



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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| Name(s) Charlie Hankin; Matt Munther | Project Number J1512 |
| Project Title Can You Hear It Now? Estimating the Speed of Sound through Air | |
| Abstract | |
| Objectives/Goals The objective was to estimate the speed of sound through air, and to determine if temperature and air density impacts the speed. | |
| Methods/Materials Using a stopwatch, we measured the time it took for a loud sound (two blocks of wood banged together) to reach the human ear at seven different distances: 100, 150, 200, 250, 300, 350, and 400 meters. We conducted our experiment on three different days with different temperatures and conditions, and used the true speed of sound at different temperatures to analyze our results. For each day, we plotted the different trials we had recorded as time against distance, and fit a linear regression with the reciprocal of the slope equaling distance against time (in meters per second). | |
| Results On the first day, which was overcast, humid, and had a temperature of 18 degrees centigrade, we estimated the speed at 346.4 meters per second. On the second day, which was also overcast and humid but had a temperature of 15 degrees centigrade, we estimated the speed of sound at 346.5 meters per second. On the third day, our estimated speed was 324.6 meters per second at 13 degrees centigrade in dry and sunny conditions. | |
| Conclusions/Discussion Our results confirmed that sound travels at approximately 344 meters per second through air at 20 degrees centigrade, but our measurements were not precise enough to see a definite change with temperature and air density. According to our research, as the temperature increases, so does the speed of sound. Also, our experiment verified that sound travels slightly faster through moist air than dry air (as we learned in our research). Although our project was only partly successful, we proved that a person does not need electronic measuring equipment to estimate the speed of sound. | |
| Summary Statement Using simple materials (blocks of wood and a stopwatch), we estimated the speed of sound through air. | |
| Help Received My dad participated in collecting the data for this project and helped fit linear regressions for our graphs. | |