CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Sonya Aggarwal

Project Number
J0901

Project Title
Got Water?

Abstract

Objectives/Goals
The purpose of my project was to test the quality of water in terms of microbial count from different water sources in different cities of the Bay Area. These sources included tap water, drinking fountain water, and refrigerator dispenser water. Tap water is chlorinated, therefore, it is expected that it should be free from any bacteria. However, refrigerator dispenser and fountain water pose a possibility of contamination, so tap water may be the cleanest or contain the least number of bacterial count.

Methods/Materials
Using sterile bottles, I collected water samples from the tap, drinking fountains, and refrigerator dispensers from Palo Alto, Saratoga, San Jose, and Santa Clara. After I measured the pH of water from various sources, I pipeted 1 ml of water into each of the 3 petri dishes from each sample and mixed it with warm liquefied nutrient agar. After the agar was solidified, I incubated all the plates for 48 hours at 37 degrees Celsius. I counted and recorded the number of colony(s) from each plate. I made some sample smears of bacteria from various sources onto glass slides. I stained them with Gram Stain, and then examined them under the microscope.

Results
The results show that the pH of water from most sources was about 7. The bacterial count was from 0 to very few in tap water, from a few to "too many to count" in both fountain water and refrigerator water. The bacteria found in the water samples were Gram-negative and Gram-positive bacilli as well as Gram-positive cocci.

Conclusions/Discussion
I concluded that tap water was the safest to drink among the four cities in the Bay Area.

Summary Statement
The purpose of my project is to test the quality of water in terms of microbial count within the four various cities of the Bay Area.

Help Received
Mr. Francis Lee explained how to test the quality of water, helped me with the Gram Stain method, and microbial count. My father helped me in collecting the water samples and research some background information about water quality.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Jonathan R. Allison

Project Number
J0902

Project Title
It's Raining, It's Pouring, the Radishes Are Growing: Chemical Analysis of Rainwater for the Nation's Food Production

Abstract

Objectives/Goals
My objective was to see if rainwater from different parts of the nation affected the growth of radish seeds. I tested the rainwater's hardness and pH levels, obtained information about the air quality of the area the rainwater was collected from and then planted radish seeds.

Methods/Materials
I contacted friends and family from 11 different cities in the United States and asked them if they could help me by collecting rainwater from their city. After they collected it, they shipped it back to me. Then I tested the rainwater for hardness, using the chemical process of titration. Next I tested the rainwater for pH levels. Then I planted radish seeds in potting soil and watered each plant with rainwater from a different city. I observed, measured and recorded any growth or changes daily for seven days.

Results
The results of my testing were that Chicago and Virginia had the highest hardness level at 7.0 and most acidic level at 5.0 and they had the least growth. Next Boston, Florida, Long Beach, Los Angeles and New York had average hardness level at 3.0 and pH at 5.5 and their plant growth was average. Hawaii, Memphis, South Carolina and Spokane had the best hardness level at 2.0 and pH level at 6.0 to 6.5 and their plant growth was excellent.

Conclusions/Discussion
My conclusion is that since deionized water, the purest form of water, has a hardness level of 1.0, the lower the hardness level the better. Also a pH level of 7.0 is neutral, so the closer a pH level is to 7.0 the better. This supports the results of my testing, that the lower the hardness level and the closer the pH level is to 7.0 the better. According to my experiment, the hardness and pH level of rainwater does affect plant growth.

Summary Statement
The effects that rainwater hardness and pH levels have on the growth of vegetation.

Help Received
My mom helped me complete and type this application.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

Lauren M. Bergmann

Project Number

J0903

Project Title

Reuse It or Lose It: The Effect of Recycled Water on Grass and Flowering Plants

Abstract

Objectives/Goals

Water shortages are a worldwide problem. Using recycled water (reclaimed wastewater treated to the tertiary level) is one possible way to help preserve our natural water supply. According to one source, 80% of our water supply is used for agriculture and irrigation.

My objective was to determine if recycled water is as effective as tap water for the irrigation of grass and flowering plants. Recycled water contains nutrients, which may benefit plant growth, but a higher level of salt, which may be harmful to plants.

Methods/Materials

For my experiment, I chose three different types of plants: Marathon grass, French lavender (salt tolerant), and snapdragons (salt sensitive). 10 samples of each plant type were planted and maintained in identical circumstances. The experimental groups were watered with recycled water, and the control groups were watered with tap water. I watered the plants three times per week and measured growth weekly for eight weeks. I also collected water samples that were tested weekly for levels of nitrates, nitrites, and total dissolved solids (salt).

Results

My results showed that recycled water worked just as well as tap water. Grass growth (blade height) and quality were actually better with recycled water. Salt Tolerant Plant growth (height) as well as growth of new buds, flowers, and stalks were also better with recycled water. Salt Sensitive Plant growth was similar in both the experimental and control groups. The experimental samples displayed no visible signs of salt damage. Water tests consistently showed higher levels of nitrogen compounds and total dissolved solids (salt) in the recycled water.

Conclusions/Discussion

In conclusion, grass and flowering plants irrigated with recycled water grow just as well, and sometimes better, than those irrigated with tap water. I believe that the nutrients in recycled water act like a natural fertilizer, which helps to enhance plant growth. My experiment demonstrates that using recycled water for irrigation is an effective way to help preserve our natural water supply.

Summary Statement

My project studies the effect of recycled water on the growth of grass and flowering plants.

Help Received

The San Elijo Water Reclamation Facility provided me with recycled water and conducted water tests in their laboratory; Home Depot Nursery helped me select appropriate plants and soil for my experiment; my mom drove me to the water plant, proofread my paper, and helped organize my display board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Rosalind N. Cox

Project Number
J0904

Project Title
Water Quality of Big Chico Creek

Abstract

Objectives/Goals
The objective of my project was to determine if the water quality of Big Chico Creek is better above the development of the City of Chico than below town using benthic organisms and water analyses.

Methods/Materials
I chose five sample sites along Big Chico Creek starting at Alligator Hole, above development, and continuing downstream through town to Bidwell Drive, below development. I collected benthic organisms using a dip net at each site, preserved them in denatured alcohol, and later categorized and counted them. Also, at each site, I ran four water analysis tests, dissolved oxygen, nitrate, phosphate and pH. I recorded the results of the benthic organism counts and water tests.

Results
At the five sites I sampled, I found six orders of insect larvae, Ephemeroptera, Odonata, Plecoptera, Tricoptera, Coleoptera and Diptera. The numbers of benthic organisms were fairly high at all of the sites, except Site #5. The highest count of insect larvae was 136 at Site #4, near the middle of town. The lowest count was 3 at Site #5, the site most downstream. The average number of insect larvae was 51. According to my water tests, there were high levels of dissolved oxygen at all sites. The average pH was 7.4. I found no phosphate at any of the sites and only traces of nitrate at two sites.

Conclusions/Discussion
My results suggest that the water quality of Big Chico Creek is healthy throughout the whole testing area, not just above the developed area of town. This is shown by the high levels of oxygen at all sites and low or no levels of nitrate and phosphate. The traces of nitrate found at two sites are so small that they probably did not affect the health of the creek much. I also found fairly high levels of insect larvae at all sites except Site #5. This was probably due to the silty substrate and not pollution because the chemical analysis tests showed healthy results.

