



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

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| Name(s) Michael R. Julian | Project Number J1010 |
| Project Title Renewable Energy Generation Using a Fidget Spinner | |
| Abstract Objectives/Goals My question for my science fair project was 'Can I turn mechanical energy into electrical energy using a fidget spinner?'. I recorded the voltage I was producing from my fidget spinner generator by connecting the output to an oscilloscope. From the voltage I calculated the speed of the fidget spinner. I recorded the graphs I had collected from the oscilloscope into my notebook for further analysis. | |
| Methods/Materials Create a structure to keep the fidget spinner stationary using 2 long bolts and 2 little bolts. Place 2 permanent magnets in each of the 3 fidget spinner holes using a hot glue gun. Wind as many coils in the stationary part of the fidget spinner. Put as many turns as possible to obtain maximum output voltage. Connect output to an oscilloscope to record data. Spin the fidget spinner with your finger. Download the recorded data of the voltage produced by the fidget spinner generator. Analyze the data and compute speed. Add a super capacitor and a switch to the circuit. Calculate the amount of energy in Joules being stored into the super capacitor. Graph the data. Calculate the energy in Joules required to charge a small electronic device, such as an iPod or kindle. The materials I used to test my hypotheses were a fidget spinner, 6 permanent magnets, 2 ferrite cores and miscellaneous circuit elements. | |
| Results The fidget spinner generator successfully produced 'green' electricity. The first set of experiments showed that I could turn on a LED only for a second or so, so I created a second hypothesis and a second experiment. Adding a super capacitor and a switch, I was able to store the energy I was producing from my fidget spinner into the super capacitor. Then using a switch I was able to release that energy into the LED. I observed that the LED emitted light for a longer period of time. I calculated the energy produced and compared it to the energy needed to power small electronic devices. | |
| Conclusions/Discussion In this project I attached 6 permanent magnets to the holes of a fidget spinner and I built a generator to produce electricity from spinning the fidget spinner through 2 sets of copper coils. I then proved that my first hypothesis was correct: I could turn mechanical energy into electrical energy using a permanent magnet fidget spinner. | |
| Summary Statement I was able to turn mechanical energy into electrical energy using a permanent magnet fidget spinner and then I stored the energy for future use | |
| Help Received My mother and father explained the physics of electromagnetic induction to me and helped me build my permanent magnet fidget spinner generator. | |