



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Muhammad A. Khan</b>	<b>Project Number</b> <b>J0820</b>
<b>Project Title</b> <b>Zap! Electricity Generation</b>	
<b>Objectives/Goals</b> An electric generator is a device that converts mechanical energy to electrical energy. Generators are now widely used in homes, vehicles, industries as they provide a highly reliable source of electric power. The basic principle in a generator is that a voltage is induced in the coil when a magnet is moved inside it. The objective of my project is to investigate the relationship between the number of turns in the coil and the voltage generated in the generator.	
<b>Abstract</b> <b>Methods/Materials</b> The materials I used for this project were 4 magnets, a metal rod, a frame, 4 cardboard boxes (the first box with 100 turns of magnetic wire, the 2nd box with 200 turns, the 3rd box with 300 turns and the 4th one with 400 turns), a hand drill (to rotate the magnets) and a voltmeter. First, I attached 4 magnets to the metal rod, then built a wooden frame and anchored the hand drill to it. I prepared the generator boxes, set one box connected to the voltmeter and the magnet hanging inside the generator box. I spun the magnet at a constant rate by using the hand drill and measured the voltage generated for each generator box.	
<b>Results</b> The average volts generated by the coil containing 100 turns was 0.25 V, it doubled to 0.51 V with the 200-turns coil, trebled to 0.78 V with the 300-turns coil, and increased four-fold to 1.06 V with the 400-turns coil.	
<b>Conclusions/Discussion</b> The conclusion I reached was that greater the number of turns in the coil, the greater the induced voltage and therefore, the greater the current can be in the wire (if the resistance is kept constant). When the wire around the magnet contains more turns, there are more electrons available to move around and thus more current. Hence when designing a generator, scientists can use more coils around the magnet in order to maximise the voltage induced and the current.	
<b>Summary Statement</b> The purpose of my project was to investigate the relationship between the number of turns in the coil and the voltage generated in a generator.	
<b>Help Received</b> My dad helped me get the materials and make the set-up. My mom helped me with the board and my teacher (Dr. Lian Jeeawoody) gave me advice.	