



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Annabel J. Yates</b>	<b>Project Number</b> <b>J1633</b>
<b>Project Title</b> <b>Good Vibrations</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of the experiment is to figure out whether changing the depth of the experimental xylophone's keys, when compared to the control xylophone's keys which were thicker, shows a difference in the pitch, or frequency between the two xylophones. This was beneficial to me because being a musician, I was interested in how the instruments I play everyday work and the science behind them.</p> <p><b>Methods/Materials</b> In my experiment, the lengths and the widths were kept constant, while the experimental xylophone's depth was half of the control xylophone's depth. Both of the instruments were made out of walnut wood and screwed onto hardwood frames on top of felt pads. To measure the pitch of the xylophones, I used a Korg Chromatic Tuner, which was more accurate than by ear.</p> <p><b>Results</b> The results proved that the hypothesis was correct, and changing the depth also changes the pitch of each bar on the xylophone. For example, the results for Bar 8 on the experimental xylophone was Eb-311.1Hz, compared to the results for Bar 8 on the control xylophone, which was C- 523.2Hz. The pitch on the experimental xylophone was also an octave lower than the control xylophone.</p> <p><b>Conclusions/Discussion</b> The major finding in Good Vibrations was that sound travels faster through solid objects. This is shown by the fact that the control xylophone has higher frequencies than the experimental xylophone because sound travels through the wood at a number of faster vibrations, thus causing a higher note to be produced. The sound takes an equal amount of time to get through either instrument, so the vibrations in the control xylophone move faster in order to do this. The faster a note vibrates, the higher the pitch of the note will be. The frequencies of the keys on the experimental and control xylophones differ because of the speed the sound waves have to travel through the bars.</p>	
<b>Summary Statement</b> In my project, two xylophones made with different depths, the pitches were compared, and it was found that the changes in depth also changed the pitch.	
<b>Help Received</b> Father helped with supervision of power tools.	