (g)

**Part B: Analysis**

1a. Calculate the mass of the CuO that you produced by subtracting the mass of the empty test tube (2a) from the data in procedure part c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(g)

1b. How does the mass of CuO that you produced in the reaction compare to the mass of CuO that was calculated above in the prelab section (#4)?

2. Calculate the percent yield of CuO

*Actual yield is measured in the lab from (Analysis 1A answer)*

*Theoretical yield you found above using the balanced equation (Part B: Lab #4 answer)*

**Percent yield = actual yield x 100**

**theoretical yield**