CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Katherine R. Altobello

Project Number
J0901

Project Title
Thirsty Trees, Hungry Beetles: What Is Happening to Our Local Forests?

Abstract

Objectives/Goals
My family owns a cabin in the San Jacinto Mountains. Five years of severe drought has led to weakened trees and noticeable changes in the forests which are under attack by several species of bark beetles. The bark beetle problem has led to much tree mortality in the San Jacinto Forest. This study was conducted to try to determine which tree species at different elevations in the San Jacinto Mountains are most affected by bark beetles.

Methods/Materials
Interviews with forest rangers, naturalists, biologists, and entomologists were conducted to learn more about the problem and how to identify signs of beetle infestation. Data was collected from the Idyllwild Nature Center, and other local sources. Multiple 10mX10m plots of land were measured at elevations of 1,310m(4,300 feet), 1,615m(5,300 feet), and 1,890m(6,200 feet). Trees in each plot were identified with the help of a tree identification guide. The health status of the trees, and signs of bark beetle infestation were noted.

Results
At the 1,310m(4,300 feet) elevation level, Ponderosa pines sustained the most damage. At 1,615m(5,300 feet) Jeffrey pines were most affected, and at the elevation of 1,890m (6,200 feet) sugar pines were most damaged. The average tree mortality in the plots observed was found to be 23%.

Conclusions/Discussion
Cedar trees were not found to be damaged. Oak trees did suffer some damage, but it was difficult to decipher how the trees had died. Although different trees were found to be more susceptible at different elevations, this may be due to the fact that different trees thrive at different elevations (and so are more numerous and more affected). Recommendations for further research include measuring larger plots at several other elevations. This would allow for a more accurate assessment of tree mortality.

Summary Statement
This project investigated which tree species were most affected by bark beetle damage at different elevations in the San Jacinto Mountains.

Help Received
Interviews were held with:Laura Merrill, Ph.D. entomologist; Shelly Kibby, Director of the Idyllwild Nature Center; forest rangers: Chief Glen McWilliams, Joe Grammer, Jim Kutsch; Forest Sevice Dept.: Dave Jason, Roma Rodriguez; biologist Ann Poopatanapong. Thanks to my parents for driving me.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Jade K.R. Batstone

Project Number

J0902

Project Title

What Goes Up Must Come Down: Tracking Airplane Pollution on the Coastside

Abstract

Objectives/Goals

Airline traffic is one of the top ten industrial air polluters in urban areas. Airplanes are constantly flying over my community, located not four miles down the road from the local Moss Beach airport in Northern California. I designed my project to discover if houses that are situated along the airport flight path are more susceptible to air pollution, in the form of particulate matter, than those houses outside the flight path.

Methods/Materials

I used twenty residences as pollution monitor sites. Ten were situated inside the flight path and ten were outside. On three separate occasions I collected air samples, each testing for a 48-hour time span. I set up the experiment using 3 x 5 index cards with graph paper on them that served to separate the particles into sections. I smeared each card with petroleum jelly to capture the air particles and placed these on fences, decks, and roofs at each site. Using a microscope, I analyzed the cards after each experiment, resulting in an average number of particles at each test site.

Results

Houses that lie inside the flight path have 38% more air pollution than those houses that lie outside the flight path. On average, the houses inside the flight path collected 126.10 pollution particles per square inch, and houses outside the flight path collected 91.47 particles per square inch.

Conclusions/Discussion

It is clear that the Moss Beach airport does not only impact our community with distracting noise but with significant levels of air pollution as well. This study reveals that geographical proximity to an airport is not the only factor to consider in evaluating the impact of air pollution on a residence. Those residences situated in a flight path are more exposed to air pollution than those residences that lie outside the flight path.

Summary Statement

The impact of air pollution derived from airplanes on residences both inside and outside of an airport's flight path

Help Received

No help

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Andrew S. Benson

Project Number
J0903

Project Title
What's the Best Aspect for Intertidal Life?

Abstract

Objectives/Goals
My objective was to learn whether or not the aspect of a rock or pier piling surface affected the abundance of algae, mussels, barnacles, limpets, etc.

Methods/Materials
I measured algal and animal abundance on all sides of five different rocks, and five different pier pilings, at the same intertidal height. A quadrat was used to obtain multiple measurements of abundance on north, south, east and west sides of rocks and pier pilings. Abundance ratings of 0-4 for animals, and a separate rating of 0-4 for algae, were averaged for each aspect.

Results
Algae grew most prominantly on the south and west sides of rocks, and the south and east sides of pier pilings. There was a higher animal than algal abundance on the north side of rocks and pilings. There was much more animal growth on the pier pilings than there was algal growth.

Conclusions/Discussion
Algae and most intertidal organisms that live on rocks and pier pilings do not grow or live past a certain depth because of predation, food, and especially for algae, light. I believe that there was very little algae on the pier pilings because there is very little light and algae need light to photosynthesize. There was a lot of algal growth on the south side of both rocks and pier pilings because, in Santa Barbara the light is strongest from the south.

Summary Statement
I compared the abundance of intertidal life on different aspects of rocks and pier pilings .

Help Received
Dad helped carry out experiment; sister helped design board; mentor gave me reading material.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Kyle Burdick; Omar Njie

Project Number

J0904

Project Title

The Effect of Different Types of Water on the Growth of Ice Plant and Salt Grass

Abstract

Objectives/Goals

Invasion of foreign plants in the Ballona Wetlands is a major problem; they prevent the native plants from thriving. The purpose of our experiment is to test what water treatments kill ice plant but allow salt grass to live. Salt grass, along with other native plants to the Ballona Wetlands, is being taken over by a non-native plant named ice plant.

