

Beer's Law Laboratory Simulation

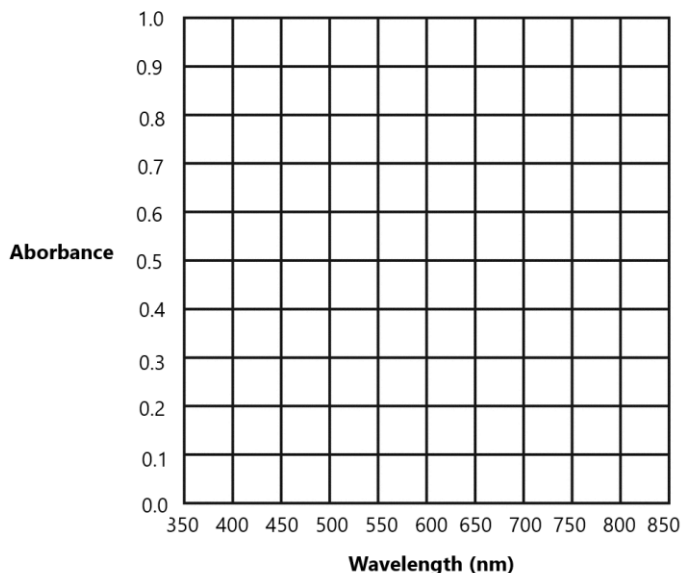
- Google “phet beer’s Law Lab”
- Click on “phet.colorado.edu > simulation > beers-law-lab”
- Click on the play icon on the simulation
- When the Beer’s Law Lab Home Screen is up, click on Beer’s Law
- Change Wavelength to “variable”
- Change the solution to “CuSO₄: Copper (II) sulfate”
- Change the wavelength manually to the left at “450 nm”
- Change the green detector to “Absorbance”
- Keep the CuSO₄ solution at a concentration of 100 mM
- Turn the wavelength light source on by clicking the red button

- 1) What is the Absorbance of the 100 mM CuSO₄ solution at 450 nm?
- 2) Does Copper (II) sulfate absorb blue light? Why or why not?
- 3) Does Copper (II) sulfate transmit blue light? Why or why not?

- Change the wavelength manually to the prescribed wavelengths and record the Color as well as the Absorbance and Transmittance values in the table below.

Wavelength	Color	Absorbance	Transmittance
450 nm			
525 nm			
610 nm			
650 nm			
700 nm			
750 nm			
780 nm			

- Plot the Wavelength (nm) vs. Absorbance data on the graph below. Draw a best curve fit to the data.

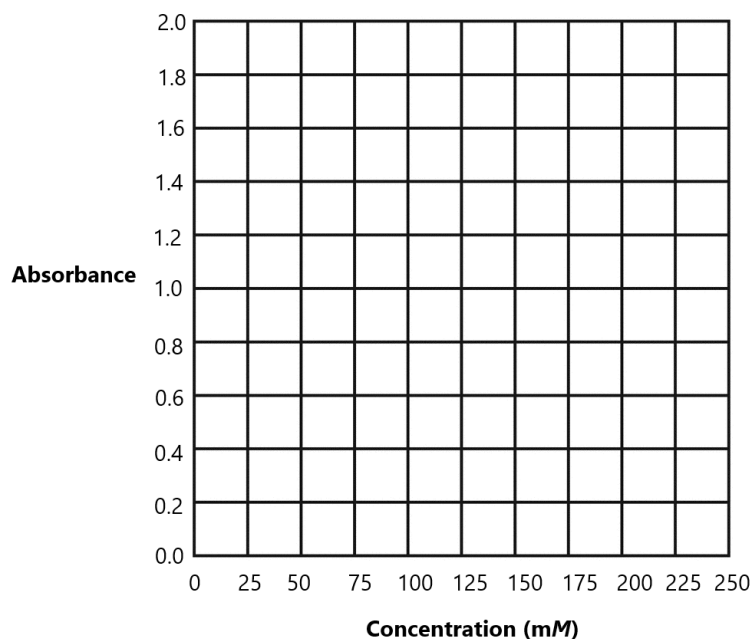


- 4) In order to find a solution of an unknown wavelength, you need to analyze or test a colored solution like CuSO₄ and see changes in its absorbance (but you need to set the wavelength to one specific wavelength). If you need to see changes in the absorbance of a colored solution, what wavelength according to your table above would you use to analyze or test CuSO₄?

- Set your light source on the wavelength you specified in 4) and analyze the copper (II) sulfate at the concentrations listed in the data table below. Record the Absorbance at each concentration.

Concentration (mM)	Absorbance
0	
25	
50	
75	
100	
125	
150	
175	
200	

- Plot the concentration (mM) vs. Absorbance on the graph below. Draw a best-fit line to the data.



- What qualitative observation can be made about the “color” of the aqueous solution as it becomes more concentrated?
- What type of relationship can be stated of the absorbance of a solution to its concentration?
- What is the slope of the line of the data graphed?
- What is the independent variable (x) in the laboratory?
- What is the dependent variable (y) in the laboratory?
- What is the equation for the $y = mx$ in the variables listed?
- What could the slope represent, ie. the values that are constant in this experiment? List at least one constant.
- Using your slope and equation, what would be the concentration (in mM) of an unknown copper (II) sulfate solution that has an absorbance of 1.12?