



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) <p align="center">Grace A. Doyle</p>	Project Number <p align="right">33322</p>
Project Title <p align="center">Measuring Plant Growth Using Greywater from Different Laundry Detergent Solutions</p>	
<p align="center">Abstract</p> <p>Objectives/Goals I wanted to know which laundry soap solutions would be safe for our garden plants and our local environment (garden drains to a local creek). Would laundry solutions be safe for the plants or kill them? My hypothesis was that plants watered with laundry solutions containing perfume, dyes and bleach would not sprout, die sooner or seem less healthy than plants watered with bio-degradable solutions free of perfume, dyes or bleach. I thought that plants that were watered with plain tap water would be the healthiest.</p> <p>Methods/Materials Potting mix, seeds, starter plants, combinations of laundry soaps: Red Solution: 2X Ultra All liquid with dye and perfume, Purple Solution: Arm and Hammer powdered detergent - free of perfume and dye, Yellow Solution: Trader Joe's liquid laundry detergent with AND (Blue Solutions:)without liquid Bleach, Tap water.</p> <p>Results Red Solution: average growth of 6.58 inches. The plants seem to be healthy. Purple Solution: average growth of 2.08 inches. These plants seemed to grow more slowly and one seed sprouted and then died. Yellow Solution: average growth of 6.41 inches and these plants seemed very healthy. Blue Solution: average growth of 7.86 inches and seemed very healthy. Tap Water: average growth of 5 inches. One plant died just after it sprouted. These plants seems to have average health.</p> <p>Conclusions/Discussion My hypothesis was mostly wrong. The plants watered with solutions that had perfume, dye and bleach did well, better than than the plants watered with tap water. The Arm and Hammer solution plants were the worst, it was the only powdered detergent. I learned that powdered detergent sometimes has other chemicals not found in liquid detergent that can harm the environment. For the plants that did well, even with bleach, perhaps the soil absorbed some of the harmful chemicals. If that is true, then soil is holding these chemicals and they could be washed into our local creek if we use them so they should be avoided. I did not grow the plants to their full life or taste the radishes or snap peas to see if the different solutions effect taste. This may make a difference and I will find out when we use some of these solutions in our garden this summer.</p>	
Summary Statement I used different greywater laundry detergent solutions to water plants to determine which solutions produce the healthiest plants	
Help Received My Father was with me when I recorded the data each week and my Mother showed me how to make graphs and charts with my data	