# Diffraction Grating Lab

**Procedure**

Make a chart with Quantity Measured/Symbol for Measurement/Instrument Used. Briefly, but completely, describe the procedure for this lab – and include a labeled sketch.

**Data**

Arrange your data, neatly, in tables with correct headings and units.

| L | $y_{red}$ | $y_{green}$ | $y_{blue}$ |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Graph**

Using appropriate titles, scales, labels units and your data, create a linear graph with your independent variable on the x-axis and dependent on the y-axis. Graph all sets of data on the same graph, but *use a different color for each*, and clearly label the sets of data. Draw three separate best fits lines, also using different colors. I don't want to dictate which colors to use, but it seems fairly obvious.

**Questions**

1) Describe, using your observations, what changes you saw in the diffraction pattern as the number of lines per inch increased. Explain these changes, using equations if necessary.

   (Note: You should have three values, one for each color for questions 2 – 5)

2) Find the slopes of your best fits lines. Show your work.

3) Using the slopes from your graph, find θ for each laser using the 5000/cm diffraction grating. Think about which trig function you need, and show your work.

4) Using your values for θ, along with the correct diffraction grating formula and *d*, find the wavelength of each laser. Show your work.

5) The labels on the laser show the actual wavelength values. Use these values to find the percent errors for the wavelengths found in #4.

**Error Analysis**

Thoroughly explain what the main sources of error are for this lab, and how you would correct them.