



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kyle N. Markfield</b>	<b>Project Number</b> <b>J2116</b>
<b>Project Title</b> <b>The Toxic and Non-Toxic Cleaning Wars</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of this experiment was to determine if non-toxic cleaners work as well, or are more effective than toxic cleaners. <b>Methods/Materials</b> Five small circles of blotter paper were placed in each cleaning sample for 1 hour. The toxic cleaning sample was Lysol, and the non-toxic cleaning samples were water, baking soda, lemon juice, hydrogen peroxide and vinegar. Prepared sterile agar Petri dishes were then inoculated with bacteria samples taken from the floor of my house. I then placed a soaked dot sample in the middle of each of my Petri dishes and labeled each dish with the name of the cleaner the dot soaked in. I observed and measured the kill zone areas of each of the samples over a seven day period. <b>Results</b> The Petri dishes with the toxic cleaner Lysol had an average kill zone radius of 2.8cm and an area of 24.62 sq. cm. All of the Petri dishes with water had no kill zone areas. The Lemon Juice Petri dishes had an average radius of 1cm and a kill zone area of 3.14sq. cm. Vinegar had an average kill zone radius of 2.1 and its area was 13.85 sq. cm. Both Hydrogen Peroxide and Baking Soda had an average kill zone radius of 4.2cm and an area of 55.39 sq. cm. <b>Conclusions/Discussion</b> My conclusion is that the non-toxic cleaners Hydrogen Peroxide and Baking Soda actually performed better than the toxic cleaner Lysol. My results lead me to believe that there are better cleaning agents than the many dangerous toxic cleaners sold in our stores. Non-toxic cleaners do not hurt our environment, and after doing this experiment I learned that some also clean and kill bacteria just as well as toxic cleaners.	
<b>Summary Statement</b> My project was to prove that some non-toxic cleaners work just as well as the toxic cleaners that continue to harm us and our environment.	
<b>Help Received</b> Mother helped me insert pictures into charts, and my father helped me create the graphs on the computer.	