



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Michelle M. Lin	Project Number J2221
Project Title Fiddling with Friction: A Test of 15 Rosins	
Abstract Objectives/Goals The purpose of rosin is to increase the amount of friction between the bow and a string on a stringed-instrument. Rosins are made mostly from the resins of trees, but sometimes other materials, such as gold or silver, are added to set-up even more friction. The purpose of this experiment will test a variety of rosins to discover which brand produces the most friction on a bow hair. Such information may be useful to stringed instrument players in selecting rosin. Methods/Materials A bow hair suspension device was designed and constructed to measure changes in friction due to rosin on single bow hairs. With the device, the rate at which a light weight (small paper card) slid down (due to gravity) a single horse hair was measured, before and after rosin. A stop watch was used to measure the time of travel. More than 660 measurements were made, and the data were analyzed statistically (t-test). Fifteen different commercially available rosins for the various stringed instruments (violin, viola, cello, and double bass) were tested. Results Seven of the rosins increased the slide time by more ten percent ($P < 0.003$). The rosin with the greatest increase in slide time was Pops# Bass Rosin (ratio = 1.88). For all-purpose rosins, the rosin with the highest ratio was D#Addario Light. For violin/viola rosins, it was William Salchow. Hidersine had the highest ratio of the cello rosins. Conclusions/Discussion A potential source of error was the measurement of the slide time (1-2 seconds). However, errors in measurement of the slide time may have been relatively small, because ratios of slide times #with# rosin to slide times without rosin were fairly close to 1 for the controls (range, 0.94-1.04). Another possible limitation was applying different amounts of rosin to each hair, as the rosin was applied by hand. Some of the rosins may require different amounts of pressure to generate their full stickiness. However, a more precise way to apply the rosin could not be found for this project. Finally, friction (stickiness) is not the only quality that musicians consider when selecting rosins. Surface noise, tone, and dust generated are also important, which is why price does not correspond with stickiness. Although the cheaper rosins create more friction, they may not do as well in other categories.	
Summary Statement The purpose of this project is to test a number of different stringed instrument rosins and discover which variety produces the most friction on a bow hair.	
Help Received Father gave advice and minimal assistance assembling display board	