13B – SOLUTION CONCENTRATION

Analysis – Known Concentrations

Table 1 – Known concentration and absorbance

Test tube label	Molarity (mol/L)	Red Abs 650 nm	Orange Abs 610 nm	Yellow Abs 570 nm	Green Abs 550 nm	Blue Abs 500 nm	Violet Abs 450 nm
A							
B							
C							
D							
E							

1. Referring to your data table, which color of light absorbs the most light at all the concentrations?

2. Go to Page 2 in SPARKvue. You should see a graph of Red Absorbance (y-axis) versus Concentration. If necessary, change the y-axis to the color of light that absorbs the most light at all the concentrations. Sketch the graph below.

Graph 1 – Absorbance versus Concentration

3. Apply a linear fit in SPARKvue to determine the slope and intercept of the graph. What is the line expression for the graph?

4. Based on the "r" value, was the linear relationship a good fit for the data? What can you say about the relationship between two variables on a graph if there is a good linear fit?

Analysis – Unknown concentrations

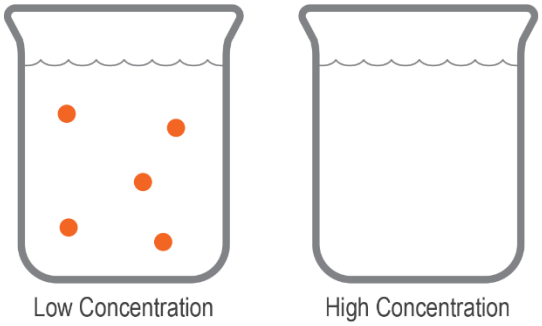
Table 2 – Unknown concentration and absorbance

Solution label	Absorbance	Molarity (mol/L)

1. Using the line expression from the first part of the investigation, calculate the molarity of the unknown solution. Your Absorbance from Table 2 above is the y value. You will need to solve for x. Show your work!

Questions – Unknown concentration

1. The picture below represents the solute particles of a low concentration solution. In the empty space draw the solute particles if the concentration were doubled.



2. What happens to the absorbance of light as you increase the concentration of the substance?

3. Do you think this is a reliable method for determining the concentration of a known solution?

4. How do your results for the unknown compare to those of your classmates?

5. Your teacher will tell you the real concentration of the unknown solution. Determine the percent error for your experiment.

6. What would likely be the largest source of error? Explain.