CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
Chloe Brandon

Project Number
J1403

Project Title
Eco-Insulation: Environmentally Friendly Options for our Homes

Abstract

Objectives/Goals
The objective of this project was to compare the effectiveness of non-traditional recycled materials versus commercial materials as thermal insulation.

Methods/Materials
The rate of cooling of warm water was measured, when surrounded by various types of non-traditional recycled or commercial insulating materials. A metal can was filled with warm water, and placed in a cardboard box. The spaces between the can and the sides of the box were filled with the material to be tested. The temperature of the water was measured at regular intervals using a thermometer, to determine the rate at which heat was lost.

Results
The material used affected the rate at which the heated water cooled. Although one of the commercial insulation materials (which was used as a comparison baseline) kept the water the warmest for the longest time, some of the sustainable materials had very similar results. The sustainable material with the best performance was a custom blend I prepared of shredded paper and loose-fill cellulose insulation.

Conclusions/Discussion
Repeated trials showed that a non-renewable insulation option was able to keep the water the warmest. However, there were several other materials options that were almost as efficient and were also recycled and less expensive. A composite blend of commercial and recycled materials also proved to be a viable and realistic option.

Summary Statement
I tested the thermal insulation properties of several recycled materials, and found they have similar performance to standard insulation which is less sustainable and higher in cost.

Help Received
I researched how insulating materials work, and performed the measurements. My mother helped with the purchase of materials. My father helped with taking pictures while I was performing the experiments.