Methods/Materials

In our method we watered four out of our five plant groups three times a week. We watered our drought group once a week. We watered group A with water with low level nutrients. We watered group B with NPK fertilizer in the water. We watered group C with low level nutrient water once a week. We watered group D with low concentrated salt water (fifteen ppt). And we watered group E with high concentrated salt water (thirty-five ppt). We used fifty-one gallon pots, six fifty-pound bags of sand, fresh water, and the substances used in the water.

Results

Ice plant grew better than salt grass being watered with the following substances: All Purpose plant food (group A) and NPK (Nitrogen, Phosphorus, and Potassium) (group B). Salt grass grew better in the following categories: drought (group C), low-level salt water (group D), and high-level salt water (group E).

Conclusions/Discussion

In conclusion, our hypothesis was very accurate. We hypothesized that the ice plant would grow better than in our All-purpose plant fertilizer group (Group A) and in our NPK Fertilizer Group (Group B). We also hypothesized that salt grass would grow taller than ice plant in the Drought category (Group C), the Low Salt Category (Group D), and the High Salt Category (Group E). This project has shown that if some how the ice plant growing in the Ballona Wetlands was exposed to salt, its growth process would be slowed down considerably. In the long run, the exposure of salt water to ice plant could possibly kill it.

Summary Statement

Our project is trying to determine what water kills ice plant but lets salt grass live.

Help Received

Kyle's mom bought the supplies; Dr. Drennan from LMU helped collect plants.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Kaylah M. Clement-Harris

Project Number
J0905

Project Title
E. coli Happens!

Abstract

Objectives/Goals
The objective of my project was to determine if higher water levels in the Kern River, following a storm contribute to higher levels of fecal coliform and bacteria.

Methods/Materials
This is an extension of my project last year were I took water samples at 8 locations along the Kern River and tested for fecal coliform and E Coli. This year I took samples at the same locations, exactly 1 year/1 day apart, yet following a storm. I followed the Standard Methods for the Examination of Water and Wastewater 19th Edition under the direction of Gary Hill of McRay Laboratory. I again tested for fecal coliform and E Coli, though this year I tested the pH before and after incubation. I also ran the API 20E test, which identifies 20 bio chemicals.

Results
My results confirmed that fecal coliform and bacteria levels will be higher following a storm. The 2004 samples testing for fecal coliform produced 5 positive results where as the 2005 samples produced 8 positive results. In addition, testing for E Coli had higher results in 2005 than 2004 with 2 positive sample sites in 2004, compared to 6 in 2005. The pH results before incubating were standard with the lowest result being 7.71 and the highest being 8.17. Results of the API 20E confirmed 27.6% identification for E Coli at my first sample location (Kernville) and a possibility of Brucella spp at my last location (Truxtun Lake).

Conclusions/Discussion
I have concluded that storm run-off will contribute to higher levels of fecal coliform and other bacteria. I am interested in continuing this study next year and focusing more attention on the API 20E test and learning more about the bio chemicals being identified. The information I have obtained from my results is valuable to the public who come in contact with these waters. Truxtun Lake, where Brusella spp was detected, is located in the middle of town and is heavily used for fishing. I feel it is important for the public to be made aware of the possible dangers of bacteria found in the water.

Summary Statement
I have completed a two-year study comparing water samples taken in 2004 to samples taken after run-off from a heavy storm in 2005. I feel that storm run-off will contribute to higher levels of fecal coliform and other bacteria.

Help Received
Used equipment at McRay Laboratory under the supervision of Gary Hill. My mom drove me to the lab and video taped and took pictures. My uncle Pat drove me to the sample locations.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Alexander A. Cohen

Project Number
J0906

Project Title
Global Warming in a Jar

Abstract

Objectives/Goals
The purpose of my project or my objeective is to show which gases out of my six gases absorb the most amountenergy and to show if global warming is possible

Methods/Materials
Materials
· 6 jars
· Dry Ice, (Co2)
· Nitrogen gas
· Oxygen gas
· Methane gas
· Steam (Water Vapor)
· Air
· 6 thermometers
· Glue
· Screwdriver

Procedure
1. Poke a hole in the jar cap with screwdriver; pour glue in hole and place thermometer in hole.
2. Fill containers with proper gases and put the lid back on the jars quickly.
3. Place jars under direct sunlight.
4. Record every hour on the hour until one hour after the sunsets

Results
On this project i noticed that the Carbon dioxide and the water vapor were the most efficient energy absorbers while the other gases did not absorb energy as efficiently. On all three expiriments i observed the same thing that water vapor and the carbon dioxide had the highest overall temperature and absorbed the most amount of heat.

Conclusions/Discussion
I observed that carbon dioxide and water vapor were the most efficient absorbers. My Hypothesis was correct. Most of this information was from the third experiment. The rest of the gases absorbed heat but then lost it quicker while water vapor and carbon dioxide kept its heat.

There were certain things that should have been done. I should have had bigger bottles so I could get

Summary Statement
My project is about Green house gasses and global warming and whichgas absorbs the most energy.

Help Received
not that much help

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Taya S. Crayk-Bonde

Project Number
J0907

Project Title
Is Soil at Old Gas Station Sites Contaminated by Petroleum Components?

Abstract

Objectives/Goals
This experiment studied the question if there would be contamination in soil samples at old gas station sites. Soil was to be obtained from 5 abandoned gas station sites around the city of Apple Valley and tested for lead contamination, presence of hydrocarbons, pH levels and variances in soil nutrients; phosphorus, potash and nitrogen levels. Two soil samples (variables) were to be taken from each site plus one control sample (constant), to compare them to.

