CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1207

Project Title
In Hot Water: Comparing the Effectiveness of Reflective Material in Solar Ovens

Abstract

Objectives/Goals
The problem was, "How does changing the type of material used as a reflector in a solar oven affect the temperature reached in a solar oven?"
It was hypothesized that when the reflector used in the solar oven was made of Clear Dome Solar, the temperature reached would be higher than the Kirkland Aluminum Foil, Emergency Survival Blanket, Vons Heavy Duty Aluminum Foil, and Kirkland Aluminum Foil painted black. This was hypothesized because Clear Dome Solar is a professional solar oven material; it is supposed to reflect 70% of the heat. It is also the sturdiest material; when glued on the solar ovens, no wrinkles should be present, which could cause the temperature reached to go down.

Methods/Materials
A brief procedure of the experiment is as follows. Five solar ovens were made according to the directions given in the Procedure. A bowl of water sealed with cardboard and duct tape was placed in each solar oven, and they were placed outside for a period of four hours. The temperature was recorded before and after the testing period in degrees Celsius. All tests were repeated for a total of five trials.

Results
Kirkland Aluminum Foil had the highest average change in temperature, 29.3 degrees Celsius, and the highest overall temperature, 61.8 degrees Celsius. The Kirkland Aluminum Foil painted black had the lowest average change in temperature, 23 degrees Celsius. Clear Dome Solar came in fourth, with an average change in temperature of 25.9 degrees Celsius.

Conclusions/Discussion
The results did not support the hypothesis. This was unexpected because the Clear Dome Solar material is made for use in homes to reflect the sun#s energy away from homes to keep them cool in the summer. On the other hand, the Kirkland Aluminum Foil is a material that can be bought in grocery stores and its main purpose when designed was not use in solar ovens. To see the cheaper, easier to get a hold of material do better than the professional material was very surprising, and it shows that effective solar ovens can be made without a huge expense. This can help people outside the United States who have to rely on burning wood to cook their food; they can save a lot of time and effort using solar ovens. And these ovens can be inexpensive and yet effective, as shown by this experiment.

Summary Statement
This project looked into the reflectivity of different materials in solar ovens, and how they maximize the temperature water reaches in a solar oven.

Help Received
Mother bought all the materials needed for this project.