



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Matthew P. Reilly	Project Number J2318
Project Title Detergent Effects on Plant Growth	
Objectives/Goals My Objective was to understand how runoff detergents affect plant growth. I hypothesized that runoff detergents would affect plant growth because detergents contain harmful chemicals that I thought would negatively affect plant growth.	
Abstract Methods/Materials For the Los Angeles County Science Fair, I used 12 total plants and four different solutions for watering them. For each watering solution, we had 3 plants, so my experiment was done 3 times each. I watered each plant 20 mL of its respective mixture every other day. For the California State Science Fair, I am taking it to the next level and repeating my experiment at three levels of detergent concentration for each solution: 1:100 or 1% (same as first experiment), 1:1,000 or .01%, and 1:1,000,000 or .00001%. I now have 30 plants and 10 solutions, so am again repeating each experiment 3 times. I am doing this to test if there is a safe level of detergent pollution.	
Results The results of my initial experiment showed that my hypothesis was correct. The plants watered with the solution containing Tide 2X Ultra or Tide 2X Ultra with Bleach Alternative did not grow much, and eventually withered and died. I was surprised that the plants watered with Planet 2X Ultra Detergent grew so well. I was surprised because the ideal pH for growing radishes is 6 which is close to that of pure water (pH of 7). The pH of the Planet detergent is 10.0-11.0, which is even higher than that of Tide which is 8.1-8.6. The Planet Detergent contains no harmful chemicals. Both kinds of Tide brand Detergent contain three harmful chemicals; Ethyl alcohol, Sodium borate, and 2-Aminoethanol. I determined that it was these chemicals that caused the plants watered with the two Tide brand solutions to die.	
Conclusions/Discussion I am looking forward to seeing the results of part II of my experiment, which will be complete just before the California State Science Fair. Again, I am testing for a "safe" level of detergent pollution. Regardless, I believe the results of my first experiment are valid as I was following an accepted scientific method in testing the results of chemicals on plants and animals, which is to test them at high concentrations.	
Summary Statement My project studies the effects of runoff detergents on plant growth and examines if there is a safe level of detergent pollution.	
Help Received A classmate started with me on initial project, but was unable to continue. Teacher recommended that I continue and enter the LA County Science Fair on my own. My Mother drove me to get supplies and helped make calls to local water biologists, and paste board together. Dad helped w/ pictures & graphs.	