Methods/Materials
15 soil samples were obtained from 5 old abandoned gas station sites. The control sample was taken 100 feet away from mid-station from adjacent lot. This was to establish if there had been any circular areal zone of contamination. At each site, information was recorded on a site sample sheet that included the color, texture, odor, and appearance of the soils. Also, how long it had been since the gas station had closed. I interviewed owners and business people nearby to find out more about the gas station sites. Lead testing, pH and nutrient testing kits were used in 75 seperate experiments to test for pH , lead contamination, potash, phosphorus and nitrogen levels. The various sample soils were measured/rinsed/strained and in the cases of finding lead, the samples were each boiled for 40 minutes. During conducting the tests, various sample specific capsules and liquids including liquid balancers and indicators were added to the soil samples and the rinsed soil samples test tubes. Color changes for presence of lead were compared visually and all other tests were compared to 3 color charts and noted. Results were observed and documented.

Results
There wasn't lead contamination at all of the gas station sites. There was lead presence at sites 1A, 3A, site 3 control and site 4A and 4B. The pH levels were either very high or very low at lead presence sites. Very low nitrogen was found at all areas that tested positive for lead. Soil nutrient testing varied from high to low at the different sites.

Conclusions/Discussion
I concluded that 4 soil samples at old gas station sites in Apple Valley and one control site were contaminated by lead. All of the sites except 2 control sites were positive for hydrocarbons and petroleum components. Many of the area's soils that were analyzed were changed in soil composition due to lead and hydrocarbon contamination in this experiment.

Summary Statement
This project is about finding out if there is presence of lead, hydrocarbons, petroleum components, and changes in soil composition in the soil at old gas station sites.

Help Received
Photsgraphs of me doing my experiment were taken by my mother.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Hillary Crouch; Tor Skeen; Jordan Vieira

Project Number
J0908

Project Title
How Clean Is Your Water?

Abstract

Objectives/Goals
Our project was to see how water quality changes in a pristine mountain stream as it travels through elevations, distance from source, and through populated areas.

Methods/Materials
Water conductivity was measured over a variety of points along the Kaweah River. The points represented stream conductivity over elevational change and distance from source. The points began inside Sequoia National Park and sampled the stream through a local town, man made reservoir and ended in the San Joaquin Valley.

Results
When we got to lower elevations and farther from the source conductivity increased significantly between each sampling point. The largest increases occurred just down stream from the town and at the reservoir.

Conclusions/Discussion
Our conclusion is that the water quality degrades as it travels through elevation, farther from its source with significant quality changes as it travels through populated areas.

Summary Statement
Testing water purity through conductivity.

Help Received
Partner's parent loaned us equipment to test conductivity and showed us how to use it, and helped with graphs. My parent showed me how to make maps on computer.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Lindsay K. Dickerson

Project Number
J0909

Project Title
The Dirt on How Microarthropods Make for Healthy Soil

Abstract

Objectives/Goals
To discover if the population of microarthropods varies based on different environments, and whether a larger population of microarthropods has a positive effect on plant growth.

Methods/Materials
I conducted two phases of the experiment. PHASE 1: I collected soil samples from nine different environments and placed them in a homemade Berlese funnel, which used heat from a 40-watt light bulb to cause the microarthropods to migrate downward into alcohol. The microarthropods were then counted using a stereo-dissecting microscope. PHASE 2: Pea and radish plants were grown in organic farm soil with and without microarthropods -- using appropriate controls.

Results
* Surprisingly, the microarthropod count in the organic soil sample (69) was just 35% of the population of microarthropods in the conventional soil sample (189).
* Development had a significant impact. The construction site soil had no microarthropods, and only one was found in the "high foot traffic" sample. Redwood soil taken 80 meters into the forest had more than 250% the population of a sample taken four meters off a paved road (61 vs. 23).
* In Phase II of my project, more plants (10 vs. 8) and taller plants (8.16 cm vs. 7.59 cm on avg.) grew in pots with microarthropods than those without. Observations also revealed that plants in pots without microarthropods were less healthy (4 with leaf defects vs. 2). The soil without microarthropods also had a white fungus growing on the surface at week 3.

Conclusions/Discussion
The first phase of the project demonstrated how the microarthropod population varies from soil to soil, and how development drives microarthropods away. The second phase of the experiment proved how important microarthropods are to the health of the soil and the plants growing in it.

Summary Statement
My project was about discovering a below-ground community of life that contributes greatly to the health of our soil and plants, but is threatened by development and other human activities.

Help Received
Ian Teresi, farm manager, provided access to farmland; Ingrid Parker, Ph.D., University of California-Santa Cruz offered several ideas to explore; Francis Dickerson helped edit report.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Rachel E. Eglash

Project Number

J0910

Project Title

Effect of Rainfall on Dissolved Oxygen in the Palo Alto Flood Control Basin

Abstract

Objectives/Goals

A large number of fish died suddenly in the Palo Alto Flood Control Basin in Fall 2002. My objective was to determine if this fish die-off was caused by low dissolved oxygen (DO) levels triggered by the first heavy rainfall of the season.

Methods/Materials

During Fall 2004, I made field measurements of the DO concentration in creeks and the Flood Basin. I used a Dissolved Oxygen Meter to make measurements. Then, using website data, I analyzed the historic rainfall patterns for the beginning of the rainy seasons in 2002-2004. Finally, I collected water from the Flood Basin and measured the effect of introducing decomposing plant matter on DO. I measured baseline DO in four aquariums, added decomposing leaves to two of them, and continued to measure DO.

Results

In my field measurements of DO, the flood basin readings were always lower than the creek readings. When I studied rainfall data from 2004 I noticed that the DO always went up after a rainfall, then it came down, and then it stabilized. In 2002 there was a huge rainfall followed by no rain for several days, unlike 2003 and 2004 when there were more frequent lighter rainfalls. In my aquarium readings, when I added the leaves to two aquariums the DO went down a lot and after a few days the aquariums started to stabilize.