Summary Statement
The purpose of my project was to determine whether the water quality of Big Chico Creek is better above or below the developed area of the City of Chico.

Help Received
I used books and water test kits provided by Anne Stephens, Marsh Jr. High. My father drove me to the test sites and helped construct my backboard. My sister helped me with my tables and graphs on the computer and my mother helped type my final draft.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Sanjit Datta

Project Number
J0905

Project Title
Madrona Marsh Microbes

Abstract

Objectives/Goals
The objective of my project was to determine whether the sump, a water collection area in Madrona Marsh Preserve, had more bacteria than five other sites on the Preserve.

Methods/Materials
I collected samples and inoculated agar plates from each site at dilutions of neat, 1/10, 1/100, and 1/1000. The agar plates were inoculated by taking 1/10 of a milliliter of water from each of the sampling containers and transferring the water onto the agar plate. I spread the bacteria out using a glass rod that was sterilized between each inoculation. I later counted the individual bacterial colonies in each agar plate.

Results
The sump had more bacteria than other sites on the Preserve. However, there was an uncommonly high number of bacteria at one site, probably an error due to cross-contamination from other samples or from the air. Nevertheless, the two sites in the sump had more bacteria than the other five sites.

Conclusions/Discussion
My results suggest that the sump has more bacteria than the other sites on the marsh, which coincides with my hypothesis. My project was the first broad-scale sampling of the Preserve, so my data cannot be compared to others. However, my results agree with what Mr. Carr, my mentor, thought was happening in the sump.

Summary Statement
My project determined whether the sump or five other sites on the Madrona Marsh Preserve have more bacteria.

Help Received
Conducted research and collected samples from Madrona Marsh Preserve under the supervision of Mr. Robert Carr and Ms. Tracy Drake

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Tricia K. Dong

Project Number
J0906

Project Title
When It Rains, It Pours: Does the Rain Affect the pH and Salinity of Our Local Beach Water?

Abstract

Objectives/Goals
My objective was to determine what affect the rain or runoff from the rain had on the salinity and pH content of our local beach waters. I believed the water samples taken from Redondo Beach would change the most since it is closest to a storm drain.

Methods/Materials
I visited Hermosa Beach, Long Beach, and Redondo Beach at least five days after a rainfall. At each beach I collected a sample of water in a new, glass Mason jar and documented the weather and wave conditions. Immediately upon arrival home, I began testing and documenting my samples for salinity and pH. The day after a current rainfall, I repeated this process at the same three local beaches and analyzed the data. I also captured a sample of rainwater to be evaluated for salt content and pH.

Results
After conducting three to four pH and salinity trials for each sample, depending on variances, I found that the pH levels for all three samples, before and after the rain, did not change. Salinity was another story. At all three beaches before the rain, the salt content was similar, but after the rain, Long Beach plummeted while Redondo Beach dramatically rose and Hermosa Beach stayed about the same.

Conclusions/Discussion
This experiment proved my hypothesis to be incorrect. It was not just the rain and runoff that affected my results. After a face to face interview with an aquarist from the Cabrillo Marine Aquarium, I learned that my results could have been influenced by geological features of the Southern California coastline. Redondo Beach's rise was possibly due to upwelling off the Redondo Beach underwater canyon and Long Beach's drop was from an influx of fresh water from the Los Angeles River. After these explanations, I realize there is much more that I can learn by following up with this project, adding water temperature to my data would be a start.

Summary Statement
Comparison of local beach waters for pH and salinity, tested before and after the rain.

Help Received
Mother took pictures; Aquarist from Cabrillo Marine Aquarium answered questions

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Savannah R. Downer

Project Number
J0907

Project Title
Mojave Precipitation Records

Abstract

Objectives/Goals
To see if I can take ring samples from local Juniper trees and match the precpitation pattern for the Victorville/Mojave region as recorded by the National Weather Service over the last 100 years. Will the variations in the pattern give me a more accurate precipitation record for my local area in Hesperia. Also can I date the ages of the trees using the known years of precipitation extremes and the ring growth and precipitation patterns?

Methods/Materials
We cut one of the main stems off at the base leaving the rest of the tree intact.
Each sample was sanded down smooth on one side to expose the growth rings of the tree. I then identified the individual rings, marking where each one started and ended. After that I measured the width of each ring in millimeters and recorded this data.I then took the annual rainfall for each year and recorded that next to the ring width for that year.I them plotted a graph comparing the precipitation pattern and growth ring pattern.

Results
The overall patterns generally match with some notable exceptions. 1948 and 1949 had a combined precipitation total of 8.5 in. although the growth pattern for that period would indicate a lot more precipitation had fallen. One explanation is that most of that precipitation fell as snow allowing the water to slowly and deeply penetrate the ground. However the overall pattern remains similar. 1963 and 1965 again show low growth rates for above average precipitation. These years however were at the end of a very long dry period for the Mojave region. Drought conditions can put a lot of stress on a tree. It may take a tree several years to recover from such conditions. But overall the patterns were almost identical

Conclusions/Discussion
I feel quite confident that I was able to date the tree accurately to 1905. The results showed that I was able to match the growth pattern with the precipitation pattern with some expected variations. Some of these minor variations could be the results of more or less precipitation. However, major variations do not necessarily reflect a more accurate precipitation record for my local area. There are many variables that have to be considered. In the results section some of these variables were discussed. In conclusion, the growth ring pattern of the tree was able to accurately show the precipitation changes for the region over the past 100 years but less able to show the precipitation record for a specific year.

Summary Statement
That the Juniper tree is a natural and accurate precipitation record for the Mojave Desert Region

Help Received
My father helped me cut the samples, understand the research, type and helped with the display board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Dana A. Feeny

Project Number
J0908

Project Title
The Receding Night: The Effect of Artificial Light on the Migration Pattern of Daphnia

Abstract

Objectives/Goals
The objective is to determine if artificial light has an effect on the migration pattern of Daphnia in a simple laboratory experiment, in a simulation of a pond habitat, and in their natural pond environment.

Methods/Materials
The experiment had to be done in two phases. First, the Daphnia's natural migration pattern was observed. Then the effect of artificial light on these patterns was studied and compared to the original migration pattern. Daphnia were observed in test tubes and then in 3-foot columns of water and in their natural pond environment during the day and at night. Five different artificial light sources were introduced and the Daphnia were observed.

Results
The study revealed that the Daphnia did migrate in open areas of the pond, but hovered in the top and middle layers of the pond both day and night in areas where they were protected from sunlight and had a food source. When artificial light was introduced in test tube experiment, the Daphnia were not bothered by halogen, florescent or incandescent light as much as by sunlight and UV light, but attracted to sodium light. Sodium and incandescent lights, the most common outdoor lights, were used for experiments on a simulated pond habitat and the pond. The results showed that the Daphnia were attracted to both the sodium and incandescent light, but much more to the sodium light. The pond study showed swarms of Daphnia were attracted to both lights at all levels of the pond, wherever the light reached.

Conclusions/Discussion
Artificial light affects the migration pattern of Daphnia by attracting them towards the light at night. Future work would examine the migration (is it horizontal, not vertical) of zooplankton in a natural wetland that has a lot of light pollution and compare it to a wetland protected from artificial light.

Summary Statement
The project determines the effect of artificial light on the mighration pattern of Daphnia in laboratory experiments and in their natural habitat.

