



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) William J. Hatcher	Project Number J1513
Project Title Cymbal Sounds	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project involves testing the quality of different types of cymbals. I will be testing two consistencies of cymbals. Sheet bronze and cast bronze. Sheet bronze is 92% copper and 8% Tin. They tend to be lighter than cast bronze and also cheaper. Cast bronze is 80% copper, 20% tin and has traces of silver. These are the more expensive of cymbals. I believe that the cast bronze cymbal will produce a clearer, more consistent sound because they are heavier and more expensive.</p> <p>Methods/Materials My project involves testing the quality of the sound of different types of cymbals. Using a device called an oscilloscope, I will determine the projection and clarity of the cymbals. I will hit each cymbal a number of times each and record the clarity and loudness# given by the oscilloscope. I then will record my results. I will measure the cymbals clarity in sound volts that are functions of time. The oscilloscope will show the sound wave given by the cymbal on the computer and show how my volts the sound wave has.</p> <p>Results For the crash section of all the cymbals, the ZBT Splash had the highest frequency, the ZBT hi hats had the highest standard deviation and the Pacific China type had the lowest. For the bell section, the ZBT Hi Hat had the highest frequency, the ZBT Splash had the lowest standard deviation and the ZBT Crash/Ride had the highest. For the ride section, the ZBT Crash/Ride had the lowest standard deviation and the ZBT High Hat had the highest and the Pacific China Type had the highest frequency.</p> <p>Conclusions/Discussion My hypothesis was incorrect. Most of the sheet bronze cymbals had higher frequencies and were more consistent than the cast bronze cymbal.</p>	
Summary Statement I want to find out which of the two metals of cymbals - will have a clearer and more consistent sound.	
Help Received My father helped me order the oscilliscope.	