



# CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

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<b>Project Title</b> <b>Naturally Colorful</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my science fair project was to learn which fruits and vegetables produce the deepest hues. My hypothesis was that the deepest colored hues of raw fruits or vegetables would produce the deepest hue of dyed cloth.</p> <p><b>Methods/Materials</b> I have tested four fruits (strawberries, oranges pomegranates, olallieberries) and five vegetables (beets, carrots, red cabbage, onions) and chose them because of their availability. One cup of each fruit or vegetable was chopped and boiled for 10 minutes with one teaspoon of alum and four cups of water. The liquid was strained and cooled to room temperature. One 4x4 inch muslin swatch was placed in the dye bath for 24 hours, then removed to air-dry. This experiment was conducted one time. Each swatch was compared to a chart which is on my display board. This shows the data collected in my experiment. It shows the color of each raw fruit and vegetable and the dyed cloth. The raw material was assigned at a 100% color value. These 100% color values were based on the Pantone Matching System normally used in the graphic arts industry. The dyed cloth row may show a different hue and a different percentage of color value.</p> <p><b>Results</b> The dyed cloth from beets, onion skins, red cabbage, carrots, olallieberries, and oranges all changed hues. The dyed cloth from pomegranates and strawberries stayed within the same hue. The cloth from pomegranates registered at 40% thereby showing a 60% change in value. The dyed cloth from strawberries registered at 30%. The other materials cannot be compared in this fashion due to their change in hue.</p> <p><b>Conclusions/Discussion</b> I predicted that the deepest hues of raw fruits or vegetables would produce the deepest fabric hues. Results show that only two of the materials stayed within the same color hue. The others changed from one hue to another so it is impossible to judge according to my measurement scale. I also measured the color value changes. Because of the setup of my experiment I was only able to measure the value changes of pomegranates and strawberries. I was surprised at the data I collected because I assumed that all of the dyes produced, would stay within the same color hue as the raw fruit or vegetable. According to the data that I collected, my hypothesis is not supported. In order to better my understanding of this subject, I could set up my experiment to include measurement devices that include changes in hues as well as values.</p>	
<b>Summary Statement</b> The purpose of my project is to determine which fruits and vegetables produce the deepest colored dyes.	
<b>Help Received</b> My mother helped me type up my report and my father lent his expertise in color analysis.	