CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
J1526

Project Title
Insulation Value: Straw vs. Modern Insulation Methods

Abstract

Objectives/Goals
The purpose of my project is to compare straw insulation to conventional insulation types that are commonly used today, which are fiberglass and solid foam sheets. My hypothesis is that straw will provide the best insulation of the types I am testing for heat retention and sound proofing, even though it does not seem possible. In order to test my hypothesis, I have designed two tests. Both of these tests required that I build four structures each identical in size and construction, with different types of insulation. I designed and built four identical stud frame structures with an internal volume of 2.73 cubic feet, one insulated with straw, one insulated with fiberglass, one insulated with solid foam, and one with no insulation to serve as a control structure.

Methods/Materials
Experimental Method: First, I tested which insulation is the most sound proof. I tested the sound insulation by testing to see how much sound can pass through the structure with each type of insulation. I put a speaker inside each structure playing a constant sound at 100 decibels. I measured the number of decibels that came through the wall to the outside of the structure. The insulation that let the least amount of sound pass through the walls provided the best sound insulation.
Second, I tested which insulation kept the indoor temperature warmest when it is cold outside. I tested the heat retention by testing to see how quickly the inside temperature of each structure cools down when exposed to outdoor temperatures. I warmed the structure inside and out until the inside temperature was between 68 and 70 degrees, by bringing them into my house. I then moved them outside and recorded the dropping temperature inside each structure over a 12 hour period. The insulation that drops temperature the slowest and drops the least amount of degrees is the best insulation for retaining heat.

Results
In the sound test straw was the most sound proof, allowing the lowest volume of sound to come through the walls. In the temperature test it retained heat the longest, it cooled down the slowest and it had the highest ending temperature.

Conclusions/Discussion
In the two tests that I conducted straw provided the best insulation for heat retention and sound proofing, of the types that I tested.

Summary Statement
The purpose of my project is to compare straw insulation to conventional insulation types that are commonly used today, which are fiberglass and solid foam sheets.

Help Received
Father guided the building process; Mother gave advice for display