CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)
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Project Number
S1721

Project Title
Flute Frequencies

Abstract

Objectives/Goals
This experiment aimed to discover more about the nuances of flute playing. I am a flute player and wanted to find new ways to control the sound produced by the flute. I chose to look at the relationship between the angle of air into the flute has with the purity of frequency, which I observed as the different number of harmonics present.

Methods/Materials
Flute, airstream, Logger Pro equipment, protractor
Tested relationship between angle and purity of frequency by controlling the angle of air into a flute and measuring the resulting frequencies. Logger Pro equipment was utilized to collect the frequency data, and the number of frequencies and the amplitudes of these frequencies was collected for each different angle to determine the purity of frequency.

Results
The evidence supported the hypothesis and showed a trend of an increased angle resulting in a decrease in purity of frequency. These results are useful to flute playing because they show that the number of harmonics present can be controlled.

Conclusions/Discussion
Angle of air into the flute does have an effect on the resulting frequencies. The results are useful for controlling flute sound but might not be applicable to flute playing because this experiment did not evaluate the overall sound and tone of the flute, only the purity of frequency. From a musical perspective, the overall sound produced by the flute is the most important aspect of flute playing, and from this experiment I discovered that the best tone quality and the purity of frequency do not correlate. Further experiments could be performed to explore other factors that contribute to an ideal flute sound

Summary Statement
I investigated the relationship between the angle of air into a flute and the resulting purity of frequencies (measured by harmonics present).

Help Received
My Physics teacher, Mr. Fabini, helped me to form my project idea and research and provided me with the Logger Pro equipment.