CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1603

Project Title
The Speed of Sound

Abstract

Objectives/Goals
I want to find out if the frequency of a sound wave affect the wavelength or speed of that sound wave.

Methods/Materials
First, I put three tones with different frequencies: 400Hz, 500Hz and 600Hz onto my laptop. I hooked up two microphones to an oscilloscope, a device that measures voltage, and placed it with the laptop on a long workbench. Then, I put down a meter stick going across the workbench, with the laptop#s speakers at one end. I put the two microphones facing the laptop speakers, aligned with the meter stick. I played one of the tones, and looked at the screen of the oscilloscope. The screen would show two, identical waves moving together. The vibrations of the air would have moved the magnets in the microphones together, making a similar voltage pattern in the wires reacting to the moving magnet. I would move one of the microphones further and further away from it, until the waves, matched again. The distance between the two microphones was the wavelength, the length of one cycle in the wave. I would repeat this for the other tones with different frequencies, and multiply each wavelength with its frequency to get its speed.

Results
When I did the experiment with the 400Hz tone, my average wavelength was 88 2/3 cm, and my average measured speed was 354 2/3 m/s. When I recorded the wavelength I found using the 500Hz tone, I got an average wavelength of 88 cm and and average speed of 440 m/s. When I repeated the experiment with 600Hz, I got an average wavelength of 70.4 cm and an average speed of 422.4 m/s

Conclusions/Discussion
The results of my experiment were not as a accurate as I would have hoped, and it did not support my hypothesis much. My calculated speed of sound changed from trial to trail, and also changed with the frequency of the tone used. The higher frequency tones were much less accurate than the lower ones. However, as the frequency of the tone increased, the measured wavelength decreased. This helped support my original hypothesis.

Summary Statement
I tried to find out if the frequency of a sound wave affected the wavelength or the speed of that wave.

Help Received
Brother helped with project idea; Father helped with equipment