



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Danica K. Moeller	Project Number S0909
Project Title Which Motor Works Best?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of my project is to build eight "Simple Electric Motors", and from that point to test the amount of voltage that each motor requires.</p> <p>Methods/Materials For this project the supplies needed are: a measuring tape, C-size battery, knife, magnet wire (enamel-coated, 22-gauge, approximately 75 feet), wood, wire cutters, thick copper wire (2, 6 inches long), 2 beads, battery holder (fits 4 AA batteries), 4 AA batteries, flip switch, 2 magnets, electrical wire, 4 LED lights (2 red, 2 green), sander, solder, solder iron, 2 pieces of nylon, 7 screws, drill, voltmeter, timer, and a notebook. Using these supplies, I built the motor by connecting the wiring underneath, and then setting up my display on the top. Once this was done, I could turn the motor on and test the voltage with a voltmeter.</p> <p>Results For the average voltage used I found that the 5 Winding motor used an average of 5.724 V, the 10 Winding motor used an average of 4.056 V, the 15 Winding motor used an average of 4.456 V, the 20 Winding motor used an average of 3.324 V, the 25 Winding motor used an average of 2.484 V, the 30 Winding motor used an average of 2.688 V, the 40 winding motor used an average of 2.556 V, and the 50 Winding motor used an average of 3.248 V. As a result, the 5 Winding motor required the least amount of voltage, and the 25 Winding motor required the most amount of voltage.</p> <p>Conclusions/Discussion In the end, the 5 Winding motor required the least amount of voltage. I believe that this is because it used the least amount of wire since it was wound less, and since it used less wire, there was less space for the volts to flow. I also found that the 25 Winding motor required the most voltage, rather than the 50 Winding motor. I believe that this could either be an experimental error, or because it is not too big, yet not too small, so it used the most amount of voltage. I found, however, that the bigger a motor is, the more voltage it uses, and the faster it spins. So this means, the bigger the motor, the more power it has. A few experimental errors that I could have had would be that the batteries ran out of juice often, the LED lights took away some of the power, and the Windings weren't tightly coiled enough.</p>	
Summary Statement The purpose of this project is to build eight motors, and to then test which motor, big or small, requires the highest amount of energy, or voltage.	
Help Received Mother bought me the batteries; Father helped gather supplies for building; Father showed me how to wire the board and connect everything	