CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

J1315

Project Title

A Study of Decibel Reduction as Sound Passes through Common Materials

Abstract

Objectives/Goals

My objectives and goals for my project was to find out which practical material would soundproof a room the best. Another goal that I was testing was to see if certain materials can soundproof better at certain frequencies. My hypothesis is based on the fact that absorption materials are most commonly used by building contractors, also insulation is used in walls, and some insulation is specifically used to soundproof a room. This led me to my prediction that fiberglass insulation will soundproof a room the best in my project.

Methods/Materials

My materials used were as follows: a computer w/internet and Bluetooth, an iPad, microphone, Bluetooth speaker, carpet tape, power saw, power drill, 24 screws, eight 11x11 ½ in. wood (for boxes), and all of my testing materials ½ in. depth, 12x12 in.: Particle board, Plywood, Sheet rock, Carpet pad, Fiberglass insulation, and glass.

My methods: I first made two boxes closed on all sides except one side for each box. Then I downloaded an app on my computer which would allow me to connect a microphone to my computer and find how many decibels are being read at that point for each frequency. I also downloaded test tone files on my iPad. With my Bluetooth speaker in one box and the microphone in the other box, I started my testing. I tested each material five time each for the following frequencies: 100 Hz, 250 Hz, 1kHz, and 10kHz. Additionally, I tested each without any material for my control.

Results

Glass performed best at all frequencies except 10 kHz where particle board performed the best. Insulation did the worse at all frequencies except 100 Hz where plywood blocked the least amount of sound. Although glass performed the best all-around particle board and sheet rock also did well at soundproofing a room.

Conclusions/Discussion

These results in fact were completely against my hypothesis and prediction which stated that insulation would block the most sound and in fact as a whole insulation seemed to do the worse at blocking sound. But also as a whole glass in fact did the best at soundproofing a room. However glass would not be used to fully make a room, mainly only windows, so the best way to cheaply make a house that would be moderately soundproof would probably be to make it out of particle board.

Summary Statement

A study of decibel reduction as sound passes through common materials.

Help Received

Dad helped me build materials like boxes; Step dad helped me find needed applications and was there during the actual experiment to give certain guidance and also helped me on my board; Teacher, Mr. Hobbs, helped me in the writing portion of the project.