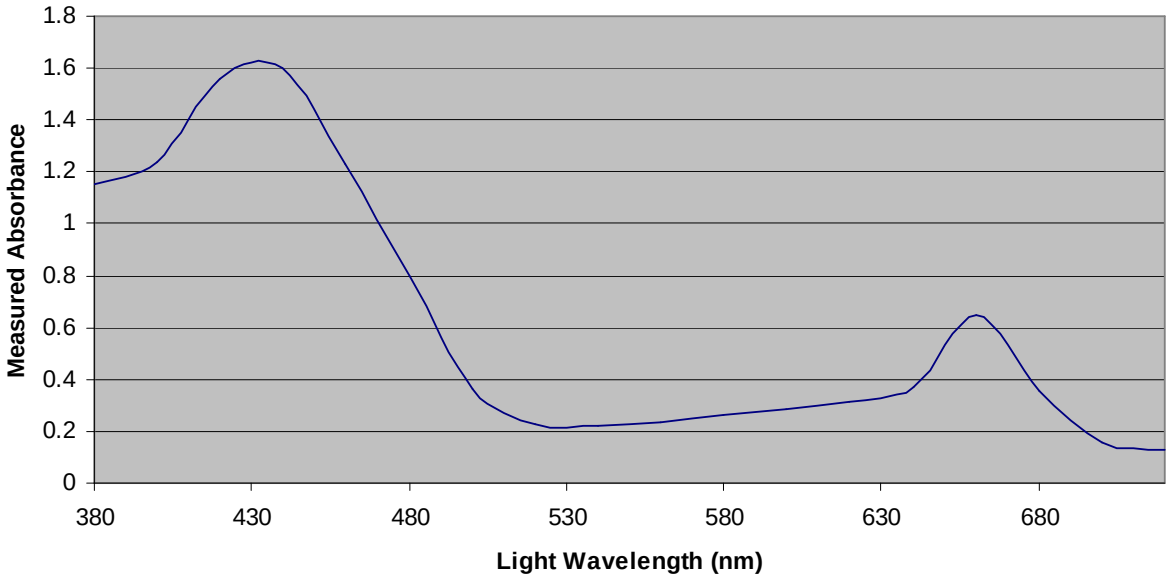
Light Wavelength Absorption of Pigments

Summary: My group and I measured light absorbance of plant pigments from the visible spectrum. We did this by using a sample of spinach leaf extract solution and taking absorption readings with a spectrophotometer. Our results show that pigments in spinach leaves absorb light mostly from two ranges: 380nm to 520nm and 640nm to 680nm, which represent blue and red light, respectively. These results are supported by the general knowledge that most plants absorb blue and red light during photosynthesis *(Raven et al., 2008)*.

Methods & Results: My group and I obtained a fresh sample of spinach leaf extract solution and poured it into a cuvette. A second cuvette was filled with acetone-water mixture and served as a blank for calibrating a Spectrophotonic 20 spectrophotometer device. We set the *dark point* by using the left hand knob and setting the machine to 0% transmittance with no cuvette in the cuvette holder. Next, we placed our blank cuvette in the machine and set the right hand knob to 100% transmittance. We then diluted our spinach leaf extract sample enough so that the machine would provide an absorbance reading of 0.8 at a 480nm wavelength.

Absorbance measurements were then taken at wavelength intervals of 20nm, beginning at 380nm and ending at 720nm. Before each measurement we "re-blanked" the device to ensure an accurate absorption reading. After graphing the values from all 18 readings from the instrument we were able to construct the following graph of data, which represents the visible spectrum and the amount of light absorption by the plants pigments for each wavelength:



Our data shows that chloroplasts in spinach leaves absorb much of the light in the blue portion of the visible spectrum, along with a smaller amount of red light. These two ranges occurred between 380nm to 520nm for blue light wavelengths and 640nm to 680nm for red light wavelengths. These results are consistent with the portions of the visible spectrum that are known to be absorbed by green plants.

References:

Raven, P. & Johnson, G. & Losos, J. & Mason, K. & Singer, S., 2008. *Biology*, 8th ed., McGraw-Hill.