



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Erin M. Miller	Project Number J1522
Project Title Measuring Fruit/Veggie Batteries' Efficiency	
Objectives/Goals I read that lemons and potatoes can act as batteries and drive a small clock. I wondered what fruit or vegetable would make the best "veggie" battery? I hypothesized that the fruit/vegetable with the lowest pH level (most acidic) would perform best.	
Abstract I did 5 tests on 16 fruits and vegetables: 1) Measured pH. 2) Did the fruit/vegetable run a small clock? 5 didn't! 3) Measured the volts generated by the fruit/vegetable when not running the clock (no work). 4) Measured the volts generated when running the clock (clock volts). I compared the "no work" voltage to the "clock volts." 5) Counted the number of people holding hands (completing the circuit) before the clock no longer ran.	
Methods/Materials Of the 16 fruits/vegetables tested, the RED CHILI PEPPER won the battery contest and the BRUSSEL SPROUT lost.	
Results Strangely, some batteries like the lime, couldn't run the clock but otherwise were similar to "good" batteries. I retested the lime using a different lime. It did run the clock but it was still one of the poorer performing fruits or vegetables.	
Conclusions/Discussion Surprisingly, pH does not predict the best fruit/vegetable battery. The best veggie batteries generate more volts when they are working (running the clock), usually 0.55 volts or higher. They have less fall off in voltage when they are running the clock versus when they aren't running the clock, often declining only 0.10 - 0.15 volts. They drive more volts through a bigger "circuit", usually 13 people or longer.	
Summary Statement My project seeks to identify the "best" fruit or vegetable battery by running a series of experiments to measure efficiency.	
Help Received Mother typed part of my report and bought the produce; Father demonstrated how to use a Voltmeter; neighbor Jim Martin showed me how to make Excel charts and graphs.	