



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Douglas S. Duchon</b>	<b>Project Number</b> <b>S0704</b>
<b>Project Title</b> <b>The Effects of Dimensional Variations in a Resistor on an Electric Current</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My goals were to find out the properties of electric currents: volts, amperes, etc, and how their values are affected by different amounts of resistance. I sought to find out how metal rods varying in dimensions(variables A and L in $R=PL/A$ ) but not in substance or temperature(varyable P in $R=PL/A$ ) resisted electricity differntly. Overall i sought to find out if shoret wires and wires with larger cross sections resisted current more and those with smaller dimensions. <b>Methods/Materials</b> I sought to find metal rods varying in dimensions(variables A and L in $R=PL/A$ ) but not in substance or temperature(varyable P in $R=PL/A$ ). I got these in three different groups varing in the P variable: alluminum, iron, copper. I then took each rod and placed it in a current and messured the loss from the current via the metal rod. I messured the loss by percent change from the originol current. I compared the percent change of each rod to the messurements made with the other rods in its group. <b>Results</b> Eeach group showed a pattern. The longer the rod/wire the more current lost. The smaller its cross section the more current lost <b>Conclusions/Discussion</b> The results were found because the dimension variations directly change the metal's proportion of volume to surface area. The surface contains atoms carrying the current and exposing them to give off heat, via vibration, to the surounding air. Rods with larger cross sections have less surface compared with volume. Longer wires have more atoms in them subject to give off energy to the surounding air.	
<b>Summary Statement</b> The ways in which wire surfaces loose energy based on dimenional proportions.	
<b>Help Received</b> Dad bought materials needed, used given format for referring to soarces in my research report	