



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Nina S. Raj	Project Number S0811
Project Title Mind in the Gutter: The Effects of Various Natural Filters on Urban Runoff Water	
Objectives/Goals My experiment was an attempt to test the effectiveness of various natural filters on urban runoff water. I may propose my findings to the Save the Bay Organization, and ask them to line the roads of Marin with the most effective filter. The filters I used were redwood bark, orchid bark, pebbles, charcoal, soil, and peat moss. My control was the unfiltered water. Pollutants I tested for included lead, bacteria, chlorine, nitrates, nitrites, pesticides, hardness, pH, and turbidity.	
Abstract Methods/Materials I sent away for test kits that tested for my pollutants and borrowed test kits from the science teachers at Tamalpais High School in order to test for turbidity as well. I created the filters by cutting squares of mesh wire, and duct-taping them into plastic flower trays. I spread 1 1/2 inches of each material into the bottom of the trays. I collected runoff water from various locations and let the water sit for 72 hours so that bacteria could form. I polluted the water with pesticides, drain cleaner, and mice remover. I let the water sit for 30 minutes to let the pollutants dissolve and disperse. I stirred the solution to disturb the levels in the water, and tested for all pollutants. I then poured five cups of this control water into a watering can. I placed another plastic container under the filter and slowly doused the material with the water. After letting the water drip through, I took the filter off and gently swirled the filtered water around the container, and then poured it back into the watering can. I repeated this process. I filled the six equally-sized containers with the filtered water. I tested for each of the different pollutants twice.	
Results I found that the most effective filters were the redwood bark and the charcoal. They worked best in filtering out nitrates, nitrites, pesticides, and chlorine.	
Conclusions/Discussion I believe that the most effective filters were the redwood bark and the charcoal because they had the largest surface area for chemical bonding. The results supported my original hypothesis, which was that if the water was poured through the redwood bark, the water would be cleaner than any of the other samples. I predicted that because redwood bark has natural filtering properties such as a large surface area for pollutants to bind to, plus the wood will naturally absorb water, reducing amounts of other chemicals.	
Summary Statement My experiment tested the effectiveness of various natural filters on the cleanliness of urban runoff water.	
Help Received Mother helped type report; Sister and friend helped design poster/advise project; used lab equipment at Tamalpais High School.	