Help Received
My mother found the sodium light, drove me to the pond, helped me sample,and helped me get my data into data tables. I looked on the Internet and found Howard Webb who photographed Daphnia. He gave me encouragement (see emails) and after my project was completed, took the pictures of my Daphnia.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Olivia G. Fiori

Project Number
J0909

Project Title
Are You Sick of Surfing?

Abstract

Objectives/Goals
My project was to determine if swimming and surfing in more urban areas increase your chance of illness due to contaminates entering the ocean by urban runoff from storm drains, streams and rivers.

Methods/Materials
7 different samples of ocean water. Water containers. Hanna instruments ecology water testing kit. Protective gear; goggles, apron and gloves. Ocean illness surveys. I passed out surveys and interviewed surfers. I collected 7 different water samples from urban areas and unpopulated areas. I tested the water samples I had collected for dissolved oxygen, acidity, carbon dioxide and PH. I had the samples tested by a professional lab for coliform.

Results
9 of 10 people surveyed indicated that they had become ill after surfing in urban areas with known storm drains and creek runoffs. Illnesses ranged from skin rashes and sinus infections to flu-like symtoms. No one reported getting ill in the less urban areas. The water close to urban areas did show higher levels of pollution, however those levels were well within the state standards for safe water.

Conclusions/Discussion
My conclusion is that you are more likely to become sick by swimming and surfing in more urban areas as compared to less urban areas due to a higher level of pollution entering the ocean through storm drains, sewage spills, creeks,etc.This year was unusually dry and there had been no resent runoff. I was not able to get samples during a time of runoff. I learned that pollution levels are their highest within 72 hours after a storm or heavy rains. I would like to continue my research throughout the year or more so I can compare results under different conditions.

Summary Statement
My project is about ocean pollution and whether that pollution can actually make you sick from contact.

Help Received
Testing for E-coli and Total Coliforms were done at Bolsa Analytical. I did not perform any part of those tests.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Danielle J. Gessow

Project Number
J0910

Project Title
The Devastating Effects of Oil Spills

Abstract

Objectives/Goals
My objective was to determine the effect of different amounts of oil on elodea densa plants and their inner cell structures in an aquatic environment and the effects of oil clean-up from the aquatic environment.

Methods/Materials
10 quarts of distilled water
25 elodea densa plants
metal weights for plants
5 plastic fishbowls
clean gravel to cover bottom of fishbowls
plant lights
microscope
ruler
paper towels
cutting blade
permanent marking pen
500 ml beaker
lamp oil
strainer
skimmer
Add 2 quarts of distilled water to each fishbowl. Take each plant and cut it with a cutting blade to 4 inches. Five plants are labeled and placed in each of the five fishowls. After 2 weeks of growth, measure the plants and observe them both visually and microscopically. Record your observations. Measure the appropriate amounts of oil with the 500-ml beaker. Add nothing to fishbowl 1, 25 ml to fishbowl 2, 50 ml to fishbowl 3, 100 ml to fishbowl 4 and 200 ml to fishbowl 5. Expose the plants to the oil for 7 days. Again measure the plants and observe them both visually and microscopically. Record your observations. Take the strainer and syringe and try to remove as much oil as possible from each of the 4 fishbowls that contain oil. Allow the plants 7 days to recover. Continue your observations in the same manner.

Results
After two weeks of growth the elodea plants and their inner cell structures were extremely healthy. One week after the oil spill the plants began to disintegrate. One week after the clean-up, only two plants exposed to the oil remained. The inner cell structure of the elodea densa plants exposed to oil also

Summary Statement
My project is to determine the effects of oil spilled on elodea densa plants in an aquatic environment as well as the effect of oil cleanup.

Help Received
My mom helped me buy the materials and edited my writing.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Dhruv K. Gopinath

Project Number
J0911

Project Title
Does Man-Made Pollution Affect the Hydrological Cycle?

Abstract

Objectives/Goals
The objective was to determine if water evaporates more in a polluted atmosphere or a non-polluted one.

Methods/Materials
Experiments were carried out to determine whether water evaporates more in a non-polluted atmosphere or a polluted one. In this experiment two aquariums were used. One was a clear tank which we designate the non- polluted tank. The other aquarium had a simulated haze of man made pollutants, which was obtained by soaking a cotton ball in 2.5 ml of unleaded gasoline and burning it in a Pyrex dish within the aquarium. The burning produced a sooty slightly cloudy haze similar to a polluted environment. The burning took place 2 hours prior to testing. Both tanks were placed outside at the same times and stayed out in the sun for exactly the same time. Based on prior research on the topic, the experimenter hypothesized that the water in the non-polluted tank would evaporate more than the water in the polluted tank.

Results
Water in the non-polluted tank evaporated more than the water in the polluted tank. In all phases of the experiment, the experimentation supported the hypothesis that man made pollution could impact the hydrological cycle by blocking the sunlight needed for evaporation. Also temperature readings in the aquariums during different times of the day supported the hypothesis that pollutants have both a warming and cooling effect.

Conclusions/Discussion
To conclude this experiment the experimenter found out that his hypothesis was correct as the non-polluted tank evaporated 31% more than the polluted tank did.

Summary Statement
It is about the effects of pollution on the hydrological cycle

Help Received
Mother helped record data, Father helped correct graphs, Neighbor advised on decorating the board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Michael A. Gushansky

Project Number
J0912

Project Title
The Effect of Pollution on Bacteria Levels Along the Los Angeles River

Abstract

Objectives/Goals
The objective of my project was to determine how pollution affects the water quality along the Los Angeles River. I believe that the overall bacteria level will increase as we move along the river from its source toward the ocean.

Methods/Materials
Petri dished containing specialized bacteria growing media were inoculated with water samples taken from various location along the Los Angeles River (Encino, Burbank, Los Feliz, Los Angeles, Compton, and Long Beach). They were placed in an incubator at 37 degrees Celcius for 24 hours. The number of colonies of fecal coliform, non-fecal coliform and other types of bacteria were counted and averaged.

Results
The total bacteria count generally increased along the Los Angeles River (71 colonies in Encino, 202 in Compton, 186 in Long Beach). The non-fecal coliform bacteria level also increased (6 colonies in Encino, 27 in Compton, 40 in Long Beach).

Conclusions/Discussion
The results confirm my hypothesis that pollutants accumulate along the Los Angeles River. The higher level of bacteria in Compton, in comparison with the last sampling location in Long Beach, is probably due to the higher number of industrial outlets in the city of Compton.

Summary Statement
This project shows the importance of preventing excessive water pollution

Help Received
My uncle, Gene Gushansky, helped me build the incubator and advised me on the testing materials

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kayla M. Harrington

Project Number
J0913

Project Title
My Creek's Trout

Abstract

Objectives/Goals
I know that there used to be trout running all through Pescadero Creek and since Pescader does mean "place of fish", where did all the trout go? I hypothesize that the plants which live and grow around the creek may be significant reasons for the pH changes in the water.

Methods/Materials
I tested the pH levels in and around Pescadero Creek. I chose ten sites along this path with each site being 100 feet away from the last. I collected samples from each site, testing the pH of the creek water, the bank soil, the creek bottom soil, and the dominant plant or tree. The pH was tested on site, the samples saved and labelled, and the results of the pH tests recorded on a data sheet. (Materials: Distilled water and AccuGrow pH Soil Test Strips).