Conclusions/Discussion

In my field measurements, organic matter and pollutants were flushed down to the Flood Basin where they decomposed and created low DO. The DO went up right after a rainfall because fresh water, which was high in DO, was flushed into the Flood Basin. Then the DO went down because of decomposition of organic matter and pollutants. In 2002, the first heavy rain flushed a lot of organic matter and pollutants into the creek creating low DO. Then with no rain for several days the DO stayed low, killing many fish. In my aquarium readings I learned that decomposing organic matter can cause low DO.

Summary Statement

Organic matter and pollutants being flushed down into the Flood Basin can cause low DO, which in the case of a heavy rainfall followed by no rain can cause a fish die-off.

Help Received

Karin North and Stephanie Hughes at The City of Palo Alto Environmental Compliance Group told me about the fish die-off in Fall 2002 and showed me how to use a Dissolved Oxygen Meter. My parents drove me around to creeks and the Flood Basin to make DO readings.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Rebecca K. Etnyre

Project Number
J0911

Project Title
Should Riverside County Be Wonderin' About the Water?

Abstract

Objectives/Goals
My objective is to find out which middle school in the Alvord Unified School District has the best water quality by testing pH levels, Total Alkalinity, total hardness, iron levels, copper levels, nitrate levels, and nirtrite levels.

Methods/Materials
The materials I used were 1 pint water samples from each of the middle schools in the district; Villegas, Arizona, Wells, Loma Vista and the filtered water as my control. Then I put the water samples in 1 pint Kerr self-sealing jars. I purchased 3 Pro-Lab Water Quality testing kits which contained the strips needed for my experiment. I then used the time increments listed in the directions to test each of the waters seperately. The already prepared sheet was my first data table in the experiment itself.

Results
Wells Middle School was found to have the best water quality compared to the filtered water mostly based on the pH levels. The other remaining schools: Villegas, Arizona, Loma VIsta had pH levels of less than 7ppm, which means that they are acidic. The ideal level is between 7 and 7.5, therefore Wells Middle school has the best water quality beacause of the 7.5 ppm level.

Conclusions/Discussion
In conclusion, my hypothesis was incorrect. It was found that Wells Middle School had the best water quality and Villegas Middle School had somewhat good quality in the drinking. For the safest water I would choose Wells Drinking water.

Summary Statement
My project was intended to find out which middle school in the Alvord District had the best water quality so we all know what we're drinking at middle school.

Help Received
My mom purchased the materials needed for my experiment.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Lila Gitesatani

Project Number
J0912

Project Title
Water Quality

Abstract

Objectives/Goals
The objective of this project was to test different samples of water for chemicals that can lead to pollution. It was hypothesized that the lake water would be the dirtiest, and the bottled water would be acceptable. Also the filtered tap water would be the cleanest.

Methods/Materials
For this project 15 samples of water were collected. Ten samples were tap waters gathered from San Diego County one was filtered the other remained unfiltered, in all we had 5 different locations. Three samples were bottled waters; Essentia, Arrowhead, and Kirkland bottled water. The remaining 2 were from lakes; lake Murray and Miramar. All samples were tested for 11 diverse pollutants. To test for bacteria, the samples were put in a liquid broth then incubated for 7 days and monitored daily for bacterial growth. The other tests were done by titration or oxidization reduction reactions. Special titrators measuring with ppm were used and in others special comparators were used. The water samples were tested for alkalinity, hardness, Iron, Chloride, Chlorine, Copper, Nitrate, Sulfide, pH, and total dissolved solids.

Results
The results were very good. For the most part, all the sample waters stayed within their range. The only problem was the amount of Chlorine in the unfiltered tap waters was double the maximum containment level. The amount of hardness, also, went above its maximum containment level in some unfiltered tap waters. In general, all water samples were safe to drink except the lake water. The lake water had the highest amount of bacteria even when diluted. Luckily, all the drinking water had a low amount of bacteria.

Conclusions/Discussion
From among the bottled waters, the Kirkland and Essentia brand were both very good, only Essentia had much more bacteria then Kirkland. Also, the tap water was better filtered. Through these experiments it is easy to say that it is better to filter our home tap water, in the long run it will be cheaper and better for us. Also, bottled water is not as good as most people believe.

Summary Statement
This project tested 15 samples of water for 11 polutants to find which type was the best.

Help Received
Used lab equipment at Bio-Quant lab under the supervision of Dr. Samer, and Dr. Bassam; Mrs. Hanan supervised the use of pollutant testing kit at the Islamic School of San Diego.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Benjamin C. Grazda

Project Number
J0913

Project Title
Jammin' on Janes and Jolly Giant, the Sequel: Which Creek Is A Better Fish Habitat?

Abstract

Objectives/Goals
My objective was to determine which creek, Janes or Jolly Giant, was better fish habitat, and compare these results to the results of my project two years ago. I believe that Jolly Giant Creek will be better fish habitat than Janes Creek, and that Jolly Giant will have improved and Janes will have deteriorated in fish habitat quality from two years ago.

Methods/Materials
I went out and tested three sites on each creek. I used instruments for macroinvertebrates, dissolved oxygen and water temperature, and for the rest I did observations. I did all the same tests at the same sites as two years ago, but added macroinvertebrates this time. Tests for each trial were done on the same day to control for rainfall. Then I repeated the tests three months later. My variables are the two different creeks and the two different years.

Results
My results show that Jolly Giant is indeed better fish habitat than Janes. The most significant thing that I noticed was that there was a drop in dissolved oxygen in site one (Janes). Site one had a lot of dead plants and manure in it. Site one had a large effect on Janes Creek's overall rating.

