



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Samuel J. Smith	Project Number J0239
Project Title Which Material Will Most Efficiently Reflect Sound?	
Abstract Objectives/Goals The objective of my project was to determine which types of surfaces (materials) would most efficiently reflect sound volume, as measured by a decibel meter. I believe that metal siding will most efficiently reflect sound. Methods/Materials I used the following type of materials for my surfaces: wood, metal, brick and stucco. Before testing, a pattern was measured and marked in front of each material. The pattern went from 10 feet to 40 feet directly behind the materials and along a 45 degree angle to 40 feet. A stereo with a constant sound was placed facing the material, 5 feet away and 6 inches off the ground. To make the ground surface constant a piece of carpet was placed between the material and stereo. Foam insulation panels were used to stop sound coming from the back of the stereo, another panel was used behind the decibel meter to limit background noise. Testing was done 20 times at each material and in each position. Used an average for results. Results My results conclude metal siding was the most reflective in all but two cases. One case was at 40 feet directly behind the material - brick was the most reflective. The second case was when brick was tested 30 feet behind the material and 30 feet along a 45 degree angle. The wood material was the least reflective in all cases except for one. The test on 10 feet behind the material and 10 feet along a 45 degree angle was stucco which was the least reflective. Conclusions/Discussion My objective was correct in most cases. Metal surfaces will on average reflect the highest percentage of the original input of sound. In most cases wood consistently reflected the least amount of sound. I believe the reason for the certain uprise in the decibel level for the bricks is like when Mount St. Helen's blew its top, the people closest to the mountain didn't hear it blow up as loud as the people farther away from the mountain. From my testing I learned sound doesn't travel in a straight line, it travels in a wave like the ocean. After completing this project I have a better understanding of how to setup the speakers on our schools sound system.	
Summary Statement How well will sound reflect using various wall surfaces at predetermined distances?	
Help Received parents-helped board layout and title; Music Director-loaned constant sound meter; Sound Stage spent time talking to me; Science Teacher-helped with title.	