CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22435

Project Title
Assessing the Ability of Various Materials to Absorb Sound

Abstract

Objectives/Goals
The objective of my project is to determine which common insulating materials possess the best sound absorbing and sound reflective qualities. My goal was to devise a simple test apparatus that would allow a standard way for me to test different materials so that I could accomplish my objective most accurately.

Methods/Materials
I used eleven different insulating materials (not counting my control - which was no insulator at all); I used a testing chamber constructed of plastic three litre soda bottles, felt, and plastic mesh;, and I used € decibel meter. I used an audio tape recorder on which I recorded ten different sounds. I then played each of these sounds, five times each, through the chamber containing each different insulating material (and my control). The decibel meter was at the output end of the chamber, and I recorded each reading.

Results
I found that different insulating materials had different sound absorbing/reflective qualities. I found that€ one of the best sound absorbers was common ceiling insulation of the type that is sprayed into the ceilings or ordinary homes. I also found that different types of sounds, even played at the same volume, produced different results with different materials.

Conclusions/Discussion
I found that my original hypothesis - that materials of a lighter, less dense, nature would absorb sounds less effectively -- was true. My second hypothesis - that sounds of a lower pitch would be absorbed by the materials much more than sounds of a higher pitch were not entirely correct. The lower, deeper sounds were not absorbed as well as I expected.

Summary Statement
Testing the sound absorbtion qualities of various insulating materials.

Help Received
My parents and sister helped me in obtaing the raw materials and sound, and collecting the data.