Conclusions/Discussion
Site one's decomposing material led to the dissolved oxygen decrease. Decomposing things need oxygen, so they take it out of the water. I am concerned about the dissolved oxygen in site one, because if the fish can't breathe in one section of the creek, then they can't get upstream to the rest of the creek. I am writing a letter to the city of Arcata about ways to improve Janes Creek. When I talked to them two years ago they said they'd work on it. They never did, so maybe this letter will have an effect.

Summary Statement
My project compares fish habitat quality of two local creeks, and also compares these results to the results of two years ago.

Help Received
My mother helped type my report. I got equipment from Mr. LaBolle at SBMS and Louis Armin-Hoiland at Arcata High School.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Lauren I. Grazier

Project Number
J0914

Project Title
Determining the Effects of Various Environmental Pollutants on Living Things

Abstract

Objectives/Goals
The purpose of my project is to determine which environmental pollutant has the most effect on plants and animals. The pollutants I used were used motor oil, used transmission fluid, and used antifreeze. To represent the plant I used and elodea and to represent the animals I used daphnia.

Methods/Materials
I used 12 jars. Each had 3 cups of water, an elodea plant and 10 daphnia. Each jar had a certain amount of pollutant. Three jars had 4.93mL of the different pollutants. Three jars had 2.47 of the different pollutants. Three jars had 1.23mL of the different pollutants. The other three jars had no pollutant.

Results
The used motor oil had the worst outcome out of the three pollutants. The used antifreeze and used automatic transmission fluid both had about the same outcome. Most of the observations made on both were about the same.

Conclusions/Discussion
I learned from my project that it is bad to dump any pollutants anywhere that would lead to the water cycle because any pollutants contaminate water. It is worse though if oil is gets in to the water cycle.

Summary Statement
I tested different environmental pollutants on elodea and daphnia in different jars.

Help Received
pep boys helped get pollutants, a peer took pictures, mom edited writing

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
James L. Henrick

Project Number
J0915

Project Title
Fecal Flush: Level of Fecal Coliform (CFU's) Found in a Coastal Stream

Abstract

Objectives/Goals
To measure fecal levels in Aptos Creek before, during, and after a rainstorm, to determine when it is safe to swim. I believe that the levels will increase dramatically during a rainstorm, and drop slowly afterward.

Methods/Materials
I collected water samples from the Aptos Creek. I placed Millipore#s test swabs in creek water then incubated at 35 degrees C for 24 hours. Examined swabs for blue microbial colonies of fecal coliform,under a microscope.I counted the colonies, graphed and charted the results.

Results
The fecal levels quickly rose to as high as 220 times the safe level for human contact. Surprisingly after the rain stopped the levels fell to zero as quickly as they had risen.

Conclusions/Discussion
My conclusion is that the levels rise to dangerous levels that are definitely not safe for human contact. People should wait several days after a rainstorm before playing in the coastal creek. However, I would not recommend swimming in the creek, ever.

Summary Statement
Measure the level of fecal coliform (CFU's) found in a coastal stream, to determine if it is safe to swim.

Help Received
Father helped drive to stream and confirmed CFU count; consulted Mr. Peters of SCC Dept. HHS

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Chelsea A. Hoover

Project Number
J0916

Project Title
Of Fish and Plants

Abstract

Objectives/Goals
The objective of this experiment is to see how plants affect the water quality of a goldfish tank.

Methods/Materials
The materials I used for my experiment were four milk cartons that can hold eighty ounces of water,a fish net,fifteen goldfish, same size,seven plants, same size,gravel, enough to fill the bottom of all four milk cartons an inch thick,a can of fish food,a thermometer that measures humidity as well as temperature,a cardboard circle, draw in fourths of a size of a quarter,a turbidity kit,PH testers,a water quality tester,a pencil or marker,a twelve ounce measuring cup,a notebook,water,a tank big enough to hold all the fish

Results
The results on this project turned out perfectly but not exactly the way I expected. My hypothesis was wrong, it turned out that the tank with the most plants had the dirtiest water out of all of them. I believe this is because at night the plants suck up oxygen instead of giving it out and there wasn't enough oxygen for all the plants at once.The tank that did the best was tank number three because it had just the right ammount of plants to create oxygen and not take too much back at night.Tank number one accumulated bubbles on the top of it and so did number two indicating there was not enough oxygen in the tanks. The only problem that occured during this experiment is that the fish in tank number two decided to eat their plant, don't ask me why.

Conclusions/Discussion
In this experiment I learned that plants are not good to have too many of, like many things in life. If you over run a tank with plants they will suck up all the oxygen at night when they are not photosynthesizing. Also fish are a very hard thing to work with. One little thing could go wrong and your entire experiment could go down the wrong way and end in a fiery crash.
Luckily I oversaw these things and was able to pull it off.

Summary Statement
My project is on plants and how they affect the water quality of a goldfish tank.

Help Received
my mom helped me decorate it, my dad helped me soder and wire the water quality testing device, my teacher set deadlines for me to follow

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Madison L. Hunter

Project Number
J0917

Project Title
Spray Patterns of Water and Oil Based Substances to Simulate Pesticide Movement in Still and Windy Environments

Abstract

Objectives/Goals
My objective is to determine the drift of two types of aerosol sprays, to model a pesticide, under different conditions.

Methods/Materials
I used oil and water-based substances to simulate different pesticides with two commonly used spray bottle types available. I did a total of 80 trials, 40 for each substance.

Results
The oil based spray consistantly drifted farther than the water-based spray. Both substances tended to drift farther when disbursed from spray container number one versus when disbursed from spray container number two. Also, the higher the altitude that I released the substances from, the farther the drift.

