



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Kimberly Perring	Project Number S0520
Project Title What Is the Best Solution for Hair Exposed to Pool Water?	
Abstract Objectives/Goals My objective was to test which solution worked best to prevent hair from being damaged by pool water and to repair hair damaged by pool water. Methods/Materials I tested two solutions (hair conditioner and water) as pretreatments before putting the test hairs in pool water, and 4 solutions (lemon juice & water, aspirin & water, Swimmers shampoo, and regular shampoo), as post-treatments after putting the test hairs in pool water. Measurements of each hair were taken before and after their treatments. I measured hair width and appearance (amount of cracking) under a light microscope and I measured the hair's strength by stretching them using a modified stretching machine. I calculated the differences between pre and post treatments. Results Some of the treatments caused a loss in hair width and some showed an increase. From most loss to least, the treatments were swimmer's shampoo (-3.5 mm), pre-water treatment (-2.3 mm), pre-conditioner (-2.2 mm), water control (-0.7 mm), chlorine control = no solutions (+1.4 mm), regular shampoo (+3.9 mm), and lemon water (6.2 mm). Treatments impacted hair cracking. In order of increased cracking, pre-conditioner treatment, pre-water treatment, regular shampoo and swimmers shampoo cause fewer cracks, while aspirin water, water control, chlorine control, and lemon water caused more cracks. Treatments also affected hair strength. From stronger to weaker, the treatments were aspirin water, regular shampoo, water control, pre-water treatment, lemon water, chlorine control, swimmer's shampoo and pre-conditioner. Conclusions/Discussion The data shows that regular shampoo after exposure to pool water helps hair the most. From before placing in pool water to after, it increased hair width by 3.9 millimeters on average. It also lessened cracks by a rating of 0.2, and it made the hair stronger, on average, by 288.75 stretching units. The results of my experiment proved my hypothesis wrong. I thought that the swimmer's shampoo would work the best because it is pH balanced and contains sodium thiosulfate which replaces the protein eroded by chlorine. It ended up that the swimmer's shampoo was one of the worst solutions. It made the hair thinner, helped the appearance only slightly, and it made the hairs weaker.	
Summary Statement My project tested various solutions to prevent damage or repair hair exposed to pool water and it showed that regular shampoo after swimming worked best.	
Help Received Father helped make graphs. Used lab equipment at University of California Riverside under the supervision of Dr. Thomas Perring. Mother helped glue work on board.	