



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Wylan R. Simpson	Project Number J0728
Project Title Is Temperature a Factor? Solar Panel Efficiency	
Objectives/Goals My project was designed to test whether the temperature of a solar panel has an effect on the voltage it produces. I believed that the greater the panel temperature, the greater the voltage it would produce.	
Abstract Methods/Materials To test my hypothesis, I used two similar solar panels. I used small test panels, about 6 cm by 5.5 cm. I heated one panel in direct sunlight, while cooling the other in the refrigerator. When the panels reached the target temperatures (7 degrees Celsius for the "cold" panel and 43 degrees Celsius for the "hot" panel) I took the panels and placed them on pegs, side-by-side in the sun. I then attached multimeters to each panel to measure voltage. Then, once every minute, I took multimeter readings and used a laser temperature reader to measure panel temperature until the panels reached equal temperature. The variance in voltage between the panels was so minute that it did not affect my results, at the most varying .03 volts. To eliminate the potential for even the smallest panel variations to affect my results, I rotated panels between tests.	
Results The cold panel consistently yielded greater voltage than the warm panel, though the difference was small. On average, from all four of my tests, every 1 degree Celsius that the temperature of the "cold" panel rose, the voltage output decreased .02 volts. This difference is so small mostly because the panels were small, never producing more than 5 volts.	
Conclusions/Discussion The lower the temperature, the better the conductivity, so greater voltage is produced. This is the exact opposite of my hypothesis. From this data, I gathered that it would be worthwhile to install a "solar panel cooler", a device to keep the panel temperature low on sunny days. This "solar panel cooler", while perhaps not efficient on small scale, one-panel arrays, could be used on large industrial arrays to great benefit.	
Summary Statement My project was designed to test if the temperature of a solar panel affects its voltage output.	
Help Received Peter Johnstone, from the Schatz Energy Laboratory, Humboldt State University, helped plan the project, provided equipment, and helped graph data with Excel. Ms. Skiles, science teacher, and my classmates provided review and critique.	