Conclusions/Discussion
After reviewing the data, I found that the particles were affected by aerosol movement. Aerosol movement occurs when particles are suspended in the air, or fall to the surface due to sedimentation. The suspended particles showed more drift. My experiment suggests that the higher the altitude that you release a substance from, the farther the drift from the main target.

Summary Statement
My project relates to the spray patterns of water and oil based substances to simulate pesticide movement in still and windy environments.

Help Received
Mother drove me to Office Depot to buy poster board, as well as cut out letters for title.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Daniel A. Huthsing

Project Number
J0918

Project Title
Trapezoidal Channels vs. Natural Creeks Effects on Habitat

Abstract

Objectives/Goals
In this experiment I address the effects of trpaezoidal channels on the physical and biological characteristics of a Santa Barbara, California creek ecosystem. Two 100 ft. sections of San Jose Creek, one natural run and one trapezoidal run, were described and compared using measurements of water flow rate varience, water temperature, potential for water oxygenation, and insect population.

Methods/Materials
Each of the 100 ft. runs were divided into 20 ft subsections to allow a more precise measurement of the characteristics of the creek. The flow rate was found by droping an orage at the top of the run and using a stopwatch to measure the time, in seconds, that it took for the orange to travel by each subsection. Water temperature was taken every twenty feet statring at zero with an analog thermomiter. Potential for water oxygenation was measured by finding the length of white water in the creek. Finaly the incect population was meeasured by using a seine net to capture the insects when the were kicked up out of the bottom sediment.

Results
The natural creeks flow time variance was 12.93 times grater than the the trapezoidal channel. The average water temperature of the trapezoidal channel was 59.5°F versus 60.7°F in the natural creek. The potential for water ozygenation was 15 times grater in the natural creek that it was in the trapezoidal channel. There was only 1 more insect in the natural creek, 43, than in the trapezoidal channel.

Conclusions/Discussion
The physical characteristics of a creek are clearly affected by trapezoidla channels. These changes in physical characteristics may be responible for the slight decline fo the insect community. The resluts of this experiment could be used to modify trapezoidal channels so they have less of an impact on the creek ecosystem.

Summary Statement
Creek channelization changes physical and biological characteristics of natural creeks in Sanat Barbara, California.

Help Received
I worked with an ecologist who works a UCSB during my field testing.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Michelle E. Iafe

Project Number
J0919

Project Title
Post 2003 Wildfires: A Study on Regrowth of Native and Non-native Plants

Abstract

Objectives/Goals
This project studied the effect of hillside topography on the regrowth of Adenostoma fasciculatum, a native chaparral shrub known as Chamise, following the October 2003 wildfires in Southern California. The hypothesis proposed that for any area of the Elliott Chaparral Reserve that was burned by the October 2003 wildfires, the native Chamise would grow more predominantly and replace other plants.

Methods/Materials
This project compared the abundance of newly germinated shoots of Chamise on north- and south-facing slopes to non-native plants in the University of California's Elliott Chaparral Reserve in San Diego. Observations were recorded of the number and height of each newly sprouted shoot of Chamise, and of each non-native plant, growing in one-square-meter sized quadrants for 100 quadrants on the north- and south-facing slopes.

Results
Results showed Chamise grew more successfully on south facing slopes with a ratio of 12 to 1 individual Chamise plants on the south versus north slopes; and the Chamise plants represented 12% of total plant population on south slopes compared to only 1% on north slopes.

Conclusions/Discussion
The hypothesis was proven for the most part wrong. The Chamise has been crowded out by the non-natives on the north slopes and left to compete better on the south slopes, where it has a better chance of thriving. Chamise has adapted well to events of fire but the future for Chamise does not look good. The non-native plants and development brought by modern civilization are overtaking land once favored by Chamise.

Summary Statement
My project studied and recorded the competition between native Chamise (Adenostoma fasciculatum) and other various non-native plants after the 2003 wildfires.

Help Received
Teresa McKinney was my Science Fair Advisor; Isabel Kay, Coordinator for UCSD Elliott Chaparral Reserve, gave access to Reserve

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Shaheen Jeeawoody

Project Number
J0920

Project Title
The Photochemical Formation of Ozone at Ground Level and Its Effects on Some Plants

Abstract

Objectives/Goals
Airborne pollutants contribute to poor air quality and smog in many cities. The main cause of smog is ozone. I wanted to investigate how ozone is formed at ground level, measure the ozone concentrations at varying traffic locations during different weather conditions and test the effect of ozone on some plants.

Methods/Materials
I designed experiments using clear plastic bags filled with ambient air, car exhaust fumes(NOx) and paint thinner (VOC) to measure the level of ozone formed in the presence and absence of sunlight. I measured the ozone levels on sunny and cloudy days at 5 different sites. I compared the effect of ozone on marigold seedlings, radish seeds, and lichen and moss in an ozone chamber with controls over a 15-day period.

Results
After 7 hours, the ozone level was only 4 ppb in the bag containing ambient air without sunlight but the ozone levels increased by 3 times in the presence of sunlight, 6 times in the presence of VOC, 18 times in the presence of NOx, and 24 times in the presence of NOx and VOC. Ozone levels increased to reach a maximum between 12:30 and 1:30 pm on both sunny days and cloudy days. On sunny days, the highest ozone levels were measured at B (overpass Freeway) and D (south side gas station) with a peak of 49 ppb. After 15 days, the control marigold seedlings grew 200% in height while the ozone-exposed grew only 100%. After 7 days, 24% of the control radish seeds sprouted compared to 3% in the ozone chamber. After 5 days, the control lichen and moss was thriving and green while the ozone-exposed was shriveled with some brown patches.

