



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

<b>Name(s)</b> <b>Kevin A. Tavangari</b>	<b>Project Number</b> <b>J1320</b>
<b>Project Title</b> <b>String-Cup Telephones</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of my project was to determine the best combination of string and cup materials and thread or wire length used in creating a String-Cup Telephone, also known as a Tin Can Telephone, would result in the greatest output volume.</p> <p><b>Methods/Materials</b> Aluminum cans, plastic cups, and paper cups were three conventional cup materials I used in the project. I tested 5 and 10 meter lengths of steel floral wire and 100% cotton thread as the string materials. To perform my experiment, I used a computer installed with a software that generated different frequency tones which was connected to an speaker as the output for the different tones, at 196 Hz and 392 Hz. I placed one end of the constructed String-Cup Telephone (there was a total of 12 possible combinations) one centimeter away from the speaker, secured to the ground. The opposite cup of the telephone contained a microphone placed 3.5 centimeters inside the cup, which was connected to another computer installed with a software that recorded sound using the external microphone and plotted the volume levels in Decibels, which I later converted to Sound Pressure Level (SPL), which is the deviation of the sound pressure from the atmospheric pressure. Each test measured ten seconds of data for each of the 12 combinations, and for each low and high frequency, which were all tested three times. The highest Decibel level throughout the ten second recording was documented and converted to Pascals.</p> <p><b>Results</b> The 5-meter length of cotton thread combined with an aluminum can created the greatest low-pitched output volume, at an average .1867 Pascals, or Newtons per meters squared. The 10-meter length of cotton thread combined with an aluminum can created the greatest high-pitched output volume, at an average .2018 Pa.</p> <p><b>Conclusions/Discussion</b> The experiment data suggests that on average, cotton thread combined with an aluminum can generates the greatest output volume. My hypothesis stated that an aluminum can combined with 5 meters of steel wire would create the greatest volume. The hypothesis was partially incorrect. Essentially, aluminum cans were the most effective, and plastic cups the least. 5 meters of cotton thread combined with a plastic cup with a high frequency tone had the overall lowest output volume of all, and the opposite with 10 meters of cotton thread combined with an aluminum can transmitting a high frequency tone.</p>	
<b>Summary Statement</b> The Testing Of Which Combination Of String And Cup Materials And String Length Will Create The Greatest Output Volume In A String-Cup Telephone.	
<b>Help Received</b> Sister helped play tones across the room.	