CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J0206

Project Title
How to Maximize the Ability of a Solar Thermal Fluid Heater

Abstract

Objectives/Goals
My objective was to learn how I could make the most efficient solar thermal fluid heater. I predicted that using Mylar, rubbing alcohol, and a copper tube would yield the best results.

Methods/Materials
I performed 24 tests (6 for each experiment) that were each two hours long. I measured these tests every 30 minutes, while rotating the device towards the sun every 15 minutes. These 4 experiments were the control group with water in the copper tube, rubbing alcohol in the copper tube, Mylar covering the mirrors with water in the copper tube, and water in a black tube. Lastly, while doing the tests, I measured outside temperature, how sunny it was, and how windy it was.

Results
I found out that rubbing alcohol worked better then water, the black tube worked better then the copper tube, and Mylar worked better then the mirrors. Also, I concluded that in a warm environment with lots of sun, long days and little wind works best when using a solar thermal device.

Conclusions/Discussion
I conclude that liquids with low boiling points heat up the best, good heat insulators warm up the fluids the fastest, and Mylar has extremely beneficial effects on solar thermal energy using devices.

Summary Statement
My project involved finding out how to most effectively reach a maximum temperature in the solar thermal device.

Help Received
Uncle helped build device; teacher helped get formula; teacher helped me come up with experiment