



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Alexander K. Nunn	Project Number J1527
Project Title Crack vs. Ping: The Breakdown of Bat Sounds	
Objectives/Goals The objective of this project is to determine if there is a correlation between the sound made when a ball hits a bat and the type of bat.	
Abstract The experiment will be conducted as the following: a camcorder will be placed to the side of the batter to record the sound made when the ball collides with the bat. The ball will be pitched by a pitching machine at 60 mph from 50 feet away from the batter every pitch. The variables in the experiment are three different bats are used (z-core, connexion, and a maple wood bat). Most importantly, the sound variable that will be measured. The data I collected was recorded into my computer and segmented into different hits using a program called Sound Forge. I wrote a program in the MATLAB language that computed the frequency spectrum of the data. I then wrote a program to graph the different spectrums so I could visually analyze them.	
Methods/Materials Methods Materials and Their Source: <ol style="list-style-type: none">1. Maple Bat, Myself2. Z-core Bat, Myself3. Connexion Bat, Jesse Clopper4. 8 new baseballs, Play It Again Sports5. Pitching Machine, I borrowed it from the SRL6. Camcorder, Myself7. MATLAB, Myself	
Results The data shows that the highest amplitude peak in the frequency spectrum for each bat can be used to identify the bat type. The range for each peak for each bat is shown on the diagram. The results can be summarized by: A high-amplitude peak found between 1018 and 1283 Hz can distinguish the wood bat. A high-amplitude peak found between 1637 and 1736 Hz can distinguish the Z-Core. A high-amplitude peak found between 752 and 965 Hz can distinguish the Connexion.	
Conclusions/Discussion	
Summary Statement The project is to determine whether or not you can tell what kind of baseball bat is being used by the sound it makes when it contacts a ball.	
Help Received Father help during data collection and analysis	