



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Alexandra N. Vredenburgh	Project Number J1131
Project Title Save Water, Save the World: Evaluating the Effectiveness of Using Gray Water to Reduce Home Water Consumption	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals About 55% of our residential water is used for landscaping. San Diego residents will have to make an 8% cut on their use of water beginning July 1st under a drought emergency plan approved by the city council. Because of the water shortage, in August, 2009 California regulators have issued an emergency decision that allows residents to create simple reuse systems without a construction permit. I convinced my parents to install a gray water system when they remodeled their bathroom.</p> <p>Methods/Materials My study was conducted in two parts: plant growth and soil lab testing. My independent variable for both parts was water type (gray vs. hose). My dependent variable for part 1 was plant growth. My dependent variable for part 2 was soil properties (pH, phosphorous, potassium, and nitrogen). Materials included: Gray water, hose water, one bag of potting soil, corn seeds, grass seeds, eight 4" pots, 2 flats with 8 sections each, soil testing kit, measuring syringe, and a moisture probe. I measured plant growth weekly. I controlled for water amount, sunlight amount, plant seeds, soil, and removed plants from the rain.</p> <p>Results For Part 1, there was a positive relationship for number of days vs. plant growth for both the gray water and the hose water (control). The actual data collection began on the 14th day, when the seeds germinated. The growth rate was nearly identical for the first 6 days. On day 20, the growth rate for gray water plants become greater than for the control. For Part 2, my lab testing indicates that plants watered with gray water had all the nutrients that they needed; the soil was found to be the same, or better than soil watered by hose.</p> <p>Conclusions/Discussion The data supported my hypotheses: Gray water was as good as hose water for both plant growth and soil properties. In my study, I saved 133 cubic feet or 994 gallons or 3,766 liters in about three months or 331 gallons (1,253 liters) per month, or 3,972 gallons (15,036 liters) a year. If every single-family household in California (6,883,493; US Census Bureau, data from 2000) alone had this system in one bathroom, we would save, on average, 2.7 trillion gallons a year! Saving this amount of water could help us protect more endangered habitats, by using a lot less river water, and not transporting or cleaning the water (which require a lot of energy).</p>	
Summary Statement I evaluated the effectiveness of using gray water as a substitute for hose water to reduce home water consumption.	
Help Received My brother, Michael, helped me set up my study and with my poster. My father supervised my lab testing. My mom helped with my report. My brother's high school teacher provided the lab testing kit.	