



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Thomas N. Gautier, IV</b>	<b>Project Number</b> <b>J0714</b>
<b>Project Title</b> <b>Electrical Conductivity of a Candle Flame</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my project was to test the electrical conductivity of a candle flame. Considering the basic structure and physics of a flame, I thought that the center darker part of the flame would be most conductive, as I believe it would contain the most unburned carbon. <b>Methods/Materials</b> An apparatus was used to hold two electrical probes a steady separation of 0.6 mm apart inside the flame. An ohm meter was used to read the resistance between the probes. Three measurement runs were made in each of ten locations in the flame. The results were recorded in the log. <b>Results</b> The resistance between the electrodes varied from 80 to several hundred megohms at different locations in the flame. The outside of the bright yellow part of the flame showed the highest conductivity and the top of the flame showed the least conductivity. <b>Conclusions/Discussion</b> My conclusion is that the dark central part with the most unburned carbon does not have the highest conductivity. I believe that the outer part of the flame had the most conductivity because it is the hottest, which makes it the easiest to ionize, allowing electricity to easily flow through it.	
<b>Summary Statement</b> I used an ohm meter and specially made probes to measure the electrical conductivity of various parts of a candle flame.	
<b>Help Received</b> Dad helped me build the aparatus, lent me his ohm meter, and helped me with 2 runs of exparament, a two person job; A friend helped me with another exparamental run; Dad also helped me put together poster.	