



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Hamsters Gone Green	
Abstract Objectives/Goals If the weight of a hamster is proportional to the amount of energy it can produce then we should be able to create a linear equation to use weight to predict the amount of energy each hamster can produce. We can then use the equation to determine how large a hamster or how many hamsters will be needed to power common household electrical items. Methods/Materials We connected a DC motor to a hamster wheel, which acts as a generator when the wheel is rotated. Using a resistor and computer readable voltmeter, we recorded the voltages that hamsters of different weights produced during twelve-hour trials. We converted the voltages into electrical power ($P=V^2/R$) for each trial. We graphed power vs. hamster weight to determine if there is a linear relationship. Results After testing hamsters of different weights and measuring power output and total energy output with four different dependent variables, we found that only one of the dependent variables (average power output when hamster was running) showed a good fit with a linear equation. The other three dependent variables (Peak power output, total energy output, and average power over twelve-hours) showed a poor fit with a linear equation. We expected all of our dependent variables to fit well with a linear equation, so we were surprised to only find one that did. The best fit line we found was for average power when running vs. weight: $y=10.341x+20.205$ (y is in microwatts, x is in ounces) Conclusions/Discussion Using our linear equation, we determined we would need 1,160,429 five-ounce hamsters to power a 60-watt light bulb. Therefore we found that using hamsters to generate electricity was not even close to being practical with our method. We think it is possible that there is a better way to turn the energy from the rotating exercise wheel into electricity, for example by using a different kind of generator, or by finding a way to spin the generator faster using different gears.	
Summary Statement The purpose of our project is to determine if hamsters can generate a useful amount of electrical energy and to try to find a linear equation relating energy produced vs. hamster weight.	
Help Received We had too much data to open in excel so my father helped us create a pearl script to analyze the data. He also helped us with the power tools needed to attach the DC motor to the exercise wheel and mount it in the hamster cage.	