



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Alison Burklund	Project Number J1007
Project Title Hazardous Waste: What Soil Fits Its Taste?	
Abstract Objectives/Goals In my experiment I wanted to find out what soil type would be most effective so that hazardous waste would not contaminate the ground water. I had two main goals when performing my experiment. Achieve a general understanding of the chemical and physical effects that soil has on a contaminant through the process of a chemical reaction in the soil column. Determine what soil type chemically and physically really has the best positive effect on not contaminating the groundwater. Methods/Materials To do this experiment I used two 3-foot plastic tubes, each representing a soil column. I chose four different soil types and tested them each with four different liquids/contaminants. I measured the initial pH of all of these substances. The tubes were filled with soil and poured contaminant into the tube observing and recording my findings with time. Once the contaminant was beneath the soil I measured and poured average rainfall. I recorded how far the contaminant had moved about every 1-5 minutes depending on how fast the contaminant was moving. I then calculated average flowrate and measured the pH of the contaminant coming through the soil column and compared that with the substance's original pH. My tests measured the rate the chemical moved through the soil column and whether a chemical reaction may have occurred between the soil and the contaminant. Results The silty-clay was most efficient for slowing the contaminant down due to its impermeability, while the sand was the most permeable. Silty-clay was not effective in slowing down the acidic contaminant because the acid broke the organics in the soil down which caused the soil to lose its "sticky" effect. The basic soil was most effective for neutralizing acidic contaminants. Flowrates ranged from .005in/min to 1.36in/min for the experiments performed. Conclusions/Discussion I concluded that without rainfall the liquid would not move through the column. This means that if the contaminant is disposed of in arid or dry environments, it will not move downward, eliminating the potential for ground water contamination. Also, lining a landfill with either an acidic or basic soil, depending on the contaminant, would be useful. This would neutralize the contaminant just before it reached the water table, again eliminating the potential for ground-water contamination.	
Summary Statement The focus of my project was to find out what soil type is best so that hazardous waste does not contaminate the ground water supply.	
Help Received Discussed project with mother; mother made some suggestions when problems were encountered; mother supervised pouring and mixing of toxic chemicals.	