



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Wil C. Valtakis, III	Project Number 33598
Project Title How Does Color Affect the Absorption of Single Wavelength Light Energy?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My question, as stated above, was chosen because I had seen my dad pop balloons with lasers before, and I thought it would be a great base for a science fair project. I wondered how the different colored balloons would be affected by the laser wavelengths. If the balloons are a darker color than the laser used, then the single wavelength light energy from the laser will pop the balloon quicker.</p> <p>Methods/Materials Equipment: High Powered Lasers: We used 3 lasers for the experiment. Green- 532nm wavelength- 250mW, Blue- 405nm wavelength- 1W, Red- 650nm wavelength -500mW Safety Goggles: Protect eyes from the radiation and spill from the laser beam. Laser Blocking Material: To stop the beam and enable me greater control for timing. (Carbon Wool) Balloons: Variety of balloon colors: Black, Blue, Green, Red.</p> <p>I selected 10 feet as the range for my experiment. This is the distance between the laser and the balloon. Too close, and it would be really hard to time how long it took the balloon to pop, and too far away, and it may not pop at all! To act as a blocking agent, I attached carbon wool to the back of the briefcase, so there would be time to set each balloon up to time the popping. The balloon itself was wedged on a step stool so it would remain steady. I counted down, and my dad dropped the briefcase lid to let the laser beam hit the balloon. With a stopwatch, I timed each laser pass. I decided to attempt to pop 3 balloons of each color, so I could average the time for a better understanding.</p> <p>Results My hypothesis held true, but there were some surprising results that I hadn't considered. When the laser and balloon colors matched, it took significantly longer for the balloon to absorb enough energy for it to pop. In the case of the Red laser coupled with the red balloon, it never popped, it could not absorb enough energy to pop the balloon. In the case of the Green laser and green balloon, our third trial, it burned a hole through it without popping!</p> <p>Conclusions/Discussion My conclusion is that there are more factors than just how dark the balloon is that affects how the lasers energy is absorbed. However, black balloons definitely popped consistently fast during my trials.</p>	
Summary Statement The purpose of this project was to observe the affect of laser beams on different colored balloons and how popping times were influenced, which translates to energy absorption.	
Help Received My father helped operate the high powered lasers, and my mother oversaw my research and development of my presentation as my teacher.	