



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Annaliese N. Rupp	Project Number J2018
Project Title One Flush Is Not Enough	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine the number of flushes that are required to remove microorganisms from toilet water after an episode of diarrhea. To determine the effects of different automatic toilet bowl cleaning products on microorganism removal.</p> <p>Methods/Materials Constant levels of Germ Glo were introduced and evenly distributed in toilet water of three different toilets. Photographs were taken before and after each flush after illuminating the toilets with UV light. Photographs were then analyzed using Image J software. Fluorescence was measured and compared. Testing was also performed after using three different automatic toilet bowl-cleaning products. The toilet bowl rim and surrounding floor surfaces were analyzed for fluorescent aerosol droplets after each flush. Four flushes were performed when evaluating each test condition. Each test condition was tested in triplicate.</p> <p>Results Multiple flushes were required to remove Germ Glo when evaluating each condition. Decreases in fluorescence were seen with sequential flushes. Differences were seen when evaluating different toilets and different cleaning products. The use of toilet cleaning products reduced fluorescence in toilet water. Aerosol droplets were seen on the toilet rim and surrounding areas after most flushes when evaluating each condition.</p> <p>Conclusions/Discussion Toilets should be flushed at least 3 times when a family member is experiencing an episode of diarrhea. Lids should be placed down to limit aerosols contaminating the surrounding area surfaces. Test results also demonstrate the importance and added advantage of using cleaning products. Scrubbing Bubbles Toilet Cleaning Gel appeared to produce the most favorable results.</p>	
Summary Statement Determined the number of flushes required to remove diarrhea from three different toilets and the effects of three different automatic toilet bowl cleaners on diarrhea removal (aerosol production also measured).	
Help Received My teacher, Donna Harbison, and my parents provided support and guidance in performing this project.	