



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Benjamin C. Tarr	Project Number 34194
Project Title The Effect of Different Sized and Shaped Coils on the Speed of a Motor	
Abstract Objectives/Goals The ultimate purpose of this project is to find out how to make the fastest D.C motor. Methods/Materials Materials: Windows 7 Computer Arduino uno (1) USB wire (1) Arduino programming software (1) Strip of copper wire insulated (12 ft.) Photo Resistor (1) Jumper wires (2) 9 Volt Battery (1) Copper strips with holes (2) Screws (2) Screw driver able to fit screws (1) Magnet (1) Methods: Place the magnet in the center of the block. Orient the magnet on block so that the width is smaller than the height, the height is the shorter axis of the block. (Im cutting off here to minimize character length. I can send you the whole document if you like) Results As shown in the table, the 50% circle coil enabled the motor to run fastest. All of the triangles disabled the motor to even run. The smaller 20% coils were too small to continue running at a steady pace for a long period of time. Sparks flew off the motor the coil came to a halt. The large coils were to big for the magnet and ended up stopping under one minute. With the large coils coming to a halt, the energy was able to run through the coil just like a regular wire and short the circuit. Conclusions/Discussion My question: What configuration of coil size and shape will make an electromagnetic motor run fastest? My hypothesis: If I format the coil to have the configuration of an 80% maximum width (maximum width is the absolute largest size a coil could possibly be with the ability to fit in the provided space) square, the motor will run faster than if another configuration was used. Using an arduino, I measured the rotations per minute the motor could generate. I used a photo resistor and a flashlight to calculate when the photo resistor could see light or dark wth the coil blocking the light. After I looked at the data, I found my hypothesis was incorrect. This was because the 50% circle had the fastest average (876 rpm) out of all other coils, and my hypothesis was that the 20% square would have the fastest average (625 rpm). I think the 50% circle was the fastest coil because of two reasons. Cutting off here.	
Summary Statement My project is the testing of different sized and shaped coils and seeing how that effects the overall speed of the motor.	
Help Received My mom helped me bend the coils.	