CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Reed J.D. Williams

Project Number
31329

Project Title
A Greener Way of Drying Clothes

Abstract

Objectives/Goals
Test several ideas for drying clothes to see if they are more energy-efficient than a commercial clothes dryer.

Methods/Materials
A 142 x 122 mm piece of felt cloth weighed 5 g when dry. It was soaked with 13 g of water, then dried using five different methods: in a clothes dryer, in a vacuum chamber at room temperature, on a hot plate, on the hot plate in the vacuum chamber, and squeezing in a vise. Drying was determined by measuring the mass of the felt + water. Energy for the electrical devices was measured by multiplying the power from the PG&E power meter by the time that the device was on. Energy for squeezing in the vise was calculated from the maximum force read from a fishing scale and the distance the handle was pulled.

Results
Squeezing was the fastest and most efficient in terms of grams of water removed per joule of energy, but did not dry the felt completely. The hot plate without vacuum was the most efficient for complete drying, followed by vacuum with hot plate. Drying in vacuum alone at room temperature was stopped after three hours because little drying had occurred.

Conclusions/Discussion
Squeezing water out of cloth takes way less energy per gram of water than the heating or vacuum methods.
Removing water in its liquid state is more energy-efficient than removing it as a vapor.
The vacuum with a hot plate is a lot more energy-efficient than a clothes dryer, but is not likely to replace the dryer because it takes a long time and can only dry one piece of cloth at a time.

Summary Statement
This project is about finding a more energy-efficient way of drying clothes.

Help Received
My dad showed me how to read the PG&E power meter on the outside of our house. He helped me run the first experiments, then I took the data myself. I typed the data into Excel and graphed it. My dad showed me the equations for electrical energy (P * t) and mechanical energy (1/2 * max force * d).