***Introduction:*** In this lab, you and your lab partners will determine how well you can conduct a chemical reaction. The method in which you will evaluate your group’s accuracy in performing the experiment will be to find the percent yield of your reaction. Percent yield is calculated using the equation:

whereas the actual mass is the mass of the product you end with after you conduct the experiment and the theoretical mass is what you believe you show be able to produce based on using stoichiometry appropriately.

***Prelab Homework:*** Failure to complete this homework prior to the beginning of the lab will result in you not being able to perform the lab and therefore receiving a zero for the activity.

The unbalanced chemical reaction that you will perform is: [*(aq)* means aqueous/dissolved in water, and *(s)* means solid].

**lead (II) nitrate *(aq)* + potassium iodide *(aq)* 🡪 lead (II) iodide *(s)* + potassium nitrate *(aq)***

1. Using your ion sheet, determine the chemical formula for of the two reactants and two products. Write the formula below and then balance the reaction.
2. You will filter one of the products in the same way you did the first stoichiometry lab. Which product will the filter collect? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Fully explain how you know this to be true?
3. Use stoichiometry to determine the limiting reactant.
   1. During the lab, you will react 5.0 grams of each reactant together. Determine the limiting reactant and by doing so, you will also determine what the theoretical yield of the precipitate formed by the reaction:
4. Read the procedure for the lab before coming to class.

**Supplies:**

*Group Supplies*: one 100 mL beaker; two 250 mL beakers; stir rod; ring stand with funnel; 50 or 100 mL graduated cylinder; filter paper

*Shared Supplies*: wash bottle filled w/ distilled water; balance

**Safety:** Safety glasses must be worn throughout the lab procedure.

**Procedure:**

**Day 1:**

1. Put on safety glasses.
2. Get your supplies, clean them with tap water, and then rinse them with distilled water. You must dry the inside and outside of the beakers with paper towel.
3. Acquiring your chemicals and get setup:
   1. Place one of your 250 mL beaker on a balance. Hit the tare (zero) button. Into this beaker, measure out exactly 5.00 grams of Lead (II) Nitrate.
   2. Place the other 250 mL beaker on a balance. Hit the tare (zero) button. Into this beaker, measure out exactly 5.00 grams of Potassium Iodide.
   3. Prepare a filter paper disc for placing in a funnel. What is the mass of the initial filter paper? \_\_\_\_\_\_\_\_\_\_\_\_\_ grams.
4. Measure out 50 mL of distilled water and add it to the Lead (II) Nitrate to dissolve/dissociate the ionic compound. Swirl until dissolved.
5. Measure out 50 mL of distilled water and add it to the Potassium Iodide to dissolve/dissociate the ionic compound. Swirl until dissolved.
6. Once both reactants have been completely dissolved in distilled water, carefully pour one reactant into the other. What do you observe? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Prepare your filter paper and funnel for filtering.
8. Carefully pour your product into the filter paper.
9. Rinse any remaining product out of the beaker using distilled water from the wash bottle.
10. Carefully remove your filter paper and precipitate from the funnel. Place the filter paper in a small beaker and tape a strip of paper with the names of your group members and period number on it. Place the small beaker/filter paper in the drying oven according to your teacher’s instructions.
11. Clean all glassware and return to there proper locations.

***Day 1 Homework:*** *This must be done prior to working on the day two activities.*

1. Last week, Johnny and Kadiesha performed the same lab. They measured the mass of their precipitate to be 5.88 grams of PbI2. What is the percent yield of their lab?
   1. Do you think this is good or bad? Why/Explain your reasoning
2. Jose and Rachel also performed the same experiment. They measured their product and found that they had 8.25 grams of PbI2 in their filter paper. What was their percent yield?
   1. What does this result tell you about their lab procedure? Explain!

**Day 2:**

1. Remove your beaker/filter paper from the drying oven (***Caution, it will be warm***). Allow it to cool to room temperature.
2. Use a balance to find the new mass of the filter paper and precipitate. What is this mass? \_\_\_\_\_\_\_\_\_\_\_\_ grams.
3. What is the mass of only the precipitate? \_\_\_\_\_\_\_\_\_\_\_ grams.
4. Dispose of the filter paper as instructed by your teacher.

***Questions:***

1. What percent yield did you find for this lab? (Show your work)
   1. What can you conclude about this lab experiment based on your answers above?
2. Do you think it is common for scientists to achieve a 100 % yield? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Explain your answer.
3. If you had to do this lab over again, what would you do differently to improve your results next time?