



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

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<b>Project Title</b> <b>Do You Hear What I Hear? Does the Frequency or Amplitude of a Sound Change through Materials of Varying Densities?</b>	
<b>Objectives/Goals</b> The objective was to determine whether the frequency or amplitude of a sound changed when traveling through liquids of varying densities. <b>Methods/Materials</b> Use Jello-O, cooking oil, water, air, corn syrup, dish soap, and sand for the mediums being tested. (The rest of the materials are mentioned below.) Put a microphone inside the balloon and tie the rubber band around the neck of the balloon. Hold the microphone on the iPad up to one of the bags of the material. Put the microphone in the balloon inside the material you are testing. Begin playing the sound and recording it on Audacity. Repeat this at least five times with each material and frequency. <b>Results</b> The frequency did not change at all. At the beginning, the amplitude and frequency seemed to be two variables that were independent of each other, but it turned out that they affected each other. Relative to air, lower frequencies caused loud sounds and higher frequencies caused quieter sounds. <b>Conclusions/Discussion</b> A computer coding program called R was used to create graphs (both of regular and normalized data). The amplitude of a sound did not significantly change through different materials. Instead, at lower frequencies, the amplitude was higher (the sound was louder), and at higher frequencies, the amplitude was lower (the sound was quieter). This was probably because there was less power going through medium at higher frequencies (decibels are a measure of the wave's power).	
<b>Summary Statement</b> Although frequency does not change, the amplitude of a monotone sound does not change as much at lower frequencies compared to higher frequencies (in solids and liquids).	
<b>Help Received</b> Dad helped with R coding	