



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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Project Title Color Express	
Objectives/Goals Objective The purpose of this experiment was to find which wavelengths of light provide the strongest photovoltaic effect in a solar-powered vehicle. Methods/Materials Materials and Methods We used colored cellophane filters to isolate a specific color wavelength of light, and then exposed a solar-powered model car to this filtered light in a sealed environment. We were trying to see which of the main spectral colors (Red, Yellow, Green, Blue, Violet) would produce the highest voltage. We used a clear filter as a control. Our car used a 1-volt, 1000 RPM motor, powered by two 1-volt solar panels wired in sequence. We were originally going to test the voltage produced as a function of how fast it took the model car to travel a meter. Unfortunately, due to non-standard parts, our car could not propel itself. We tested the solar panel directly using a voltage meter because we could not measure the resultant voltage as a function of speed. Results Results We found that Red and Blue light allowed the solar panel to function at maximum strength (1-volt). We also found that Yellow, Green, and Violet light all reduced the power of the solar panel by a small amount, allowing it to produce 97-98 percent of maximum power (E.G. 0.97-0.98-volts). Surprisingly, our clear control filter resulted in the lowest power output, only 0.90-volts. Conclusions/Discussion Discussion Solar panels are made up of units called cells, which are designed to facilitate photovoltaic reactions, allowing them to produce electricity from sunlight. Sunlight, or visible light, is comprised of the colors of the rainbow, and has a wavelength range of around 400-700 nanometers. Most solar cells are low efficiency, but there are modern high-efficiency cells that are being developed. Due to this low efficiency, large amounts of cells are required to make solar energy a practical power source. Solar energy has been praised by environmentalists, due to its ability to provide a non-polluting source of electricity. Solar-powered vehicles have been in the development stages for years, but, with the present available technology, they are not an economical or convenient mode of transportation.	
Summary Statement Testing the effect of a specific wavelength of light on the energy output of a solar panel.	
Help Received	