



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Connor A. Wynveen	Project Number J1139
Project Title Blondes Can't Bear, All That Green Hair!	
Abstract Objectives/Goals Objectives/Goals: Many people that swim in pools have green hair and have trouble getting this green residue, copper, out of their hair. Acids, vinegar and lemon juice, and chelating agents (molecules that bond to metal), aspirin and Ultraswim shampoo, will be tested to determine which treatment is better at removing the green from blonde hair.	
Methods/Materials Methods/Materials 1. Acquire blonde hair. 2. Collect six cups of pool water. 3. Analyze pool water with an Aquachek kit. 4. All hair, except control group, will be soaked for 8 hours in pool water. 5. Divide hair into 41 equal sections, 40 will be treated, one will be left as a control. 6. Distilled water, and treatment agents were titrated with a syringe. 7. Preliminary tests were performed: 1. 50 ml of distilled water was tested using copper test strips. 2. Distilled water 50ml and control hair was tested for copper. 3. Green hair that was soaked in pool water but not treated was tested for copper levels. 8. The remaining green hair was divided into 4 groups of 10 and placed in baby food jars containing the agents noted: Group 1, 25ml of fresh squeezed lemon juice, with 25ml of distilled water Group 2, 25ml of apple vinegar with 25ml of distilled water Group 3, 625mg of aspirin (two aspirin) with 25ml of distilled water Group 4, 10ml of Ultraswim shampoo 40ml of distilled water 9. All groups of hair were soaked for 5 minutes. 10. All groups of hair were rinsed for 5 seconds with distilled water. 11. Hair was put in 200ml of distilled water for one minute, removed, water was tested for copper levels with Aquachek copper strips.	
Results Results: Lemon juice, the most acidic at 2.2pH, average level of copper remaining after treatment was 1.55ppm mg/l, Vinegar, acid 2.9pH, average copper level was .825ppm mg/l, Aspirin, a chelating agent, average level of copper was .38ppm mg/l, Ultraswim shampoo, a chelating agent, average level of copper was .36ppm mg/l. Ultraswim worked best.	
Summary Statement Blonde haired swimmers often get green hair from pool water, acids and chelating agents were compared to find which is best at removing the green, copper, from blonde hair.	
Help Received Leslies Pool Supply for information, Teachers for advice, Del Cerro Pool for pool water, and my mother for her help with everything.	