



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Maia Singhal	Project Number J1534
Project Title Seeing Red: How Different Are the Colors of Red Laser Pointers?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I noticed that the colors of some red laser pointers were slightly different when I aimed them at a wall. However, other family members did not see any difference, so I wanted to know who was right. My experiment was to find out exactly how different the colors were by measuring the wavelength of each pointer.</p> <p>Methods/Materials I used 3 red laser pointers (wavelengths marked between 630 and 680nm on the label) and one green laser pointer (wavelength 532nm). The green pointer was my control. I used a diffraction grating to disperse the laser beam from each pointer onto a screen. By measuring the distance between the grating and the screen, as well as the distance between the dots of diffracted light on the screen, I calculated the wavelength of light from each laser pointer. For each pointer, I repeated the experiment with three gratings and three different distances between the grating and screen.</p> <p>Results The measured wavelength of the green laser pointer was within 2 nanometers of the wavelength marked on its label. That showed that my measurements were accurate. The results for the red laser pointers showed that their average wavelengths were very close--within 7 nanometers of one another.</p> <p>Conclusions/Discussion At first, I thought that because the wavelengths were so close, the colors of the red laser pointers were really the same. I found out, though, that the human eye can see differences in color when the wavelengths are only 2-4 nanometers apart. Therefore, I concluded that although the wavelengths were only 7 nm apart, that difference could be seen.</p> <p>Because I am the youngest in my family, as a future experiment I think it would be interesting to find out if the ability to see small changes in color decreases with age.</p>	
Summary Statement For my experiment I measured the color difference in 3 red laser pointers by measuring the wavelengths of their light beams.	
Help Received My dad lent me his laser pointers for the experiment and bought the meter stick and diffraction grating for me. He showed me how to use Microsoft Powerpoint and Microsoft Excel so I could do my diagrams and graphs on the computer. My mom gave suggestions on how I could make my poster clearer.	