



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Ronak Pai; Gino Prasad; Dhruv Shah</b>	<b>Project Number</b> <b>J0222</b>
<b>Project Title</b> <b>Use of the Piezoelectric Effect to Generate Electricity with a Trampoline</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> During a natural disaster many homes have severe power outages that can range from days to weeks. During this time people need to charge important devices such as a cell phone. The goal of this project is to create an alternative energy source that people can use to recharge small electronic devices in a natural disaster. The design criteria were that it should be compact enough to fit in a house, and generate enough electricity to charge a cell phone in an hour. It should also be easy and fun to generate electricity using this alternative energy source.</p> <p><b>Methods/Materials</b> We looked at several alternatives for generating electricity at home. We decided on the approach of using piezoelectric disks attached to a trampoline as it met our design criteria. These piezoelectric disks generate electricity under pressure and are very convenient for generating electricity by using human body movement. The trampoline is a lot of fun to use, and using piezoelectric disks enable anyone to generate electricity simply by jumping on the trampoline.</p> <p>For our project, the equipment we used were: 4 piezoelectric disks 1 mini trampoline 4 pairs of 140 centimeter long wire 1 Multimeter 1 wire 9 centimeters long</p> <p>We attached the disks to the top of the trampoline, and connected them to a multimeter to record the voltage and current, and also connected it to a battery for storing generated electricity for use in charging a cell phone.</p> <p><b>Results</b> Using one piezoelectric disk, the electricity generated was 32.83 micro watts, and the amount of electricity generated for four piezoelectric disks was 4,949.25 microwatts.</p> <p><b>Conclusions/Discussion</b> Using the data on the amount of electricity that is generated, we used a regression chart to plot the amount of jumps it would take to charge an iPhone for 1 hour with 10 piezoelectric disks. The required number of jumps on the trampoline was 127 jumps, which is a reasonable number.</p>	
<b>Summary Statement</b> Use of the Piezoelectric Materials with a Trampoline to Convert Human Kinetic Energy to Electricity for Charging Mobile Devices	
<b>Help Received</b> Parents and team mate's parents helped guide us and point us in the right direction	