



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Kimberly M. Vaz	Project Number 31437
Project Title Optimal, Automatic Hydration System for Household Water Conservation	
Abstract Objectives/Goals While a lot of attention has been given to conserving water through techniques such as the use of low flush toilets, not enough attention has been given to tackle the largest source of household water usage, which is that of watering household lawns. The technology used for irrigation in the backyard requires a great deal of intervention by the consumer to ensure that lawns are not under watered in summer or over watered in winter. This project aims to provide a tremendous reduction in household water consumption through an easy-to-use, easy-to-install, automatic sprinkler system which delivers an optimal amount of water necessary for the backyard. Methods/Materials I wanted to program a micro controller with the function to check the resistance, and thereby the moisture levels, in my back yard soil. To test my code, I ran tests on my computer using a simulated circuit board to indicate the glow of an LED light. In practice, I had intended to wire my board to two metal nails underground and check the resistance on these nails, however, I wasn't able to do so due to the fact that soil is very saline and would have corroded the nails and produced inaccurate readings. Thus, I created a soil probe by inserting two metal nails into gypsum plaster. The gypsum profoundly exemplified the amounts of water absorbed. I connected my soil probe to the micro controller using multiple wires, and a PVC pipe underground. Results After effectively programming the micro controller that checked the resistance in the soil probe, I was able to receive analog resistance values and the micro controller was able to send out digital commands. These digital commands signaled the sprinkler control timer to either complete its task if moisture levels were low, or disable it if adequate moisture existed. I used rain sensor inputs on modern sprinkler timers (which are connected to a rain gauge), to turn off the sprinkler timer if it was raining. Conclusions/Discussion My invention is practical for a number of reasons. Unlike other automatic sprinkler systems, which require a great deal of time and money to install, my system is simple and very inexpensive. My smart water system has the potential to save the residents of California and the rest of the United States millions of dollars in water as well as care for the environment by not over-watering or under-watering plant specimens in the backyard.	
Summary Statement My project is the creation of a water-saving, low-cost, easy to use, easy to install automated sprinkler system that delivers the optimal amount of water required for lawns and plants.	
Help Received Micro controller recommended by colleague of father.	