CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
S1813

Project Title
Allô? Is Anyone on the String?

Abstract

Objectives/Goals
I wanted to test my following hypothesis: Sound does travel fast through air, but it can travel as fast through the string. The length will not change the velocity, but the tension will. The larger the tension, the faster the sound will travel through the string.

Methods/Materials
In this project, I used a laptop with the LoggerPro software (v.3.8.5.1), four supports, two plastic cups, two microphones (Vernier), a nylon string, an analog function generator (ranging from 0.5Hz to 5MHz), a loudspeaker (Eisco), a pulley, a set of weights, a Vernier LabPro, electrical wires, plastic musical tubes, a Dual-Range Force Sensor (Vernier), and a small platform.

For my experiment, I found the frequency at which each tube, which corresponded to a musical note, resonated the most. I set up the same experiment for a string telephone. I varied the tension and measured the resonance frequency and the wave velocity on the string. Then, I varied the length, and measured the resonance frequency and the wave velocity on the string. I finally proceeded to plot my data into graphs on Excel and analyze them.

Results
By varying the tension, I found that the velocity augmented as the tension augmented. At about 7.5N, the velocity is 314m/s, which is 26m/s away from the velocity of the sound. In addition, when varying the length at a constant tension, I always obtained the same velocity. So, the tension applied did vary the velocity, but the length of the nylon string did not.

Conclusions/Discussion
In conclusion, my hypothesis is correct. From this, I gathered that sound can travel as fast through the string as through the air.

Summary Statement
Can the speed of sound through the string come close to the speed of sound through air?

Help Received