



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Rachel E. Brown</b>	<b>Project Number</b> <b>J1507</b>
<b>Project Title</b> <b>Catch a Wave: Choosing the Right Soundboard</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Soundboards used in stringed instruments are pieces of wood that enhance the sound of the notes played. Does the type of wood used for the board affect the way the notes sound? Does wood density, thickness, size or any other identifiable factor act as the source of the enhancement? <b>Methods/Materials</b> The researcher constructed eight soundboards using tuning pegs and guitar strings on different types of wood. She used an oscilloscope to capture the wave. Then she copied and saved the wave which was then converted using the Fourier Transform. Each board was tested five to ten times with comparisons made of data that was generated. Wood density was also calculated. <b>Results</b> The harmonics generated had a clear connection to the density of the wood used in the board. An example of this is that walnut, one of the densest boards, had harmonics that were not very supportive of the fundamental tone. The absence of supportive tones contributes to a clearer, better qualitative tone. The cedar fence board was the least dense and the harmonics were very supportive. Its qualitative sound was judged least pleasing. <b>Conclusions/Discussion</b> The denser boards had a better qualitative sound. The walnut board was one of the densest and had the best sound. The cedar fence board was the least dense and had the worst sound. Also the boards had to have tight grain. The composite board was the densest board and sounded the worst because it had no grain. The pine board had tight grain but was not dense so therefore it did not sound good. Also, if the board is enlarged, the note will sound better than when the board was small.	
<b>Summary Statement</b> My project is testing if the type of wood used for sound boards influences what the note sounds like.	
<b>Help Received</b> My dad helped write a program to analyze data and helped construct the sound boards.	