



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Lindsay M. Harrison	Project Number J0406
Project Title Oranges to Oranges: Which Orange Juice Has the Most Vitamin C: Fresh Squeezed, Premium, or Frozen Concentrate?	
Abstract Objectives/Goals I want to determine which orange juice has the most Vitamin C (ascorbic acid): fresh-squeezed orange juice, premium not-from-concentrate orange juice or juice made from frozen concentrate. I think the fresh-squeezed orange juice will have the most Vitamin C. Methods/Materials I will use titration to test the Vitamin C (ascorbic acid) content in the 3 juices. An equal amount of juice and starch solution will be used for each juice type tested. A variable amount of iodine solution will be added to each juice type until the ascorbic acid is eliminated and a reaction occurs between the iodine and the starch. This reaction will be indicated by a color change and it signals that the juice has run out of Vitamin C. I will determine which orange juice has the most Vitamin C based upon the greatest number of iodine drops needed to create a color change in the orange juice. Results The fresh-squeezed orange juice had 43% more Vitamin C (ascorbic acid) than the premium orange juice and 40% more Vitamin C than the orange juice made from frozen concentrate. It took 65 drops of iodine solution to make the fresh-squeezed orange juice change color (run out of Vitamin C). In comparison, the orange juice made from frozen concentrate required only 39 drops to change color and the premium orange juice needed only 37 iodine drops to change color. Conclusions/Discussion My conclusion is that fresh-squeezed orange juice has more Vitamin C (ascorbic acid) than premium not-from-concentrate orange juice or orange juice made from frozen concentrate. Manufactured juices are subject to pasteurization and/or freezing processes that may have a destructive effect on their Vitamin C content. Even though some manufacturers add Vitamin C after pasteurization, it appears that the benefits of Vitamin C are best found in a diet including fresh-squeezed orange juice.	
Summary Statement My project determines which orange juice (fresh-squeezed, premium not-from-concentrate or from frozen concentrate) has the highest Vitamin C content.	
Help Received My mother helped me with this project by purchasing the supplies, by taking pictures and by proofreading.	