



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Amir S. Kelly	Project Number 31603
Project Title How High Can You Go?	
Objectives/Goals The objective of the experiment was to find out what temperature of water (room, warm, or cold) maximizes the vocal range. Abstract Methods/Materials Materials: 1. 7 singers; 2. 1 keyboard; 3. A pianist; 4. 2 minutes vocal warm ups; 5. 7 cups # 1 cup each; 6. 1 thermos of warm water at 130 degrees F; 7. 1 thermos of ice-cold water at 30 degrees F; 8. 1 thermos of room temperature water at 65 degrees F; 9. Log; 10. Pen/Pencil. Method: 1. 2 minutes of selected vocal Warm ups. 2. Subject drank a cup of room temperature water & rested 1 minute. 3. Vocal test. 4. Test notes by playing keys on the keyboard. Start lowest to highest. Record the number of notes hit. 5. Repeat procedures 3-4 with next 6 subject. 6. Subjects drank cup of ice-cold water at 30 degrees F & rested 1 minute. Vocal test. Repeat procedure number 3-4. 7. Subjects drank a cup of warm water at 130 degrees F, repeat procedure 3-4. Results The results of this project were that the cold water minimized the vocal range because the vocal chords contracted and vibrated less. The room temperature was the control and kept the range at normal. The warm maximized the vocal range because the vocal chords contracted and vibrated freely. Conclusions/Discussion The conclusion of this experiment was that the hypothesis was proven to be correct when testing seven subjects. There wasn't a large difference but the vocal range was maximized when the singer drank warm water. The ice-cold water made the singers unable to hit higher notes, resulting in their voice cracking. Most of the singers were professionally trained to hit notes under any condition. I now know that warm water maximizes the range.	
Summary Statement The summary of this experiment was that warm water maximized the vocal range allowing the subjects to hit higher notes.	
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