Results
The research Data Sheet records the pH levels found at all ten sites. The average pH of the soil bottom was 7.45. The average pH for the soil bank was 7.2. The pH of the water was consistently 8. The average pH of the dominant plant or tree was 7.435.

Conclusions/Discussion
I found that my hypothesis was incorrect. The creek bottom soil, the bank soil, and the alder or raspberry bush do not seem to affect the pH of the creek water significantly. While the pH of the plants and the soil prove to be more acidic that the creek water itself, it is not significant enough to change the pH level of the water and, therefore, affect the trout habitat.

The extreme ends of the pH scale are 2 and 13, either can bring damage to the gills, exoskeleton, and fins of fish. In the Pescadero Creek, however, I found that the pH levels of the varialbes tested fell within normal ranges for fish survival.

As disappointing as it is to have my hypothesis be incorrect, now I can move on to other projects of research. I discovered in my reading that there are many things that can keep fish from surviving and in the future I would like to test other hypotheses. These would include the temperature of the water, the levels of ammonia, nitrates, and oxygen in the creek water as well as other chemicals and obstructions. Although my hypothesis was incorrect, there are still no trout left in the Pescadero Creek and I intend to find out why!

Summary Statement
Has the pH level in Pescadero Creek driven the trout away?

Help Received
Dad and siblings helped to carry samples.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Alexandra L. Heiskell

Project Number
J0914

Project Title
Water Pollution Outbreak?

Abstract

Objectives/Goals
My objective was to find out about Nonpoint Source Pollution and test storm water in the City of Carmel, California. After meeting with the City DPW I selected 4 sites to test at. My goal was to find out whether people in my watershed are causing pollution to enter Monterey Bay.

Methods/Materials
I tested storm drain water using a water and air thermometer, chemical test strips, pH test strips, and a turbidity tube. After meeting with Dr. Holly Price and Bridget Hoover of the Monterey Bay National Marine Sanctuary, I followed their suggestion to use test strips instead of liquid reagents since they need to be captured so they don't cause pollution. I tested nitrates, nitrites, hardness, alkalinity, pH, and turbidity. I used the Sanctuary's test equipment.

Results
In my testing I found some minor variation in my data. I lost one test site due to reconstruction by the City. I wasn't able to take readings for most of December due to the extremely large storms which shut down access to the beach where three of my sites were. Rainfall data for Carmel is plotted on my display board which came from the Monterey Herald. Air temperature varied due to the time of day. Water temperature showed about a 10 degree C variation. There was no reading for nitrates or nitrates which shows no sign of animal waste. Alkalinity readings were consistent only at site 2. All my pH readings were between 7 and 8. My total hardness(GH) ranged between 150 to 300 ppm showing a lot of minerals and suspended solids in the water keeping the pH above 7.

Conclusions/Discussion
I did not see a signifant pollution problem but testing using reagents in the field or taking samples to a lab would be required to verify that. In my watershed only 5% of the storm water enters the ocean thru their pipelines, but 95% comes from the Carmel River. Testing at several sites at the river along with the sites in Carmel would give better data to base a pollution decision. I found that the best way to prevent pollution is public education so people stop doing the activities that directly or indirectly pollute our rivers and bay. If I continued this project I would get a LaMotte Storm Drain test kit and test my three sites and add sites above the lagoon on the Carmel River. I would also volunteer to take samples at first flush in my watershed. This data could then be compared with what I found in the field.

Summary Statement
Exploring nonpoint source pollution coming from the City of Carmel into Carmel Bay

Help Received
My mother drove me to the test sites and helped me record the data. Jim Cullen, Carmel DPW gave me information on the storm drain system. Dr. Holly Price and Bridget Hoover of the Monterey Bay National Marine Sanctuary gave me advice and lent me test equipment.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Marshall C. Henry

Project Number
J0915

Project Title
How Can We Help Prevent Diseases from Being Spread Far and Wide?

Abstract

Objectives/Goals
Germs spread easily when people sneeze or cough and they do not cover their mouth. Because of these traveling germs, colds and viruses spread quickly throughout schools and into the community. I am hoping my project will prove that the elbow will catch at least twice as many germs as a single hand would and one third as many germs as two hands would. If we use our elbows as the barrier when we sneeze or cough, we can stop germs from being spread so far and wide.

Methods/Materials
A funnel was used to put ¼ cup confetti into four, separate, deflated balloons. A tire pump was used to blow up the four balloons. A 6x6 ft. piece of paper, which was marked with a black pen in one-foot radiuses from minus one foot to five feet, was used to show the distances that the confetti fell when each balloon was popped with a sharp pin. The experiment was performed four times using:
·no hands in front of a balloon,
·one hand in front of a balloon,
·two hands in front of a balloon,
·the inside of an elbow in front of a balloon when they were popped.
In each of these experiments, the number of confetti pieces in each one-foot circle of radius from the minus-one-foot radius out to the five-foot radius was counted and recorded on a graph.

Results
The inside of the elbow kept 89% of the confetti within the plus/minus one-foot radius, while two hands held 78% of the confetti within the plus/minus one-foot radius. This is only a 13% difference. A one-handed barrier kept only 61% of the confetti within the plus/minus one-foot radius. This is a 28% decrease in confetti compared to the elbow. Finally, when no barrier was used, 47% of the confetti still stayed within the plus/minus one-foot radius, just under half of the amount using the inside of the elbow as a barrier. The traveling distance beyond the one-foot radius decreased when using the inside of the elbow, while more confetti pieces were blown beyond the one-foot radius when using two hands, one hand, and no barrier at all.

Conclusions/Discussion
I did not prove my hypothesis that twice as many germs would be prevented from spreading when comparing the elbow and the two-handed barrier. I proved that the inside of the elbow is 13% more effective than two hands, 28% more effective than one hand, and 47% more effective than no barrier in preventing germs from spreading.

Summary Statement
My project shows which barrier (hand or elbow) most effectively prevents germs from spreading.

Help Received
My mom helped me count confetti and create a graph from the data I collected; my sister held balloons for me; my family prayed for me.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Amanda C. Kantor

Project Number
J0916

Project Title
Acid Rain: Friend or Foe?

Abstract

Objectives/Goals
My objective is to observe the affects of four different pH levels on Water Hyacinths.

Methods/Materials
Materials:
1 thermometer 1 10ml syringe 4 7.5L buckets
20 2.0L containers 1 2L metric measuring cup 1 camera
20 Water Hyacinth plants 1 metric area template 1 2.5m table
330ml lemon juice 1 1.5m fluorescent light 1 pH tester

Procedure:
A. Set up 20 Water Hyacinth plants in separate containers containing 1.5L of water near a window receiving bright light.
B. Samples 1 - 5 are kept in a neutral pH 7.0 environment. Samples 6 - 20 are divided into three pH levels of 6.5, 5.5, and 4.5.
C. Samples are observed over a six-week period. The progression of brown spots on the samples' leaves are measured and recorded weekly, using the metric area template.
D. Calculate the percentage change of brown areas for each plant.

Results
The plants exposed to the 7.0pH level of water showed the most distress of all the samples. The data demonstrates that plants exposed to the pH level of 4.5 exhibited 8% less distress than the plants at the pH level of 7.0. The plants exposed to the pH level of 6.5 exhibited 29% less distress, and the plants exposed to the pH level of 5.5 exhibited 40% less distress.

