



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Chad W. Spalinger	Project Number S1926
Project Title Fighting Fire with Sound	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of the project was to determine if sound waves can extinguish a flame from a candle, what the optimal frequency and amplitude is to put the flame out, and how the distance between the flame and the sound source affects the sound level.</p> <p>Methods/Materials A cupcake with a birthday candle and a twelve-inch subwoofer were placed in an empty fish tank. The candle was lit, and a decibel meter was placed a few inches away from the subwoofer to record the sound level. A tone generator program was used on a laptop that was connected to a receiver, which was connected to the subwoofer. Tests were run in increments of 10Hz from 0-100Hz. The flame was placed at various distances from the subwoofer to find the shortest and most efficient location for the subwoofer to extinguish it. The flame was then placed in the back of the tank, twenty-one inches away from the subwoofer, and tested again.</p> <p>Results A frequency range of 40-50Hz and amplitude range of 115-126dB were optimal ranges to extinguish the flame. Six inches from the subwoofer was the shortest and most effective distance for the flame to be extinguished. Higher amplitudes had to be used in order for higher frequencies to put out the fire. The amplitude was higher when the candle was placed farther away from the subwoofer.</p> <p>Conclusions/Discussion I proved my hypothesis correct except for my statement: the closer the candle is to the subwoofer, the easier it is to extinguish. The flame had to be a certain distance away in order for the sound waves to effectively put it out. This science project is can be a beneficial engineering tool in fields of transportation and communication. Subwoofers can be installed in electrical control panels and be able to detect any fire within a reachable distance. The sound waves can successfully extinguish the flame without having to destroy the control panel with water.</p>	
Summary Statement My project is about using sound waves to extinguish fire and relating the difference between distance and sound level.	
Help Received Brother lent me his sound system. Mother helped supply me with the materials needed.	