



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title
Which Diameter String Has the Purest Tone?

Abstract

Objectives/Goals
My objective to to discover which set of violin strings will create the purest tone. I will test three different sets of strings, each set is a different diameter to try and prove my hypothesis that the thinner diameter strings will create the purest tone.

Methods/Materials
The most important and main part of my project is the string sets and different size strings because each string has a unique sound and creates a different no mater what diameter.
Materials: String sets E,A,D,G; online ocilliscopes; Zelscope; Raven 1.0; 4/4 size violin; 4/4 size violin bow; Electric tuner; Computer.
Method(steps): 1.Put soft set on violin; 2.Electronically tune; 3.Test on ocilliscopes; 4.Record results; 5.Put medium set on violin; 6.Electronically tune; 7.Test on ocilliscopes; 8.Record results; 9.Put orchestra set on violin; 10.Electronically tune; 11.Test on ocilliscopes; 12.Record results; 13.Take all three test results and graph them; 14.Make your conclusion.
Tip
Remove strings one at a time.
Never take all four off at once or else the bridge might fall off.

Results
For my results of my experiment, the orchestra set had the purest tone. If I were to demonstrate this to you I would use a household item such as a rubber band. A rubber hand is so similar to the orchestra set you can just pluck it and hear a very pure tone. The reason why the orchestra set is the purest is because the stings are of thicker diameter. For the orchestra set,the results of E,A,D,G are on my poster board. The results for E string soft is 661.1 HZ at its top peak,the A string soft was 435.0 HZ at its peak, the D string has a frequency of 292.9 HZ at its peak. The last string is the G string which had a peak of 395.3 HZ. After testing the soft set of strings, I moved on to the medium set. The medium set results are as follows. The E string peak was 1320.7 HZ. The A string peak was 657.5 HZ, the D string was 289.2 HZ and the G string frequency peak was 385.1 HZ.

Conclusions/Discussion
After testing, I have come to the conclusion that the orchestra set, the 0.014 mms set has the purest tone. From the evidence I have and from the tools that I have it is clear that my hypothesis was clearly wrong. My hypothesis was that the soft or thinnest diameter string would create the purest tone, From my graph you can see the evidence of my investigation.

Summary Statement
Which set of violin strings, (diameter) soft 0.012mm, nedium 0.013mm or orchestra 0.014 mm creates the purest tone.

Help Received
George Lambadakis (friend and electrical engineer) taught me to use and read ocilliscopes.