Conclusions/Discussion
The data shows that pH in the environment does have an affect on the life of plants. It is clear that in my experiment, the Water Hyacinths prefer a specific acidic environment at the 5.5pH level. A deviation from this to a more acidic or basic environment resulted in the plants enduring more distress. This demonstrates that even a small change in the environment could result in less reproduction of this plant, and all life that this plant supports. All plants have a preferred pH range, and pollution resulting in acid rain can affect their growth and life span.

Summary Statement
My project involves observing the affects of four different pH levels on Water Hyacinths

Help Received
My Parents drove me to stores to get supplies; my Dad helped me change the water in each container weekly; my Mom helped by typing a portion of the report.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Jaye M. Kasper

Project Number
J0917

Project Title
How Does the Presence or Absence of Iceplant Affect the Growth of Dune Buckwheat Plants in the Ballona Wetlands?

Abstract

Objectives/Goals
I wanted to see if the growth of Dune Buckwheat plants in the Ballona Wetlands was affected by the presence or absence of living or dead Iceplant. I believe that Dune Buckwheat plants will grow most when they live where there has not been any Iceplant for a great amount of time.

Methods/Materials
At site 1, I removed dense living iceplant and immediately planted 4 Dune Buckwheats. At site 2, where there was dead Iceplant detritus covering the soil, I left the detritus, removed all grasses and planted 4 buckwheats. At site 3, where there had not been any living or dead iceplant for a long period of time, I removed all grasses and planted 4 buckwheats. I observed the growth patterns of the plants in the 3 sites over an 8 week period.

Results
On average, the Dune Buckwheat plants in site 1 had the most increase in foliage volume from week 1 to week 8, while the Dune Buckwheat plants in site 3 grew the least from week 1 to week 8.

Conclusions/Discussion
My conclusion is that foliage volumes of Dune Buckwheat plants in my study increased the most when they were planted in soil that recently had living Iceplant removed. The average volume increases for site 2 (Iceplant detritus) and site 3 (no recent Iceplant) were very similar and were much less than the site 1 (Iceplant recently removed) volumes. There are many factors that could have contributed to my results, such as if rain affected the nutrients in which the plants needed to live.

Summary Statement
My project tested the growth patterns of Dune Buckwheat plants in the Ballona Wetlands when living under the presence or absence of Iceplant over an eight week period.

Help Received
Teacher helped plant and water plants weekly; Loyola Marymount University professor, Dr. Philippa Drennan, helped design project.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Alison E. Lanier

Project Number
J0918

Project Title
Comparison of Commercial Logs: pH and Airborne Particulates

Abstract

Objectives/Goals
If different commercial fire logs all the same weight are made by different companies, then I think that the different brands of commercial logs will vary in production of airborne particulates and pH.

Methods/Materials
Materials: 4 logs of each brand of firelogs: Duraflame, Ralph's, Sunny Select, Bengal Recycled, and Pine Mountain and a modified chiminea heater with shop vac. (see display for details)
Methods: I burned twenty logs (four of each brand) for 30 minutes and collected the soot/water from the logs. I analyzed the soot water in five different ways.

Results
The solution of each burn was analyzed in five different ways: particulate measurement, filter paper inspection, and examination of the clarity of the soot water visually and microscopically, and acidity. A measurement of the depth of sediment for each test tube was taken for each burn, and the average of four burns for each brand was calculated. The average sediment of each log was used for comparison. The soot water was also inspected for clarity and color. The averages of the pH's were calculated for each brand. Each test tube was shaken and a drop of fluid from each specimen was placed onto filter paper and evaluated visually.
The results of sediment production was from least to most: Ralph's, Pine Mountain, Sunny Select, Duraflame, and Bengal Recycled. Visually, the color and clarity also varied from yellow and cloudy to amber and clear to black and opaque, with the recycled log soot water remaining black and opaque. The pH differences were a range from 4.5 -8.0, with 5 of the burns being acidic.

Conclusions/Discussion
The results of my experiment supported my hypothesis. It turned out that all of the brands of firelogs varied in particulate production. However the pH was less variable. The recycled brand produced the MOST particulates .
Overall, commercial firelogs seem to produce a lower amount of particulates that natural wood. However there is variation in the content of the commercial logs that result in the production of particulates. The commercial logs made of wax and sawdust seem to burn cleaner than the logs made of recycled wood waste. However there is a significant amount of particulates production even in the wax logs that we must be aware of if we are to consider alternative ways to improve the air quality in the Central San Joaquin Valley as well as the state of California.

Summary Statement
A comparison of the airborne particulate production and pH from different brands of commercial firelogs

Help Received
my parents watched me burn each log (for safety reasons); my father helped me attach the misters to the chiminea after my first attempt failed due to a burned up filter.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kiel T. Lewis

Project Number
J0919

Project Title
How Safe Is the Air for Children Who Play Outdoor Sports?

Abstract

Objectives/Goals
My objective is to find out if the quality of different barriers and the distance from the source of pollution affect the amount of fine airborne particles that appear on children's outdoor sports fields.

Methods/Materials
First I plotted out the test sites on a map to find out their distances from the pollutants. I then determined the Independent variable as the barriers that potentially prevent some particles from getting onto the field. The control was the chainlink fence (no protection at all). I decided that the Dependent variable was the affect of the barriers on the amount of particles. First, I planted stakes with test cards smeared with petroleum jelly for the 7 sites. After roughly 24 hours I collected the test cards and analyzed them with a microscope. I repeated these steps and applied the data to tables and graphs.

Results
On average between the first and second tests the percentage of fine airborne particles was 93% of the total of airborne particles recorded. On the first set of testing the range of the number of particles was 150 and on the second test it was 605. The sites nearest to the source of pollution consistently had a greater amount of fine airborne particles. One unusual piece of data I found on the first test is that the control group, no barrier, was actually better at preventing airborne particles from entering the sites than the barrier trees. On the second test the tree barrier outperformed the control group. On both tests the barrier wall/trees allowed the least amount of particles from entering the test sites.

Conclusions/Discussion
My conclusion is that the air is not safe for children who play outdoor sports. The wall/trees barrier did the best at preventing particles from getting on the field and that although the barriers did help prevent particles from entering the fields many particles still entered them. I also discovered that the sites closest to the many sources of pollution resulted in having many more airborne particles than others. Then something interesting was that there was a big difference in the ranges of the numbers of airborne particles between the first and second tests possibly because it was twenty degrees warmer on the second day of tests. My data suggests that there should be barriers, natural and man-made, and that the distance away from the sources of pollution of airborne particles should be considered when a new outdoor sports field is built.

Summary Statement
My project is about finding out if children's outdoor sports fields are polluted by fine airborne particles and if barriers and the distance from the sources of pollution affect the number of particles that enter the fields.

Help Received
Mother provided transport; family friend lent me a microscope.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Melissa L. McEvilly

Project Number
J0920

Project Title
How Clean Is the San Dieguito River?

Abstract

Objectives/Goals
The purpose of my project was to discover how clean the water along the San Dieguito river watershed was, and where the cleanest area was. I believed the water nearest the source of the river would be the cleanest, and the water would get progressively dirtier as I neared the river mouth.

