CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
J1302

Project Title
Super Sound Killer

Abstract

Objectives/Goals
The purpose of this project is to help people insulate sound and reduce noises affecting their neighbors. Many people in the world have experienced annoying loud noises, which interfere with daily activities such as studying and sleeping. I wanted to show people that there is a way to reduce and control the noise in their environment using available household materials for sound insulation. At the same time, I wanted to find which material was the best at insulating sound. I believe the findings of my study will help people design buildings where sound reduction is needed, including libraries and hospitals.

Methods/Materials
In my experiment I used many materials including fiberglass, foam, pinewood, plywood, drywall, and bubble wrap. I took two 1 inch PVC pipes and put insulators between them (I made sure all the insulators were the same thickness). I tested each material 4 times and made sure the room decibel level was 50 dBs at all times. Then I generated 3 different frequencies from one cell phone. I recorded the highest, yet most stable decibel reading from the other phones, using a frequency generator and decibel meter application on an android phone.

Results
Based on my findings, foam was the best insulator throughout all the trials. In the trials with the frequency level at 440 Hz, the average for foam was 51.75 dB. Fiberglass's average was also 51.75 dB. For the 990 Hz trials, foam was the best insulator, giving an average of 53.25 dB. Fiberglass was way off, averaging at 59.75 dB. In the 1031 Hz trials, foam's average was 58.75 dB. Fiberglass's average was a whopping 88 dB. Foam definitely beat Fiberglass by a wide margin and beat the rest of the insulators.

Conclusions/Discussion
I thought the fibers would be able to absorb most of the sound. My hypothesis was completely wrong. I was surprised that the foam beat the fiberglass. The foam, followed by pinewood, beat the fiberglass by a wide margin. I had not anticipated the foam to come as the better insulator nor had I anticipated that the fiberglass would be such a poor insulator. I also had not expected that the pinewood would be a good insulator. I assumed that since it was like wood, it would not be able to reduce the sound. I was completely wrong; fiberglass is one of the worst insulators based on my findings.

Summary Statement
The purpose of this project is to help people insulate loud sounds using inexpensively available household materials.

Help Received
Teacher helped conduct experiment. Sister helped arrange board.