



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Peter Sullivan	Project Number J1322
Project Title Temperature Effects on the Resistivity of Metals	
<p style="text-align: center;">Abstract</p> <p>Objectives My objective is to see which metal type brass, bronze, copper or titanium will have the lowest electrical resistivity independent of temperature.</p> <p>Methods I first built a functional test loop to test my metals on. The test loop was made of a 6 volt battery, 16 gage wires and alligator clips to connect my battery to my metal test sample with ease, then it consisted of a bulb from a flash light and a volt meter. I then cut the metal types into 3 sample and I tested them at 20F, 70F, and 300F. This will be repeated 3 times and I will catalog my data.</p> <p>Results In was observed copper's resistivity was the lowest and had the lowest variance throughout the temperature ranges at 20F, 70F, and 300F. Brass second lowest resistivity behind copper and it performed well at all the temperature ranges. Bronze had high resistivity and through each temperature range it got worse with dramatic changes in resistivity. Titanium performed worse than bronze, even though it is a pure metal. titanium had high resistivity throughout ever temperature range.</p> <p>Conclusions In conclusion my hypothesis was correct. copper had the most electrical conductivity/ lowest resistivity independent of temperature. Copper performed within 1 standard deviation of the mean showing it had low variance. Brass, bronze, and titanium were 3 standard deviations out side of the mean. That means they are untrustworthy conductors and had lot of variance in their performance.</p>	
Summary Statement I tested how temperature affects the resisitivity of brass, bronze, copper, and titanium.	
Help Received My mom and dad helped me.	