



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> Megan L. Barber	<b>Project Number</b> <b>J1402</b>
<b>Project Title</b> <b>Is Hand Washing an Effective Way to Remove Contaminants?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> There are many products on the market that claim to remove bacteria and other contaminants from our hands. We purchase and use these products and never really know how effective they are. My objective was to test the effectiveness of water alone, soap, and antibacterial gel for removing contaminants from my hands.</p> <p><b>Methods/Materials</b> Hands were imprinted on agar plates four ways: dirty hands, hands washed with water alone, hands washed with soap, and hands washed with antibacterial gel. Untouched plates were also used as a control group. The plates were placed in a temperature and light controlled environment and observed for 14 days. The plates with the most growths in each of the four categories were photographed. The number of bacteria and fungi colonies were counted and recorded. Slides of the growths were prepared and photographed for display.</p> <p><b>Results</b> The dirty hand plate contained 130 bacteria colonies and 5 fungi colonies. The hand washed with water plate contained 163 bacteria colonies and 5 fungi colonies. The hand washed with soap plate contained 104 bacteria colonies and 2 fungi colonies. The hand washed with antibacterial gel plate contained 32 bacteria colonies and 1 fungi colony. The untouched plate contained no growths. 75% of the contaminants were removed using antibacterial gel, 20% were removed using soap, and using water alone produced more contaminants.</p> <p><b>Conclusions/Discussion</b> Washing with water alone opened the pores on my hands and released contaminants from my pores. This explains why washing with water alone is not effective. Soap and antibacterial gel products are effective for removing contaminants from my hands. Most antibacterial products contain triclosan or ethyl alcohol. These agents damage the cell walls of bacteria, slowing their growth so the bacteria eventually die. The antibacterial product that I used contained ethyl alcohol. Soap is also an effective hand cleaner, but it is not as effective for killing bacteria. It lifts dirt off the surface so that it can be scrubbed away. The scrubbing action when you wash helps to release dirt and oils on the surface of your skin and the soap picks up dirt and carries it away as you rinse your hands.</p>	
<b>Summary Statement</b> The effectiveness of water, soap and antibacterial gel were tested for removing contaminants while washing hands.	
<b>Help Received</b> Mother proofread my data, Father showed me how to use his microscope and digital camera, and Aunt Cathy showed me how to make slides.	