



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Andrew T. Clausen	Project Number S0407
Project Title Singers vs. Instrumentalists: A Study of Relative Pitch Sense	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to determine whether singers or instrumental musicians would have a better sense of relative pitch - the ability to recognize distances between notes.</p> <p>Methods/Materials Subjects were given a test on both hearing and singing. The hearing test was comprised of a note written on a page and two notes being played. The subjects were asked to then name the interval between the notes or the name of the upper note. The singing test was the opposite, as two notes were written but only one note was played. The played note was the starting pitch (the first note) on the page, and subjects were asked to sing the second note on a page. A microphone attached to a tuner verified what note the subject sang. Responses were graded on a scale of 1-5, 5 being right, 3 being within a half step, and 1 completely wrong.</p> <p>Results Singers scored an average score of 3.7 +/- 1.7 on the hearing test and 3.8 +/- 0.7 on the singing test. Instrumentalists scored 2.8 +/- 1.2 on the first test and 2.5 +/- 1.1 on the second. While there is an overlap in the scores when the standard deviation is applied, a t-test gave a p-value of 0.003 for the hearing test and 0.0129 for the singing test. As $p < 0.05$, the t-test suggests that the two samples are indeed statistically different, which in turn suggests that singers do in fact have a better sense of relative pitch than instrumentalists.</p> <p>Conclusions/Discussion Since it is suggested by the data that singers do in fact have a better sense of relative pitch than instrumentalists, it can be assumed that it would be a good idea to implement more singing training in early musical education. If instrumentalists are taught how to sing as well, they will not only be more well-rounded, but the development of the skill of relative pitch will make them overall better musicians.</p>	
Summary Statement This project tested if singers or instrumentalists have a better sense of relative pitch, which ability to recognize the distance between notes.	
Help Received General project consulting from advisor; statistics help from math teacher	