



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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Project Title ElectroMagneto	
Objectives/Goals I wanted to know whether the size of the iron core (1 nail, 2 nails, and 3 nails), the thickness of the wire (20-gauge, 22-gauge, and 26-gauge), or the number of coils (10 coils, 20 coils, and 30 coils), would have the largest effect on the strength of the electromagnet.	
Abstract	
Methods/Materials Since batteries will lose their power during the tests, the results will not be accurate. So, I used an AC adapter with an output of 9V DC 500mA. The materials I used are: three different gauges of wire, 20-gauge, 22-gauge, and 26-gauge, 12 large nails, a wire cutter, a ruler, a knife, about 200 small paper clips, electrical tape, alligator clips, a wrench, a wire stripper, pliers, and an AC adapter. I wound the wire around the nail(s) to create the magnet. I divided the magnets into three groups that would test the thickness of the wire, the number of coils, and the size of the core (number of nails). I attached the magnet to the alligator clips and plugged the AC adaptor in. Then I put the magnet in the pile of paper clips and counted how many the electromagnet picked up. I did five tests for each magnet and then found the average.	
Results These results were the averages of the five tests. In group 1, the magnet with 26-gauge wire picked up 16.4 paper clips. The 24-gauge magnet magnetized 22.2 paper clips, and the 20-gauge magnet attracted 27.8 paper clips. In group 2, the magnet with 10 coils attracted 8.6 paper clips. The magnet with 20 coils attracted 21 paper clips. The third magnet had 30 coils and picked up 35 paper clips. In group 3, the magnet with one nail picked up 21.8 paper clips. The second magnet had two nails as the core and it magnetized 25.6 paper clips. The third magnet with three nails picked up 34 paper clips.	
Conclusions/Discussion In group 1, the thickest wire was strongest. In group 2, the electromagnet with the most coils was strongest. In group 3, the magnet with the biggest core was strongest. I compared the averages in each of the separate groups. I found the percentage that the power of the electromagnet had increased by. Then, I compared the differences between the percentages with all the groups. Since the difference in power was greatest in group 2; that proved that the number of coils affected the strength of the electromagnet the most.	
Summary Statement My project is about investigating which factors affects the power of an electromagnet the most.	
Help Received My dad helped me make the power supply and attach the alligator clips to the wire.	