Methods/Materials
To obtain my results, I collected two water samples each from thirteen different areas along the San Dieguito river, and tested them for acidity, salt content, amount of suspended solids, clarity, and the presence of microorganisms. To do this, I used pH strips to measure acidity, an electrical circuit and known concentrations of sodium chloride to estimate salt content, a spectrophotometer machine to measure suspended materials, a microscope equipped with a digital camera together with GIEMSA dye to stain microorganisms, and my own observations.

Results
I found that the water nearest the source of the river was the cleanest, and that none of the other samples could be clearly determined to be the dirtiest.

Conclusions/Discussion
My conclusion is that although the water along the San Dieguito river should not be drank by humans, it seems to be healthy enough for environmental needs. Since the wildlife and ecosystems surrounding the San Dieguito river watershed depend on this water, I can conclude that the ongoing efforts by public agencies and volunteer groups to preserve this watershed for environmental purposes seem to be working.

Summary Statement
The purpose of my project was to use five different expirements to test different aspects of the cleanliness of the San Dieguito river.

Help Received
My father helped type my reoport, and obtain water samples; my mother helped make graphs; I used lab equipment at UCSD under the supervision of Dr. Robert McEvilly.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Dane L. McFadden

Project Number
J0921

Project Title
The Effects of Harmful Bacteria on Ocean Plankton

Abstract

Objectives/Goals
My objective was to see if the amount of harmful bacteria in the ocean effects the plankton population.

Methods/Materials
To answer my purpose question I collected data in the field and used information published by an organization called Heal the Bay. This information gives weekly grades for several beaches in Ventura County, based on how much harmful bacteria is in the water. For a period of 6 weeks I took water samples from four beaches using a plankton net attached to the end of a 1.6m fiberglass pole. I counted the amount of plankton in each sample using a dissecting scope and then calculated the amount of plankton that would be in one cubic meter of water. I compared the grade from Heal the Bay with the calculated amount of plankton derived from the water samples.

Results
I found that the amount of harmful bacteria in the water does not seem to effect the plankton population.

Conclusions/Discussion
The amount of bacteria in the water does not seem to effect the plankton population. The information on my graphs shows no correlation between the amount of bacteria and the plankton population. I noticed large changes in the amount of plankton after unusually hot or cold weeks. Some ideas that have arisen, which I could study in the future, are the effects of the temperature and weather on plankton populations.

Summary Statement
Today, pollution is a big problem and some kinds of pollution put harmful bacteria into the ocean, and so I wanted to see if this kind of bacteria and the other pathogens indicated by their presence are harmful to plankton.

Help Received
My mother provided transportation; my father advised me on my project and provided transportation; Marilyn McFadden (my aunt and a marine biologist) gave advice on counting plankton.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Garrett S. McGuire

Project Number
J0922

Project Title
Breathless in Chino: The Relationship Between Seasonal Air Quality, Weather, and Respiratory Problems in Children

Abstract

Objectives/Goals
My objective was to see if there was a relationship between seasonal air quality, temperature, humidity, and wind velocity and asthma and/or respiratory problems in students from K-6th grade. My goal was to find if there was a relationship between these variables and asthma/breathing problems in children. During periods of high pollen counts, smog levels, humidity, particulate matter levels, extreme temperatures, and/or high wind conditions, there will be more cases of asthma/respiratory problems for the students at four Chino Valley Unified School District elementary schools.

Methods/Materials
To test my hypothesis, the school nurses to recorded how many students had asthma/respiratory problems each school day from 11:00 a.m.- 3:00 p.m. during the months from May-November, 2002. I created a table for each month to record the temperature, wind, humidity, pollen, and smog levels from the internet. I checked the internet every weekday at 4:00 p.m., May-November, for each variable. After that, I recorded my data. At the conclusion of the project, I compared the internet chart with the nurses? charts to see how the air quality and weather data was related to the asthma/breathing problem data.

Results
My study showed that the spring had the greatest amount of visits to the health office. The pollen and humidity were the greatest in the spring. The highest factors in the summer were heat and ozone. Nitrogen dioxide and carbon monoxide were the highest in the autumn months. Wind was at high levels in the spring and summer. All of these contributed to the numbers of students that went to the health office for asthma or other respiratory problems.

Conclusions/Discussion
Pollen, ozone, nitrogen dioxide, carbon monoxide, humidity, wind, and temperature all contribute to respiratory problems. It seems that there was a greater relationship between high pollen counts and humidity levels and visits to the health offices. In examining the ten to twelve highest visitation days in each season, pollen, ozone, and high temperatures seemed to be factors particularly in the spring and summer. Humidity, carbon monoxide, and nitrogen dioxide were found to be the highest in the autumn months.

Summary Statement
This is a study of the relationship between seasonal air quality, weather conditions and respiratory problems in children.

Help Received
Interviewed Dr. Ospital (AQMD) & Dr. Abrolat (Kaiser) Father gave guidance and support

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Lauren T. Merrill

Project Number
J0923

Project Title
How Wet Does It Get?

Abstract

Objectives/Goals
The objective of this project was to determine whether amounts of water deposition at the gound surface from fog or water condensation were significant in comparison to the usual rainfall in our locality, and what factors might cause natural or artificial variation in these amounts.

Methods/Materials
Trays of different types of ground vegetation were exposed to typical local weather conditions (the southern San Joaquin Valley in February) and weighed with a precision scale twice daily. Average overnight weight gains were calculated for each sample, then compared with each other and with known rainfall standards. A simple wire mesh device was designed in order to increase deposition of water from fog on barren ground samples.

Results
Results of this experiment showed that vapor condensation and/or fog deposition amounts were a significant proportion of the total water received on the ground under typical local weather conditions. Different types of ground cover varied considerably in their relative amounts of water deposition/weight gain, with bare ground being the least effective at extracting atmospheric water.

Conclusions/Discussion
Vapor condensation and/or fog droplet deposition were shown to be significant sources of water for ground vegetation under conditions found in the San Joaquin Valley, substantially augmenting usual rainfall totals. Such extraction of atmospheric water is undoubtedly crucial to the area's native plant ecology and agriculture. Various means of increasing water deposition, through ground cover selection or use of artificial condensation devices, would be of practical benefit in this otherwise arid climate known for dense winter ("tule") fog.

Summary Statement
Precision weighing of trays of various ground covers left outside to collect dew demonstrated a significant amount of water deposition, and substantial variation between samples, elucidating local ecology and means of its modification.

Help Received
Father gave general idea for project; got materials, proofread. Sister advised and checked board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kathryn D. Nelson

Project Number
J0924

Project Title
The Quiet Pond

Abstract

Objectives/Goals
My objective was to learn if urban runoff or pollution harms plant and animal life in a Riparian Environment.

Methods/Materials
First finding each pond around Huntington Beach and one from northern Santa Barbara County. At each pond taking the pH, temperature, and observations of each pond. The observations consist of visual pollution, clear or cloudy water, the type of soil, salty or fresh water, each speices of plants and animals, and water samples. After taking the water samples, make slides for each sample and look underneath a microscope.

Results
The healthiest pond was Pond A or the northern Santa Barbara County pond. Second was Pond D or C, both were in Huntington Beach Central Park, across the street from Huntington Beach Central Library. Fourth was Pond E, off of Garfield in between all the oil rigs and man made ponds. Last was pond D, off of Garfield.(Closest to street)

Conclusions/Discussion
My conclusion is that Urban Runoff or pollution has a very harmful affect on plant and animal life in a Riparian Environment.

