CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
Abigail D.S. Shulman

Project Number
J0922

Project Title
The Journey of Sound

Abstract

Objectives/Goals
The project was test how different liquids change sound energy into electrical energy. It was thought that the liquid with the highest acidity levels would produce the highest volumes in the speaker attached to the circuit, and that milk would produce no sound.

Methods/Materials
Five liquids (vinegar, water, lemon juice, cola, and water) were poured into a metal bowl attached to a circuit. A speaker was also attached to the circuit. A vibrating tuning fork was lowered parallel into the liquid, so that it barely touched the surface. One of the prongs of the tuning fork vibrated in and out of the liquid, disrupting the current. Due to this fluctuating current, the sound exiting the speaker was the exact hum of the tuning fork. The sound that exited the speaker was amplified, and then measured through a sound meter. The tuning fork was lowered into each liquid ten times for each trial. The volume of each hum was averaged.

Results
Results: The hypothesis was refuted. In order from highest to lowest volume: milk, lemon juice, vinegar, cola, water. The water did not produce any sound audible to the human ear.

Conclusions/Discussion
The conclusion is that electrical conductance depends on the number of ions in the liquid, not whether the liquid is acidic or basic. The strength of the acid is a major part in determining how electrically conductive it is. The milk (which was souring slightly) produced the loudest tone in the speaker because it had the most ions to carry the electrons that made up the current.

Summary Statement
The purpose of the experiment was to test how different liquids contributed to transferring sound energy into electrical energy through a circuit.

Help Received
My uncle set up a microphone and amplifier to enable me to measure the very low decibel level. My grandparents helped explain things to me and buy materials.