



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> Greg D. Biles	<b>Project Number</b> <b>J0505</b>
<b>Project Title</b> <b>How Well Do Vegetable Dyes Work?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my experiment was to see which vegetables make stronger dyes. I wanted to research this project because in ancient times, all that people had was natural dyes to color their clothes. What if they washed it or just wore it on a sunny day? Would it fade? Could I guess this by looking at the color of the vegetable itself?</p> <p><b>Methods/Materials</b></p> <ol style="list-style-type: none"><li>1. Choose a minimum of five vegetables to make dyes out of. (beets, red cabbage, carrots, bell pepper, sweet potatoes).</li><li>2. Extract the pigment dyes from the five vegetables.</li><li>3. Dye 3 sets of five strips of 100% cotton fabric with the dyes (one set will be the control)</li><li>4. Examine the strips to determine which ones are darker in color</li><li>5. First set: store in an enclosed container in a dark place (control set)</li><li>6. Second Set: water rinse, then wash with laundry soap. Observe fading.</li><li>7. Third Set: set out in the open in a sunny window for 24 hrs. Observe fading.</li><li>8. Compile the data and then draw conclusions</li></ol> <p><b>Results</b> The beet dye made a darker dye solution and dyed the fabric strip darker at first, but it did not stay in after washing. The purple cabbage also made a dark solution, but it hardly dyed the fabric at all. The three lighter vegetables, (sweet potatoes, carrots, bell pepper) appeared to produce a weaker dye solution in the beginning, but they actually made a stronger dye that stayed on the fabric after washing.</p> <p><b>Conclusions/Discussion</b> My hypothesis was that darker vegetables would make stronger dyes and that lighter vegetables would make weaker dyes. But my experiment showed that the strength of the dye does not always depend on the color of the vegetable. I read that for a dye to be strong, it has to have a stronger affinity to the cloth than it has to other things like water, soap, and air (oxygen). So it must be that the vegetable dyes that worked better in my experiment had a stronger affinity to the cloth.</p>	
<b>Summary Statement</b> My experiment tests how well different vegetable dyes work when using them to dye 100% cotton fabric.	
<b>Help Received</b> Mother helped with display format; father helped with graph.	