CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
Yusuf A. Usman

Project Number
J1821

Project Title
How To: Breaking the Fire Barrier

Abstract

Objectives/Goals
The objective of this study is to find out what range of frequencies paired with which decibel counts extinguish a fire of a given flame the fastest, and most efficiently.

Methods/Materials
Subwoofer, timer, ruler, frequency generator, and decibel meter. Measured the decibel output of the subwoofer, which was connected to the frequency generator, the flame height of the lighter, and timed how long it took to extinguish the flame.

Results
After different flame heights, frequencies, and decibel counts were tested, the results showed that 40 Hz worked the best followed by 35 Hz, 30 Hz, 25 Hz, then 20 Hz which didn't extinguish anything. These frequencies were most efficient paired with the higher experimented decibel count of 94.1 dB. The results were the same for a flame height of 1 cm and 2 cm.

Conclusions/Discussion
After the tests were completed, it was concluded that the best frequencies to use to extinguish a fire are between 30 and 40 Hz. It is also the most efficient to extinguish the fire from a distance of 1 cm or less with a high decibel count because the higher the decibel count, the faster the flame gets extinguished.

Summary Statement
I identified the most efficient ranges of frequencies and decibel counts to use when extinguishing a flame at a given height.

Help Received
My mentor, Ms. Najwan Naserelddin, helped develop my understanding of sound physics.