



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jessica I. Rutten</b>	<b>Project Number</b> <b>J2319</b>
<b>Project Title</b> <b>The Greenest Clean</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my project was to determine whether liquid cleaning products effect growth and germination of garden plants, when brands claim their merchandise is environmentally safe, at one millionth percent of a dilution, to water. I believe that both the cleaning products utilized, Windex# and Greenworks#, will not have little visual effects, and need to be a higher concentration to create a result in the plant#s height and germination.</p> <p><b>Methods/Materials</b> I grew thirty-six lima beans in paper towels, inside twelve transparent, plastic cups, under two constantly open windows. I observed their temperature with 2 temperature gauges, and hydrated my plants with one millionth of a dilution of Windex# to Greenworks#. I measured my dilution in milliliters with two measuring cups, and a teaspoon. I also found it important to use filtered water, when observing the control group, and hydrating the plants with the dilution.</p> <p><b>Results</b> Results to my experiment supported my hypothesis. Trend lines where varied greatly, which brought concern to me, for a mathematical conclusion. I watched the plants germinate and grow, noticing wide spectrums of height. In both of my 10 day trials, I found that Water plants where the tallest, reaching 23 centimeters, in trial 1, and 14.7 centimeters in trial 2. The Water plants continuously molded, as so did the Greenworks plants. The water group, plant C, died in trial 1. In trial 2, plant A of Greenworks deceased on day 7. I took note that both Greenworks and Water molded over, in both trials, yet Windex had the smallest amount, according to visual observations.</p> <p><b>Conclusions/Discussion</b> My experiment supports my prediction. The trend lines where varied, and a conclusion which solutions affecting the height, was not proven. Visual conclusions where made, even though I could not draw a mathematical conclusion. The molding of the sprouts, show only specific plants molding. Windex was the group with small percentages of mold. Both Water and Greenworks molded, bringing me to hypothesis that Windex could possibly have kept mold spores off of the plants.</p>	
<b>Summary Statement</b> My experiment is a study of the effects of liquid cleaning products on plants, when it is enviromentally safe.	
<b>Help Received</b> Father helped with method of dilution.	