



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Luke A. Virsik	Project Number 35016
Project Title The Effect of Electricity on Bacterial Growth	
Objectives/Goals With the overuse of antibiotics, bacteria have developed resistance. Electricity might be useful in inhibiting bacterial growth.	
Abstract	
Methods/Materials Initial Bacterial Growth Test 1. Prepare incubator. 2. Prepare nutrient broth. Put bacteria from your arm in broth. 3. Prepare three 18, 9, and 3V battery packs. 4. Take 12 agar plates. Take 10 μL of broth and plate it. 5. Heat up a steel pin. Push into the back of an agar plate and pull it out. Push next pin into agar 30 mm from the other pin. Pull it out. Repeat on all plates. 6. Hot glue battery packs onto plates. Put steel pins into plates. Make control plates by only putting steel pins into plates. 7. Connect battery packs to pins. Incubate for 24 hours. 8. Turn off electricity. Plate 2 μL of broth on zones of inhibition. Incubate for 24 hours. 9. Rub Ph strips on zones of inhibition. 10. Repeat 1-7 with graphite instead of steel pins.	
Results Anodes had circular orange zones of inhibition around them while cathodes had circular clear ones. The average diameter of the zones of inhibition for the anode on the 18, 9, and 3 volt plates was 13.7, 14.0, and 15.0 mm. The average diameter of the zone of inhibition for the cathode on the 18, 9, and 3 volt plates was 9.7, 8.7, and 9.3 mm. Also, despite no change in pH, bacteria would not regrow on zones of inhibition. In the graphite test, the only thing that was different was that there was no orange color.	
Conclusions/Discussion I hypothesized that voltage would inhibit bacterial growth. This is incorrect. The electricity may have created anti-bacterial compounds. These compounds would be neutrally charged because there were perfect circles around the anode and cathode. I thought that the electricity was making rust. Electricity will split water into hydrogen ($\text{H}(+)$) and hydroxide ($\text{OH}(-)$). The hydroxide could have gone to the positively charged anode and formed rust ($\text{Fe}(\text{OH})(3)$). Rust has a neutral charge. I believe that hydrogen peroxide was forming at the cathode. During the electrolysis of water, hydrogen	
Summary Statement I wanted to find out how electricity effected bacterial growth.	
Help Received Parents proof read poster. Dad helped solder electrical circits together. Dad taught me about electrical circuits. Parents purchased materials	