



CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY

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<b>Project Title</b> The Visible Wavelengths of Light	
<b>Abstract</b> <b>Objectives/Goals</b> All light sources produce a wavelength or wavelengths of some kind. I performed many experiments to try to study the wavelengths of certain light sources. I thought that the color of the outside of the light source determined what wavelength or wavelengths were produced. <b>Methods/Materials</b> To examine the wavelengths and measure them, I built a spectrometer with a diffraction grating (A device with many grooves that splits the light.) To measure the wavelength I calculated and made a scale using the equation $m \cdot \lambda = d \cdot \sin(\theta)$ . The materials used to build the spectrometer were a piece of cardboard 11 inches long by 4 # inches wide, a yardstick, 2 razors, and a diffraction grating. 19,050 grooves per inch. I pointed the slit I had made in my set up and at a lit fluorescent cool white bulb, incandescent light bulb (Frosted White), aquarium light bulb (Clear Glass), black light bulb, and colored bulbs and L.E.D.s (Both yellow and red.) <b>Results</b> My results were that both the incandescent and aquarium bulb had the smoothest spectrum callp continuous spectra. The cool white fluorescent light had a continuous spectrum and within the continuous spectrum were two brighter bands, blue and green, called line spectra. The fluorescent full spectrum had line spectra of all the colors. The black light had purple, blue and a dim green line spectrum. With the L.E.D.#s and colored bulbs, I saw a continuous spectrum with the yellow colored bulbs and L.E.D.#s and a small red spectrum with the red colored bulbs and L.E.D.#s. <b>Conclusions/Discussion</b> This concluded that my hypothesis was right when it comes to colored bulbs. However, when it comes to cleared glass aquarium bulbs and frosted white incandescent bulbs, the color of the outside of the bulb did not have any effect on the spectrum and wavelengths produced.	
<b>Summary Statement</b> I measured the visible wavelengths of different light sources using a diffraction grating.	
<b>Help Received</b> My Father helped with explaining some of the math and building my spectrometer.	