Summary Statement
My project is about finding if pollution harms plant and animal life in a pond environment.

Help Received
My dad helped me understand the pond environment, and my mom drove me to each pond.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Evan M. Norris

Project Number
J0925

Project Title
Gas Stations vs. Soil

Abstract

Objectives/Goals
My objective was to determine whether gas stations affect the soil around them by comparing the dominant types of soil microbes, as well as the pH level of soil samples, from the land around a typical gas station with those from land away from the gas station.

Methods/Materials
Soil samples from the land around three different gas station locations were tested to determine whether bacterial growth from these samples differs from the bacterial growth from soil samples taken from urban, rural, and suburban,
areas away from the gas stations, which will serve as the controls.Then, the pH levels of the soil samples from the different locations will be determined by performing a pH indicator tested. The samples were cultured,incubated,Gram-Stain

Results
The soil samples of the gas stations had an average of 7029.2 colonies counted, where the control samples colonies were too numerous to count,except for the rural sample had 5520 colonies. The gas stations' samples were mostly spherical in shape, where the control were mostly rod shaped.The gas stations were all identified as gram-negative where the control samples were all gram-positive.
The gas stations had an average of 8.3 pH level, the controls were a 7.0 level.

Conclusions/Discussion
My hypothesis states: If there is a difference in the pH levels or bacterial growth between gas station samples and the control samples then it can be concluded that gas stations have an effect on the surrounding environment.
My project brought up the followiing question,"What caused the difference in the soil? I would like to further my research to find out if it was caused by gasoline leakage.I would also like to test the ground water for contaminants.

Summary Statement
My project is to determine if gas stations affect the soil around them.

Help Received
Alex Perez at CalState donated her lab, and my mom helped type, drove me to areas, and helped me with the airbrushing on my board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Daniela T. Riedelsheimer

Project Number
J0926

Project Title
Comparing the Contamination Rate and Turbidity Level of Different Wood Ashes in Water

Abstract

Objectives/Goals
The purpose of my science project is to compare the contamination rate and turbidity level of different wood ashes in the water. I want to determine what type of pollutants would cause more of an environmental hazard at a quicker rate then others. Out of all the wood ashes that I'm comparing, the oak ash will contaminate the water the quickest. After 24 hours the oak wood will have the highest amount of turbidity.

Methods/Materials
I used five different types of wood to conduct this experiment. I put a measured amount of wood ash on the surface of water in the cylinder and timed how long it would take to sink to the bottom. To measure the turbidity of the ash in the water, I used three cups for each type of ash and poured each ash in the cups and stirred the ash in the cups. I waited over a 24 hour period and then measured the turbidity level with a flashlight shining through the cup and measured the distance of light passing through the dirty water on to a piece of paper.

Results
The oak ash took the longest amount of time at 4 minutes and 7 seconds. The almond ash took the least amount of time at 7 seconds.

My investigation on the turbidity level of wood ashes over a 24 hour period showed that the ash that had the higest level of turbidity was birch. The ash that showed the least amount of turbidity was pine.

Conclusions/Discussion
In conclusion I learned that density of wood is a factor along with how hot the wood burns. I noticed that out of all the ash that was burned , oak ash was very fine and powdery. I concluded that perhaps oak wood burned very hot. Perhaps that was why the oak ash took so long to drop down to the bottom of the cylinder.
We must be concerned about our water being contaminated by carbon, chemicals, oils etc. If our water is contaminated , this is a threat to plant and animal life, including our own life.

Summary Statement
To determine what types of pollutants would cause more of an environmental hazard at a quicker rate then others.

Help Received
My father burnt the wood for me and my mother helped type the report.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Taylor Simpkins

Project Number
J0927

Project Title
Industry's Foul Little Secret: Pre-Production Plastics Found on Beaches Come Directly from Industrial Sources

Abstract

Objectives/Goals
My objective was to determine if Pre-Production Plastics (small, 1-2 mm. circular plastics used to produce plastic containers) are washing up on shore because of industrial run-off into the Santa Ana River Jetty. The recent study, Plastics White Paper: Optimizing Plastics Use, Recycling, and Disposal in California, for the California Integrated Waste Management Board, shows that the plastics products and packaging industry is not directly polluting the waterways. See CIWMB.ca.gov.

Methods/Materials
Collections of research samples were taken over 11 months from the East and West sides of the Santa Ana River Jetty. I collect 100 meters on either side of the Jetty, in 1 square meter, at the rack line, which is the highest, most recent, high-tide line. Using a spatula, I collect the top surface of the collection area down approximately 1 cm. deep, and then deposit the sand and materials into a 5-gal. bucket. Materials from the East and West sides are put into two separate buckets. At home, I sift the sand through two sifters: one with larger holes on top and the other with smaller holes on the bottom. The Pre-Production Plastics (or PPPs) go through the bigger sifter and sit on top of the small sifter because they cannot pass through like the sand. This separates the PPPs from the twigs, and larger objects, and the sand. Finally, I count the Pre-Production Plastics, deposit them into labeled containers, and log the results, weather conditions, and observations in my log.

Results
After rainfall there was a significant amount more Pre-Production Plastics compared to during the dry season when there is not a great flow from the Santa Ana River into the ocean. The lowest count of PPPs when it was dry was 0 per square meter; the highest number of PPPs was after heavy rainfall when there were 794 PPPs per square meter.

Conclusions/Discussion
My conclusion is that Pre-Production Plastics are coming from industrial runoff, which flows into the Santa Ana River and eventually the Pacific Ocean and back on its beaches.

Summary Statement
My project shows that some plastics pollution in our oceans and beaches, specifically Pre-Production Plastics, are coming directly from run-off from industries, which flow into the Santa Ana River and eventually the Pacific Ocean and its be

Help Received
Parents helped drive me to collection sites. Discussed findings with Charles Moore of Algolita Foundation and O.C. Coastal Coalition who gave me names of additional sources for more research.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kristi M. Tamaki

Project Number
J0928

Project Title
Can Mother Nature Clean Her Water?

Abstract

Objectives/Goals
My objective was to learn if permeabilities of different earth materials affected the quality of water.

Methods/Materials
6 plastic water bottles; 6 plastic cups; size variaty of plastic beakers; stopwatch; exacto (craft) knife; thermometer; styrofoam cooler; water testing materials; 3000 mL sample of creek water; 1800 mL of sand, gravel, soil, clay, bark, activated carbon

First, I created the three bottle stands, prepared the bottles, and put 250 mL of each earth materials (6) into the six different bottles. Then I placed them (nozzle down) on the stands with a cup under each one before I tested the creek water for nitrate, phosphate, bacteria, and turbidity. After, I ran 500 mL of creek water through each of the materials; timing them so that I could calculate the permeability (mL/sec). To do this, I also had to measure the amount of water that went through the material. Lastly, I tested the water after the run-through for nitrate, phosphate, bacteria, and turbidity five times and calculated the average for each.

