



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Ryan B. Stoler</b>  | <b>Project Number</b><br><b>J1227</b> |
| <b>Project Title</b><br><b>Photodegradation of Colored Paper</b>   |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>Which light source will cause dyes to fade the most? This information can be used to determine how to display and preserve important documents, historic artifacts, priceless art, and photos.</p> <p><b>Methods/Materials</b><br/>Seven sheets of paper, each with four smaller squares of colored construction paper, were scanned using a computer and scanner. Next, six sheets were exposed for 24 hours to different light sources (incandescent bulb, sunlight, fluorescent tube, LEDs, infrared bulb, and an ultraviolet blacklight). The seventh sheet was not exposed to light. The sheets were scanned again. Two computer programs were used to measure the red, green, and blue (RGB) values of four random spots on each colored square. The differences between RGB values before and after exposure were used to determine which light sources cause the most and least fading.</p> <p><b>Results</b><br/>Sunlight caused the most fading. It had more fading than all other light sources put together. LEDs and fluorescent tubes caused the least fading.</p> <p><b>Conclusions/Discussion</b><br/>If you want to keep precious objects from fading, store them in a place without light. If lights must be used to display them, use LEDs or fluorescent lights. Keep them away from sunlight.</p> |                                       |
| <b>Summary Statement</b><br>Light energy affects dyes differently depending on the source, but which light source has the greatest effect?   |                                       |
| <b>Help Received</b><br>My father helped me set up the equipment and scan the papers. I ran the software and read the RGB values to him while he entered the data for me.  |                                       |