



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Reza Gheissari; Danny O'Leary	Project Number S0808
Project Title How Does Temperature Affect the Resistance of Various Resistors?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Carbon and Metal resistors are an essential building block of most electrical circuits and are expected to maintain a constant resistance in their operating temperature range. We investigated how temperature change affects the resistance of seven different resistors.</p> <p>Methods/Materials Using two Carbon Film resistors, three Carbon Composition resistors, and two Metal Oxide resistors we were able to find the resistance of these resistors between 5 and 99 degrees Celsius. The resistors were submerged in water inside a beaker and the temperature of the water was altered while the resistances were recorded with a digital ohmmeter.</p> <p>Results We found that in general the Carbon Film resistors were more sensitive to temperature changes than the Carbon Composition ones. One of the key trends in our findings was that as temperature increases from room temperature the resistance generally decreases in Carbon resistors. On the contrary, Metal oxide resistors had an increasing resistance with temperature. Below room temperature, all types of resistors generally maintained the same trend.</p> <p>Conclusions/Discussion With further review of the literature, we learned that our findings were correct and that semiconductor resistance values decrease with increasing temperature, while conductor resistors have an increasing resistance with temperature. In conclusion, resistors maintain their values within two percent in temperatures ranging from room 20 to about 30 degrees Celsius.</p>	
Summary Statement We tested how severe temperature change affects the resistances of both conductor and semiconductor resistors.	
Help Received Used Ohm Meter and Resistors given by EE department at CSULB; Performed most of the experimentation under the supervision of Dr. K.	