Conclusions/Discussion
Ozone is formed in a photochemical reaction between sunlight, NOx, and VOC. The ground level ozone concentration increases due to high motor activity and gasoline fumes in the presence of sunlight. Ozone has a negative effect on plants as it stunts growth and hinders germination. Therefore, ground level ozone is a pollutant and not a friend to the environment.
During the long hot days of summer, ground level ozone concentrations can increase dramatically, leading to poor air quality. Levels of above 125 ppb are considered unhealthy and can cause many health problems. Special steps need to be taken to reduce emissions of pollutants. These include carpooling, using public transportation, conserving energy, and using household and garden chemicals wisely.

Summary Statement
This project determined the impact of airborne pollutants (NOx and VOC) due to human activities on ozone formation at ground level and the effect of ozone on some plants.

Help Received
My mother helped me get the materials needed and drove me around to testing sites. My father helped me with the graphs and my sister marked the 250 testcards I used.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Kimberly Kawana; Ashley Miyasaki

Project Number

J0921

Project Title

Does the Type of Water Have an Effect on Grass Growth?

Abstract

Objectives/Goals

Our objective was to see which type of water; tap, distilled, or recycled, would make grass grow the fastest and greenest.

Methods/Materials

We grew 2 strips of fescue grass for each type of water, for a total of 6 strips of grass. Each strip was planted in a 14" x 5 1/2" planter box with soil and a wire screen for drainage. We got the recycled water from the recycling plant, we used our house water for the tap, and we bought distilled water at the grocery store. Then we watered every 2 strips with tap water, 2 strips with distilled water, and 2 other strips with recycled water. We watered every other day with each strip getting 1 cup of the specific water. We measured the height of the grass once a week for all 6 samples. We also compared the appearance of the grasses. We conducted this experiment for 6 weeks.

Results

Recycled water made the grass grow the tallest and the greenest out of the other types of water. The grass watered with recycled water was the darkest green. The grass watered with tap water was a lighter green. The grass watered with distilled water was yellow and slightly green. In our first trial, the recycled watered grass grew 1/2" more than the tap watered grass and 3/4" more than the distilled watered grass. In our second trial, the recycled watered grass grew 1 1/4" more than the grass watered with tap water and it grew 3 1/4" more than the distilled watered grass.

Conclusions/Discussion

The data supports our hypothesis. The grass watered with recycled water grew faster and greener. We think the recycled water made the grass grow the best because of the particles in the waste water that act as a fertilizer. By knowing this, farmers or just regular homeowners can use recycled water and still get the same luscious agriculture or having the green lawn they have always wanted. Recycled water is a great alternative for irrigation on agriculture, golf courses, or even parks.

Summary Statement

Our project tests what type of water; tap, distilled, or recycled, will grow grass the fastest and greenest.

Help Received

My parents helped us gather materials and drive us to the recycling plants. Mark Banuelos from the City of Fresno's Recycling Plant taught us about recycled water and donated recycled water for our tests. Kings River Turf in Fresno taught us about grass and they donated the grass for our experiment.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Collin M. Lindseth

Project Number
J0922

Project Title
Do Contaminates in Drinking Water Transfer to Raw or Cooked Vegetables?

Abstract

Objectives/Goals
To determine if contaminates, such as perchlorate, and other properties found in drinking water would transfer to broccoli when raw broccoli was washed or cooked in the water.

Methods/Materials
Water from Highland, CA, Sioux Falls, SD, North Las Vegas, NV, and Dasani bottled water from each city was collected as purified drinking water. Source water from rain, destined for the Santa Ana River, and water from the Big Sioux River and Lake Mead was collected. All water, washed raw broccoli, and cooked broccoli was tested for contaminates and properties with home use test kits, designed to test within acceptable EPA limits, but unable to test for perchlorate. A Water Eye Pen more sensative to contaminates was also used to test just the waters.

Results
The purified waters tested were mostly within EPA limits using the home use test kits. The sensative Water Eye Pen indicated that the purified water from North Las Vegas was undrinkable, and the Highland water was drinkable only after filtration and boiling. Further tests indicated Lake Mead source water contained bacteria, rain water destined for the Santa Ana River was drinkable and not yet contaminated, and Big Sioux River water was drinkable. The washed raw broccoli did acquire most water properties, including the Lake Mead bacteria. The cooked broccoli aquired most water properties, but boiling killed the bacteria.

Conclusions/Discussion
The washed raw and cooked broccoli were influenced by the different water properties and contaminates. Certain test results for the raw and cooked broccoli were identical or close to the results of the waters tested; the pH and hardness test results followed a pattern between each test. Since the Lake Mead bacteria was tranferred to the raw broccoli, but not the cooked broccoli, boiling killed the contaminate. Because the water properties and contaminates trasferred to the raw and cooked broccoli in most tests, it is reasonable to say that perchlorate could also transfer to food.

Summary Statement
If water contaminates and other water properties can transfer to food washed, cooked or grown in the water, we may be eating food contaminated with harmful substances.

Help Received
Mother helped type; mother supervised display layout and testing.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Brenda Miranda; Gennesis Patron

Project Number

J0923

Project Title

Hollenbeck Park Pond Water: Health or Hazard for Its Dependent Ecosystem?

Abstract

Objectives/Goals

Our objective was to determine whether or not the water in Hollenbeck Park Pond is consistently healthy enough to sustain the aquatic life forms (and therefore the avian life forms as well) that depend on it. For water in a pond or lake to be healthy enough to sustain animal life, dissolved oxygen should be no less than 79% saturation, dissolved carbon dioxide should be 10 mg/L or less, and turbidity readings should average less than 5 NTU. We believed that the water would prove to be unhealthy because it always has a dark color, a bad smell, and trash floating in it.

