

Name _____	Lab Partner _____
TA Name _____	Section _____ Date _____

Solutions and Spectroscopy Worksheet

As you work through the steps in the lab procedures, record your experimental values and the results on this worksheet.

Table A: Calibration Curve of Cu^{2+} Solutions and Unknown

Stock Cu^{2+} solution concentration _____ M		Wavelength _____ nm				
Solution #	Target volume of Cu^{2+} , mL	Actual volume of Cu^{2+} , mL	Target volume of H_2O , mL	Actual volume of H_2O , mL	$[\text{Cu}^{2+}]$ (calculated)	Absorbance (measured)
1	1.50		6.50			
2	3.00		5.00			
3	4.50		3.50			
4	6.00		2.00			
Equation of Trendline _____			R ² Value _____			
Unknown # _____	Absorbance (measured) _____		$[\text{Cu}^{2+}]$ (calculated) _____ M			

1. What is the concentration of Cu^{2+} in Solution 1 that you prepared? Show your calculations neatly.

2. Would you predict the absorbance of solution 2 to be greater or less than that of solution 1? Why?

3. What is the concentration of Cu^{2+} in your unknown solution?

Show your calculations neatly. Record this concentration in Data Table A.

4. You desire to make a copper(II) solution at the same concentration as the unknown you just determined in Part A. How many grams of $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ are required to make 25.00 mL of this solution?

Show your calculations neatly. Record the result as the target mass in Data Table B.

Table B: Preparation of a Cu^{2+} Solution from solid $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$

Target $[\text{Cu}^{2+}]$ from Part A, M	Target Mass $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, g	Actual Mass $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, g	Absorbance of Cu^{2+} solution	$[\text{Cu}^{2+}]$ calculated from absorbance, M

5. Comment on how the absorbance of your solution made from solid compares to the unknown solution's absorbance in Part A. Do you expect them to be the same?

Why or why not?

Table C: Preparation of a Cu^{2+} Solution from stock Cu^{2+} solution

Stock Cu^{2+} solution concentration _____ M				
Target $[\text{Cu}^{2+}]$ from Part A, M	Target Volume Cu^{2+} solution, mL	Actual Volume Cu^{2+} solution, mL	Absorbance of Cu^{2+} solution	$[\text{Cu}^{2+}]$ calculated from absorbance, M

6. You desire to make a copper(II) solution at the same concentration as the unknown you determined in Part A. How many mL of the copper(II) stock solution are required to make 25.00 mL of this solution?

Show your calculations neatly. Record the result as the target volume in Data Table C.

7. Comment on how the absorbance of your solution made by dilution of a stock compares to the unknown solution's absorbance in Part A. Do you expect them to be the same?

Why or why not?