



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Brandon Bonefete; Evan Sano Fleming; Jackson Smith</b>	<b>Project Number</b> <b>J1004</b>
<b>Project Title</b> <b>Comparison of Properties between Greywater and Tap Water for the Use of Watering Outdoor Plants</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of our experiments was to determine if the properties of greywater are similar to tap water and therefore can be used to water outdoor plants.</p> <p><b>Methods/Materials</b> We collected 500 mL samples of; tap water (the control), hot water from the tap, water after dishes were washed, water after a shower, and water after washing your face and brushing your teeth. To test the pH we used a Vernier pH meter. We submerged a pH probe into the water sample and recorded the measurement. To test the salt content we measured the conductivity with a conductivity indicator. To test for solids we poured 20 mL of the water sample into an evaporating dish and boiled off the water. We measured the grams before and after we boiled the water off on an analytical balance. To test the effect on plants we used 150 mL test tubes and poured our water samples to the top. We put the plant elodea in for seven days and recorded the health of the plant compared to the plant in the control. To test for bacteria we used an inoculation loop to transfer a small amount of the water sample. We streaked TSA plates. We recorded the amount of bacteria that grew at room temperature four days.</p> <p><b>Results</b> The conductivity average for the control was 4.33 EC and for all our samples had an average of 3.6 EC. The average pH level of the control was pH 6.79 and the samples were higher with the highest at pH 7.11. There was about 10 times the amount of solids in the samples from the control. Overall the plants health was not as healthy in the samples compared to the control. The bacteria test showed a significant amount of bacteria in the kitchen sink and shower water compared to the control.</p> <p><b>Conclusions/Discussion</b> Greywater can be used to water plants in times of water shortage. According to our research both the pH and the salt conductivity levels were in the range that healthy plants can grow. There is the possibility of solid build up around the outdoor plants and unwanted bacteria in the greywater. You should not store greywater before you water your outdoor plants because the bacteria will grow in the greywater being stored.</p>	
<b>Summary Statement</b> Our project showed that greywater is within the pH and salt content levels to water outdoor plants but may have an unwanted buildup of solids and high content of bacteria.	
<b>Help Received</b> We performed all experiments in the chemistry lab at Clovis Community College with Mrs. Shawn Fleming, Chemistry Instructor, as our mentor. She taught us how to use the pH meter, conductivity meter, and how to streak a TSA plate. We had access to all the equipment used during our science fair project.	