



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

<p>Your Name (List all student names if multiple authors.) Courtney Y. Kum</p>	<p>Science Fair Use Only</p>
<p>Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Green Hair and Chlorine: Who Is the CU-1pmit?</p>	<p>J0311</p>
<p>Preferred Category (See page 5 for descriptions.) 3 - Biochemistry / Molecular Biology</p>	<p>Division <u>X</u> Junior (6-8) _ Senior (9-12)</p>
<p>Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.</p> <p>Objective: The objective is to find out what makes blonde hair turn green in a swimming pool.</p> <p>Materials and Methods: 9 ml. of water were put into a test tube with 1 ml. of the following variables: Chlorine, Copper Sulfate, Copper Sulfate/Pool Water, and Copper Sulfate/Chlorine. 1 ml. of that solution was added into another test tube of 9 ml. of water. This step allowed dilution by 10 percent, 6 times each. This method is called serial dilutions. In each test tube, groups of blonde hair were soaked over night. The next day the hair was removed, dried, and placed onto cardboard.</p> <p>Results: The hair in various concentrations of chlorine didn't seem to cause any significant difference with either tap water or pool water. We were somewhat surprised that the pool water didn't changed the hair but this could be because the pool is relatively new and hadn't had the chance to build up copper. In the second experiment copper sulfate was added to water in various concentrations. There was a direct relationship between the amount of copper sulfate in the concentration and the color of the hair. .01 grams/ml was the highest amount of copper sulfate which turned the hair very green. There must be at least .00001 mgs/ml of copper sulfate in a pool to allow the hair to turn green. Once we discovered the "culprit" we tried reversing the green hair by applying household remedies. Only the Infusion-3 had some affect while the grape juice only turned the hair purple. The other products had no affect.</p> <p>Conclusion: Chlorine doesn't turn hair green. The true "culprit" is copper. We suspect that chlorine facilitates the leaching of copper from the copper pipes but further testing is required.</p>	
<p>Summary Statement (In one sentence, state what your project is about.) What makes blonde hair turn green in a swimming pool.</p>	
<p>Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Personal equipment and supervision provided by Dr. Timothy Osslund</p>	