



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Sarah S. Bermudes	Project Number S1404
Project Title Shampoo: Friend or Foe? Discovering the Damaging Effects of Shampoo Chemicals on Hair	
Abstract Objectives/Goals My objective was to find how great the effect is of the popular shampoo chemicals Sodium Laureth Sulfate, Ammonium Lauryl Sulfate, Cocamidopropyl Betaine and Selenium Sulfide upon the strength of a woman's hair. Methods/Materials After designating five brands of shampoo that contained four different main chemicals, or lack there of, to five groups of five stands of hair, I began washing each set in their own respective plastic containers. Subsequent to washing, I would let each group air dry while lying on a towel for three hours. After washing the hair over the course of five days, I tested the five groups of hair, including a sixth control group, by clipping the hair to a ruler and attaching a paperclip through a knot in each set of hair. After gradually applying fishing weights upon the paperclip, the hair would break and I would count how many ounces each group could withstand being pulled with. Results The shampoos that preformed the worst were the ones with ingredients that were considered most drying of the hair's natural oils. Sodium Laureth Sulfate preformed the worst, only allowing the hair to be pulled with 5.775 ounces. The shampoo that preformed the best contained no harsh chemicals, withstanding 8.525 ounces of weight. However, the group that held the most weight was the control group with 8.65 ounces. Conclusions/Discussion My experimentation showed that shampoos containing chemicals considered more harsh caused the hair to break easier in relation to the hair exposed to less harsh chemicals. This illustrates that hair treated with any type of chemicals foreign to the hair's natural composure will break easier as a result of the ingredients' drying properties than if the hair was kept unwashed.	
Summary Statement My project demonstrates the damaging effects of common shampoo chemicals upon a women's hair.	
Help Received Father helped attach weights onto paperclips for each group of hair.	