Fe + $CuSO_4$ Lab Name: ______________________________ 40/1200

Objective: To produce an exact amount of copper from the single replacement reaction of iron metal and aqueous copper II sulfate. We will then to evaluate our results and check our % Error by comparing our measured results with our predicted calculated results.

Before starting this lab experiment, you must first determine how much iron will be required to produce your exact amount of grams of copper from this single replacement reaction. (2.05 — 3.15 g)

Each student team will choose an amount of copper to produce, the team with the lowest % Error will "win" the prize. Choose by initialing on the white board next to a number that you like.

Word equation & the balanced chemical equation for iron + copper II sulfate solution in a single replacement reaction
Word
Balanced

I am attempting to form ___________ grams of copper from this reaction.

Use Stoichiometry (3 steps) to determine how many grams of iron are needed to precipitate out your number of grams of copper. Get the teacher's check before you go to the lab to do this experiment.

How many grams of Iron to start with: ____________________

Procedure: First: in ink, put your name and your partner's name on the inside of the filter. Mass filter and record this mass before it gets wet!

Obtain a very clean and dry beaker (about 200 mL). Place it on the scale and zero it out. Put in your iron. Remove beaker from scale, pour in about 24 mL of copper (II) sulfate solution. Swirl carefully. Note the instant production of copper which you can see. (copper solution ~ 1.0 M)

Set up your filter in a funnel with a ring stand and be sure to have a beaker to "catch" everything pouring through it. Pour your reaction into the filter (do not go over the top of the filter paper or else copper will bypass the filter and end up getting lost)

Not all of the copper wants to exit the beaker, you will have to spritz deionized water with an eyedropper into the beaker to flush it all out. Do not touch your eyedropper to the beaker itself. Spritz all the copper into the bottom of the filter. Drain completely. Put your filter into the vent hood overnight to dry.

Wash all glassware, put upside down to dry. In 2-3 days you need to mass filter with copper, then subtract the original mass of the inked filter paper so you can get the mass of just the copper. \

DATA TABLE	Mass in grams
(today) mass of filter paper with names	
(in 2 days) mass of dry filter paper + copper	
mass of JUST the copper (MV)	
mass of copper you attempted to produce (AV)	

The Lucky Lab Questions *(1—5 are one point each, 6—10 are two points each = 15 total)*

1. Determine your PERCENT ERROR.
2. Why did you have this percent error?

3. If you made a crazy mistake and used Iron II sulfate solution with copper metal, what would happen?
4. In our experiment we form iron (II) sulfate solution. Explain how you know that Iron (II) sulfate is aqueous.

5. Where does the water to make this iron (II) sulfate solution come from?
6. How much iron did you use this this reaction? __________ grams. Calculate the number of atoms that is.

7. If you were trying to produce 35.46 grams of copper in this experiment, how many grams of iron would you need?
8. Iron reacts with oxygen in the air to form iron III oxide (rust). Write a balanced chemical equation, *with phases,* for this reaction.

9. To produce exactly 454.0 grams of rust, how many molecules of oxygen would react?

10. When 633.05 grams of rust forms, how many atoms of iron were required?

Fe + $CuSO_4$ Lab Report	includes	points
Cover	Title with short intro, Include the balanced chemical equation with PHASES	1 + 1 = 2
Page 1 of handout	Fill in the boxes, do the stoich math to calculate your mass of iron needed	3
page 3	10 Lab questions (SF are significant!)	15
page 4	Conclusion: 3-5 sentence summary of what you tried to do, and what you did do during this experiment. Tell what you calculated, what you measured, what your percent error was, why you had this error (over/under?). Include then a general statement about what stoichiometry is, what you can use it for, and why you love it so.	5
Lab due on:		25 points