



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Taylor S. Pulbrook	Project Number J0329
Project Title Wheel-O-Vision	
Objectives/Goals I notice that many emergency lights and warning lights are not directly in a persons line of sight and I wanted to determine what color will yield the fastest reaction times when viewed by a person's peripheral vision.	
Abstract Methods/Materials METHOD-Qualified subjects were seated in front of a light wheel with 4 lights (blue, green, red and yellow) that were positioned to make a 60-degree angle for all 4 lights. With subject looking directly into the center of the wheel, the testor would randomly select a light on the board depress a button, which activated the light and a timer. Subject upon recognition of the light would depress a button stopping the timer. Reaction times were recorded for all 4 lights at all 4 positions (up, down, left and right)for 25 subjects. MATERIALS-Rotating circular wooden light board with 4 different colored lights of equal wattage (red, blue, green, and yellow) spaced 40 cm from the center of the wheel.1 metal chin cradle.1 hand control for the testor and 1 hand control for the subject.1 stop watch that measures to the hundredth of a second. 25 subjects between ages of 10-20.	
Results The reaction times by color were in this order (in ten thousandths of a second): Green-.2948, Yellow-.2952, Red-.2960, and Blue-.3000. The overall times by position were (in thousandths of a second): Up-.309, Down-.295, and tied for best is Left and Right-.291	
Conclusions/Discussion Green light provided the best reaction times, but the percent of difference between the best and the worst times (worst being blue as in this case) was only 1.7%. This is because of a dramatic reduction of cones as the viewed area moves further from the center of the eye (called the fovea). Time variation between colors was small, and I believe that this is because of the subject reacting more to the light than to the color. For peripheral vision the factor of color is possibly less important than the position of the light. My experiment showed that there was a more significant difference in reaction times, based on the position of the light (i.e. up, down, left and right) rather than the color of it. With position impacting reaction times more than color, I think that for maximum efficiency of emergency and warning lights, they should be placed peripherally to the left or right side, instead of above or below, to get the fastest reactions time when recognition is critical.	
Summary Statement To determine what color light provides the quickest reaction times at a persons peripheral vision.	
Help Received Ramon Fonseca for helping me put together my testing apparatus, Dr. Steve Simpson for his insight on human vision, Mr. Post for his guidance, My parents for being there to help me with my board.	