



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Stewart H. Wirick	Project Number J1917
Project Title Will a Guitar String Vibrate Forever in the Vacuum of Space?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Of the three factors that stop a guitar string from vibrating, air resistance, absorption by the guitar, and absorption by the strings, the purpose of my experiment is to determine the importance of air resistance. My hypothesis is that in a vacuum, a guitar string will vibrate much longer than in regular air conditions.</p> <p>Methods/Materials I built a vacuum chamber and special electric guitar that fit into the chamber. The design of my experiment was first to pluck a thick guitar string, and a thin guitar string under normal air conditions, and measure how long the string vibrated by connecting the guitar pickup to a computer. I then created a vacuum in the chamber, and plucked again, measuring how long the string vibrated.</p> <p>Results Large Diameter String: 72 to 77% longer vibrations in a vacuum than normal air Small Diameter String: 30% to -5% longer vibrations in a vacuum than normal air</p> <p>Conclusions/Discussion The result of my experiment is that the smaller diameter guitar string vibrated about the same in a vacuum than in normal air pressure, however the thick diameter string did not. The smaller string was not affected nearly as much by air resistance, and thus acted almost the same in a vacuum. However, since the thick string has more air resistance, it was affected greatly when in a vacuum, and vibrated 77% longer. This proves my hypothesis correct, that a guitar string will vibrate longer in a vacuum than in regular air conditions. In conclusion, of the three factors that stop a guitar string from vibrating, air resistance, absorption by the guitar, and absorption by the strings, air resistance is a very significant factor for thick strings.</p>	
Summary Statement My project examined the importance of air resistance in stopping vibrations of a guitar string by plucking a hand-made electric guitar in a vacuum chamber and measuring how long the string vibrated with a computer.	
Help Received Dad helped with selecting and buying materials and working with power tools for woodworking.	