



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Michelle A. Karpishin	Project Number J1510
Project Title Investigation of Sound Transmission of Variable Frequencies through Materials of Variable Densities	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project investigated how different frequencies were transmitted through different materials. Noise reduction is important in building materials and also for worker exposure since excessive noise may impair a human's hearing or put stress on the heart and other important organs. I think these experiments may help architects around the world make buildings that will absorb sounds, such as walls in an apartment.</p> <p>Methods/Materials Five tuning forks of different frequencies were recorded for the experiments so that volumes of each would be identical for all of the tests. With different materials between a speaker and a microphone, I measured the volume of the recorded frequencies by using a computer attached to the microphone. Solids were the materials being investigated in this study, except for one liquid, which is water. All of the materials tested were of approximately the same thickness but were chosen for their different densities, which I measured.</p> <p>Results The results demonstrated that the densities affected the sound transmission, however not in a consistent way. The brick and the wood materials were most effective at reducing the volume of all the frequencies. The frequency of the sound makes a big difference also, since the middle frequency transmitted through most of the materials with the loudest volume, while the lower and higher frequencies did not transmit as well.</p> <p>Conclusions/Discussion My results demonstrate that, depending on the specific sounds, you would need specific materials to reduce noise effectively. These experiments could benefit society in the future because the builders could make homes and businesses more sound-proof. Knowledge about sound travel is also helpful in understanding animal communication.</p>	
Summary Statement This project investigated how different frequencies of sound were transmitted through different materials.	
Help Received Father helped set up computer and microphone and showed me how to calculate densities; mother helped with getting research materials.	