CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1236

Project Title
Putting to Test Different Materials Designed to Reduce Heat Transfer

Abstract

Objectives/Goals
The hypothesis is more heat will transfer through convection than it would through radiation and is the most important transfer method to stop. Because of this it is believed that the foam rubber and fiberglass will be better at insulating than foil. It is thought that both the foam rubber and fiberglass containers will prevent equal amounts heat because the packages stated that they both had an R-value of 3.

Methods/Materials
To test the experiment four containers were used, three were insulated with fiberglass, foam rubber, foil, and the fourth was a control. The four containers were filled with seven oz. of water and placed in a refrigerator until all of them had reached 36 degrees Fahrenheit. They were then put into a 130 degree Fahrenheit oven and the water temperature was recorded versus time. The test was repeated 6 times rotating the positions of the bottle between tests. The test results were normalized, averaged and graphed.

Results
This experiment showed the foam rubber and fiberglass insulators were the most effective of the insulators tested at reducing heat transfer. The foam rubber and fiberglass, both having a R-Value of 3 were equally good at preventing heat transfer which supports the hypothesis. The foil container performed next best. Although it was not near as good as the foam rubber or fiberglass containers, it was significantly better than the control.

Conclusions/Discussion
The idea for this experiment originally was to see which insulator would keep water coldest in the summer heat. The results of this experiment indicate fiberglass and foam rubber containers would be equally good at insulating. However, the fiberglass may not be the most logical choice. Unlike foam rubber, it is not waterproof, and would need some protection. The research shows fiberglass would not perform as well if compacted or wet. It would be interesting to see how efficient the fiberglass and foam rubber containers would perform if aided by the foil insulator.

Summary Statement
This project tests the ability of different insulators to reduce heat transfer.

Help Received
My father #Lee Swager and teacher #Mrs. Turpin for advising me; Dr. Cooper from Bakersfield College reviewed my report