



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Kristie M. Tagawa	Project Number J1133
Project Title The Hazards of Hard Water	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project involves the testing and research of hard and soft water and its cleaning effects on different objects and surfaces. I was interested in this project because the hard water in our house leaves behind visible residue on our showers, dishes and cars. I wanted to determine if the minerals in water affect how clean different surfaces will become. My hypothesis states: if soft water cleans more effectively than hard water, then objects washed in soft water will produce less water stains/residue than those same objects washed in hard water.</p> <p>Methods/Materials Firstly, I defined and determined the hardness of three types of water (deionized, hard and soft water). I tested several samples of materials (glassware, silverware, vinyl, ceramic tile and a car body panel) by spraying each sample with each of the three different types of water. Next, I collected data by measuring the amount of residue/stains that remained on the tested surfaces and I recorded and graphed the results of my experiment. I was then able to determine which type of water (hard or soft) cleaned most effectively. The deionized water served as the control.</p> <p>Results After analyzing the data, I recorded the results: the hard water left the most visible residue on all of the sample surfaces; the soft water left much fewer stains than the hard water. The deionized water produced the least amount of residue.</p> <p>Conclusions/Discussion I concluded that soft water cleans different surfaces and objects the best. Hard water contains many minerals such as calcium and magnesium which leave visible deposits behind. This supports my hypothesis that soft water cleans more effectively and leaves less residue behind than hard water. If I were to re-conduct the experiment, I would have tested the different types of water on a larger sample of objects, such as clothing, skin, hair and even corrugated surfaces. This project can benefit society in a number of ways. The knowledge obtained could impact many businesses both positively or negatively. For example, car washes, cosmetic industries, restaurants, and even construction markets are all affected by the type of water they use. If consumers are not pleased with their products or services, companies may lose business and their profits could easily suffer. Ultimately, the minerals and contaminants in water can have a direct impact on a business, one's personal life and in the overall health of society.</p>	
Summary Statement My project involves the testing and research of hard and soft water and its cleaning effects on different objects and surfaces.	
Help Received My parents purchased the supplies and test equipment.	