



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Harrison B. Yager</b>	<b>Project Number</b> <b>J1137</b>
<b>Project Title</b> <b>Coming Clean: Alcohol-Based Hand Sanitizer vs. Antibacterial Soap, Which Cleans Best?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Will antibacterial soap or alcohol-based hand sanitizer kill the most bacteria? <b>Hypothesis</b> Antibacterial soap and alcohol-based hand sanitizer will both kill the same amount of bacteria.</p> <p><b>Methods/Materials</b> Twenty randomly chosen subjects were divided into two groups; ten subjects used antibacterial soap, running water and paper towels and ten subjects used alcohol-based hand sanitizer. Taking a sterile swab, each subject's hand was swabbed from the outer edge of the palm, along and in between each set of fingers, to the outside of the palm, to the back of the hand, and then back and forth on the palm. The swab was then rolled on an agar plate in a zig-zag pattern. Two control swabs were taken on unwashed hands. Twenty-two agar plates were labeled and placed in an incubator at 37 degrees Celsius. The plates were examined at 24, 48 and 72 hour intervals. Each plate was removed from the incubator and held up to a light source. Bacterial colonies visible to the naked eye were counted and recorded. <b>Materials</b> 1 bottle alcohol-based hand sanitizer, 1 bottle antibacterial soap, paper towels, running water, sterile MacroPur swabs, agar culture dishes, incubator.</p> <p><b>Results</b> The antibacterial soap test group had 41 colonies at 72 hours versus 25 colonies in the alcohol-based hand sanitizer test group. Subjects using antibacterial soap had 64% more bacterial colonies than those subjects who used the alcohol-based hand sanitizer. Not surprisingly, the control plates grew the most bacterial colonies.</p> <p><b>Conclusions/Discussion</b> The alcohol-based hand sanitizer killed more bacteria than the antibacterial soap. This means that the data disprove my hypothesis. My experiment shows that alcohol-based hand sanitizers do a better job at killing germs than antibacterial soaps. Factors affecting my experiment included people's hands might not have been equally dirty, they may not have cleaned their hands in the same way.</p>	
<b>Summary Statement</b> I compare the number of bacterial colonies grown from two groups: those using antibacterial soap and those using alcohol-based sanitizer.	
<b>Help Received</b> Mom helped type some of report. Used dad's incubator. Bought agar plates from dad.	