



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Isaac H. Morgan</b>	<b>Project Number</b>  36409
<b>Project Title</b> <b>Testing Voltage Generated from Produce</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective is to determine which type of produce generates the most voltage: a lemon, a tomato, an orange, or a potato.</p> <p><b>Methods/Materials</b> Large naval oranges, lemons, potatoes, tomatoes, butter knife, AA battery, two 2" alligator clips, vice grips, voltage meter, tissue paper. Measured voltage generated by four different types of produce. Averaged the results of the tests to determine which type of produce generates the most voltage. Initially tested a AA battery to ensure that the voltage meter worked properly.</p> <p><b>Results</b> The tomatoes and the lemons generated exactly the same voltage on average to the hundredth decimal place, but that average was higher than the averages of both the potatoes and oranges.</p> <p><b>Conclusions/Discussion</b> The averages of my test results, per type of produce, indicate that the salt, water and acid content of each different type of produce have an effect on how much voltage is generated. However, since tomatoes have the highest water and salt content, but lemons have the highest level of acidity, it was inconclusive whether the salt and water content, as opposed to the level of acidity, had a larger effect on the amount of voltage generated. If a larger sample size of tomatoes and lemons was tested and resulted in a higher average of one compared to the other, there would be better data on which to base an inference about whether acidity, as opposed to water and salt content, have a larger effect in generating voltage.</p>	
<b>Summary Statement</b> I found that tomatoes and lemons generate more voltage than oranges and potatoes, which leads me to infer that the level of salt, water, and acid content in each type of produce have an effect on the amount of voltage generated.	
<b>Help Received</b> Both parents helped construct the display board and edit my writing. The superintendent of schools provided an engineer who helped with terminology, my oral presentation and display board. Val Hemingway, who has experience as an electrician, explained what voltage is.	