Results
The results of my experiment illustrated that the permeability of different earth materials does affect the quality of the water in different ways. The gravel had the highest permeability (water traveled the fastest through it) followed by bark, the activated carbon, sand, soil; and lastly the clay. The nitrate tests overall showed that after the run-through the purity got worse and further, that the higher the permeability or flow rate, the better the overall quality. The bacteria and turbidity tests also expressed that the quality got worse after the run-through. The phosphate test showed that the qualities improved after the run-through except for gravel, which got worse, not depending on the permeabilities.

Conclusions/Discussion
The data disproved my hypothesis that the lower the permeability the better the quality of the water. This information helps people know that water still has to be cleaned with chemicals because Mother Nature can't always do it on her own. These results also show that the majority of the time water runs through the ground it picks up contaminants rather than leaving them in the ground.

Summary Statement
My project is about how the earth naturally cleans or contaminates water through permeability.

Help Received
Step-dad helped build bottle stands; water testing materials borrowed from Watershed Resource Center in Santa Barbara; Mother helped glue down information on display board

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Elena M. Tessler

Project Number
J0929

Project Title
Water Quality in Klopp Lake

Abstract

Objectives/Goals
My goal was to determine how animal pollution affects the water quality in Klopp Lake, at the Arcata Marsh.

Methods/Materials
First, I obtained a permit that allowed me to take a boat out on Klopp Lake. Once a rented canoe was in my possession,two testing sites in Klopp Lake in the Arcata Marsh and Wildlife sanctuary were chosen. The first was about ten meters from the shore of Klopp Lake (where there are few birds), and the second site was about one meter from the center island (where there are hundreds of birds). For the purpose of water quality comparison, I used plastic collection bottles to take water and plankton samples from each of the two sites, then tested the water samples from each site, using water quality testing kits for ammonia, plankton, pH, turbidity level, and dissolved oxygen.

Results
Results from my testing showed that the dissolved oxygen level near the shore was consistantly 13 ppm, while dissolved oxygen was 11 ppm the first trial, and 10 ppm the second trial. There was no ammonia found in the water near either testing site. The turbidity level of the shore water was 9.09 NTU, and island water had a turbidity level of 9.99. Both sites had 9.0 ppm for their pH levels. No plankton was found in either the shore water or the island water, although traces of microscopic plants were found in both. Low oxygen level, high ammonia level, high pH level, and high turbidity level are all indicators of a less-than optimal environment.

Conclusions/Discussion
From the data and results I had gathered, I was able to determine that the water near the island of Klopp Lake was of a somewhat lesser quality than the water near the shore. I believe my testing was important, for if the island water had been heavily polluted, the accumulative effects of the animal pollution could have significantly influenced the wildlife in a negative way. Wild birds not only use the water as a drinking source, but they live in the water their whole lives, and are forced to rely on their nearest water source, regardless of its quality.

Summary Statement
The focus of my project was to determine how animal pollution affects the water qaulity in Klopp Lake.

Help Received
Parents helped attain canoe and permit; Water testing supplies were borrowed from Mr. Luis Armin-Hoilin, biology teacher at Arcata High School; Testing was done under the supervison of Mrs. Calisa Holm, science teacher at Pacific Union Elementary School.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Swati Yanamadala

Project Number
J0930

Project Title
The Remediating Effect of Ludwigia peploides and Aeration on Cultural Eutrophication

Abstract

Objectives/Goals
Cultural eutrophication is a major problem affecting lakes all over the world. Ludwigia peploides is a plant native to riparian communities in Southern California. It is unknown whether Ludwigia peploides should be cultivated or removed in Lake Machado to mitigate eutrophication. The effect of aerators currently running in the lake is also unknown. This project tested the effect of Ludwigia peploides and aeration on eutrophication.
Ludwigia peploides should consume nitrates, phosphates, and oxygen, and the aerator should replenish the water with oxygen thus decreasing eutrophication and improving water quality.

Methods/Materials
Each of four containers had 1200 mL of storm drain water. Container B also had Ludwigia peploides. Container C also had an aerator. Container D also had both Ludwigia peploides and an aerator. Samples were tested periodically for phosphate, nitrate, dissolved oxygen, and pH content using the LaMotte Smart Colorimeter.

Results
Ludwigia peploides when alive probably does not affect phosphate concentration, however when it decomposes it probably rapidly adds phosphate. When decomposing Ludwigia peploides is combined with aeration this causes a tremendous increase in phosphate concentration. It also appears that Ludwigia peploides rapidly consumes nitrates while living, but when it decomposes it releases great amounts of nitrate which is only worsened by aeration. Ludwigia peploides also has a detrimental effect on dissolved oxygen levels, which are not fully replenished by aeration. While living Ludwigia peploides decreases pH levels and while decomposing increases pH levels. Aeration does not have a significant affect on pH levels.

Conclusions/Discussion
It appears that the presence of Ludwigia peploides in eutrophic lake water is beneficial as it consumes nitrates and only a small amount of oxygen while living. On the other hand when Ludwigia peploides decomposes, it rapidly releases nitrates and phosphates and consumes significant quantities of oxygen thus contributing to eutrophication. It also appears that aeration may not be as benificial as previously thought. Therefore it is essential to monitor lake waters and remove any decaying or decomposing Ludwigia peploides and other organic matter.

Summary Statement
My experiment tested the effect of Ludwigia peploides and aeration on cultural eutrophication.

Help Received
Parents drove and supervised

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Ryan D. Anders

Project Number
J0999

Project Title
Are the Arsenic Levels in Wood Products Hazardous to Our Health?

Abstract

Objectives/Goals

Most of the Arsenic pressure treated wood tests will be more than 10 parts per billion (ppb) which is the current Government Standard. Some tests should be more than the arsenic levels recommended as the Government Standard. At these levels it would be considered hazardous to our health.

Methods/Materials

1.Keep a detailed journal on all pressure treated wood tests.
2.Make an Arsenic level graph chart.
3.Ordered an Arsenic test kit from the Hach Company.
The kit contains: 100 testing strips, 100 packages Reagent #1 (Sulfamic Acid), 100 Reagent #2 (Zinc), two testing vials, one each Arsenic color chart, distilled water, and Johnson & Johnson pads size 1 ½ inch.
5.Take samples at lumbar yards such as Home Depot, Lowes Home Centers, Terry's Lumber, taking samples of picnic tables, parking lot poles, and children's play equipment, and wood products in nurseries such as tree and plant stakes.
6.Find Arsenic pressure treated wood.
7.Take Johnson & Johnson pads while wearing surgical gloves and rub the Arsenic treated wood within approximate one square foot for one minute.
8.Place the Johnson & Johnson pad inside vial and fill to fill line with distilled water.
9.Lift the top of the vial and insert test strip with pad side down on.
10.Add Reagent #1 (Sulfamic Acid).
11.Add Reagent #2 (Zinc)
12.Swirl and mix. Do not shake or invert vial.
13.Wait for 20 minutes
14.Pull out test strip.
15.If Arsenic is present in the vial it will react to the gases produced by mixing of Reagent #1 and Reagent #2.
16.Compare color of test strip to color of Hach Company chart to find Arsenic levels from 0 to 500 parts per billion and record in journal.
17.Perform the test at all three lumber departments of the stores mentioned above, telephone poles, wood patios, and wooden picnic tales.
18.Analyze the data from graph chart and determine if the Arsenic pressure treated wood that we handle

Summary Statement

This project is testing how much arsenic is in wood products that we use everyday.

Help Received

My father drove me to testing sites and my mother helped with the backboard.