



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Danielle M. Gibson</b>	<b>Project Number</b> <b>S0708</b>
<b>Project Title</b> <b>A Jacob's Ladder</b>	
<b>Abstract</b> <b>Objectives/Goals</b> I wanted to test the resistance in different metals and gauges of rods to see if it affected the arc speed of a Jacob's Ladder. I wanted to find the metal as well as the gauge that would produce the fastest arc. <b>Methods/Materials</b> <ul style="list-style-type: none"><li>-Four (4) by Twelve (12) pieces of Plexiglass</li><li>- A twelve inch by twelve inch piece for the top</li><li>- Wood Base</li><li>- Neon Sign Transformer</li><li>- Wires</li><li>- Wire and Copper terminals</li><li>- Four (4) pairs of copper rods in gauges of; six, eight, ten and twelve</li><li>- Silicon Glue</li><li>- Wire Cutter</li><li>- Stop Watch</li><li>- Yard Stick</li><li>- Pliers</li><li>- Cordless Drill</li><li>- Small light bulb</li></ul> <b>Results</b> Out of the three (3) metals of brass, copper and steel, the copper rod had the least resistance and produced the fastest arc speed. The twelve gauge of the copper rod produced the fastest arc as well. <b>Conclusions/Discussion</b> I found that my hypothesis was incorrect in that the thickest gauge would produce the fastest arc. The relationship of the metal gauges, voltage and resistance showed that as voltage was constant, resistance increased with the increase in gauge size. The highest degree of difficulty in this project was getting the copper rods as straight as possible because of their malleability. The rods required meticulous adjusting because of the distance needed to provide the arc.	
<b>Summary Statement</b> My project is about how resistance in different metals and gauges of rods will affect the arc's speed rate of a Jacob's Ladder	
<b>Help Received</b> Neon sign transformer was donated by American Electric. My father provided minimal assistance.	