



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Stephen J. Wandro</b>	<b>Project Number</b> <b>J1143</b>
<b>Project Title</b> <b>Sound Barriers</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Can I set up an experiment to see what household materials would make better sound barriers against different frequency notes?</p> <p><b>Methods/Materials</b> I build a 2ft. wide by 2ft. deep by 1ft. tall box out of wood and drywall, kind of like a little room. I left one wall open to use for testing the different sound-blocking materials. Inside the box I placed three computer speakers attached to electric piano keyboard. The sound meter was placed outside the box to test the effect of the barriers on three notes covering most of the hearing range. The insulation materials tested were: plastic garbage bags, fiber glass (R13), egg cartons, bath towels, cement bricks, and dry wall.</p> <p><b>Results</b> The results of the experiments show that plastic trash bags were the worst at blocking sound and the drywall with bricks was the best at blocking sound. Most of the materials blocked the high notes better than the low and middle notes.</p> <p><b>Conclusions/Discussion</b> In this experiment I learned that different materials have different effects on the sound levels for the three frequency notes I tested. My hypothesis was that the heavier materials will be better sound barriers. I proved this to be true. The experiments where the heavy materials were used such as the drywall, bricks, and drywall and bricks or towels, reduced the sound the most. As my hypothesis stated, the heaviest materials performed the best. The lighter materials hardly reduced the sound at all. The plastic trash bags reduce the noise level by 1 or less decibels.</p> <p>I could improve my project if I tested more materials, if I had better equipment and if I had better controls on the conditions. I would like to test not only household materials but materials such as metal, glass, water, and a vacuum (like in outer space). I tried to test water but it was too hard to work with. Better equipment would have increased the accuracy of my tests. I had gaps in the box, background sound, and the keyboard wouldn't stay at a constant sound level. Even with all these problems, I was still able to see that the heavier materials were much better insulators that the lighter materials.</p>	
<b>Summary Statement</b> I tested household materials to see which would provide the best sound barrier.	
<b>Help Received</b> My dad helped me build a wooden box for testing the materials.	