Methods/Materials

We sampled the water in the pond five times, in two-week intervals over an 8-week period, taking multiple samples at 10 different locations. We used titration to test our water samples for dissolved oxygen and dissolved carbon dioxide, and we used a turbidity meter to measure the cloudiness of the samples.

Results

We found dissolved oxygen levels that ranged from 40% saturation to over 100% saturation, and dissolved carbon dioxide levels ranging from 0 mg/L to 50 mg/L. Therefore, our lowest dissolved oxygen values and our highest dissolved carbon dioxide values indicate potentially life-threatening conditions in Hollenbeck Park Pond. This was confirmed by our discovery of dead crayfish and dead catfish in the pond. There are high carbon dioxide levels because there are many things that are dying in the pond, which also results in low oxygen levels due to decomposition. We also found the water to be cloudy (as high as 17.5 NTU), which can lead to gill damage, reduced oxygen intake, and reduced growth rates for fish. The water was also foul smelling and caustic, leaving a burning sensation on our hands after which some of our skin peeled off.

Conclusions/Discussion

Overall our conclusion was that the water in Hollenbeck Park Pond is not healthy for animals to live in. The water does not consistently have sufficient dissolved oxygen, nor low enough dissolved carbon dioxide levels, to sustain aquatic life. Also, the turbidity of the water is usually higher than 5 NTU. Our hypothesis was confirmed, and we are communicating our findings to City Councilman Antonio Villaraigosa so that he might devote resources for cleaning up the pond.

Summary Statement

Our purpose was to use dissolved oxygen, dissolved carbon dioxide and turbidity as indicators to determine the health of Hollenbeck park pond water.

Help Received

Our teacher, Mr. Simonsen, helped us by providing equipment for our research and teaching us how to edit our project. Our parents helped us by allowing us to transform their kitchens into science labs.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Christopher Nikolich

Project Number
J0924

Project Title
How Does Sunlight Affect the Chemistry of Water in a Saltwater Reef Aquarium?

Abstract

Objectives/Goals
My goal was to see what happens to water chemistry when the lights are turned on over a saltwater aquarium and find out if the same thing is happening in real coral reefs. From what I found out about photosynthesis and the reaction of carbon dioxide in water, I believe that when the lights are turned on and photosynthesis starts, pH, calcium carbonate saturation state, and oxygen will increase.

Methods/Materials
Lights were turned on or off every 12 hours over a 160-gallon reef aquarium that has corals and algae in it. Every four hours I measured pH with a pH meter and dissolved oxygen and alkalinity by titration with test kits. Measurements for alkalinity and pH were entered into a computer program to find calcium carbonate saturation state. The experiment was repeated over four day-night cycles.

Results
The results supported my hypothesis. When the lights were turned on, pH, calcium carbonate saturation state, and dissolved oxygen increased. Alkalinity decreased at a constant rate. pH was more resistant to change when alkalinity was greater.

Conclusions/Discussion
The reef aquarium is full of photosynthetic organisms. When the lights were turned on, photosynthesis began and that reaction uses water, carbon dioxide, and light energy to make carbohydrates and oxygen. When there is no light for photosynthesis, carbon dioxide increases in the water and that causes pH and calcium carbonate saturation state to decrease. Corals grow better with a greater calcium carbonate saturation state. This is exactly the same reaction that happens in the ocean and is why increasing carbon dioxide in seawater is harmful to coral reefs around the world.

Summary Statement
A change in water chemistry was measured when lights were turned on or off over coral reef organisms in an aquarium and I concluded that was because of photosynthesis and the reaction of carbon dioxide in water.

Help Received
My dad showed me how to find references at the University library and explained the parts I did not understand. My mom helped me cut out the pieces for the board and glue them down.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Mariko K. Powers

Project Number
J0925

Project Title
Anemones: Indicators of Global Warming?

Abstract

Objectives/Goals
My objective was to determine if global warming is affecting the number of Giant Green (northern species) and Sunburst (southern species) sea anemones at the Almar Avenue site in Santa Cruz, California.

Methods/Materials
An 8 x 32 grid of pvc fittings and pipes was constructed. A separate grid made of smaller sections of pipe was placed atop the larger grid to aid in the process of counting the anemones. Sunburst (2 cm or larger), Giant Green, and unidentified anemones in each section of the 8 ft. by 8 ft. grid were counted at low tide. The area to be counted is defined in the LIMPETS study protocol. Comparison of the current to past counts were taken from the LIMPETS organization#s records.

Results
The average number of Sunburst sea anemones from successful counts is 158, the average number of Giant Green is 45 and the average number of unidentified anemones is 100. The results clearly show that the southern species of anemone, the Sunburst, are 3 times more abundant than the northern species of anemone, the Giant Green. The LIMPETS program recorded anemone counts in 2003 using the same plot (they recorded 133 Sunburst, 58 Giant Green, and 49 unidentified anemones).

Conclusions/Discussion
There is only one data set available from Jan. 2, 2003 for this site and therefore no accurate conclusion can be made concerning the historical relation between global warming and the number of sea anemone species. However, based on research studies, global warming is believed to be a large factor in the population and range changes seen in southern and northern species of sea life. It also can be determined that there is no significant change in the sea anemone abundance over a short period of time (1-2 years.) This project has expanded my knowledge on the habits and life of sea anemones and the affect that global warming has been having on not only aquatic life but the world as a whole. The data I have collected from this project will contribute to future studies of sea anemones.

Summary Statement
This project was conducted to determine if global warming had influenced the population of the Giant Green and Sunburst sea anemones over a 2 year period of time (2003-2005) at the Almar Avenue site.

Help Received
Mother helped edit report; Father constructed grid and took photos; John Pearse provided information and advice; Shama Hinard and Matt Knop for assistance and introducing the process of anemone counting; Long Marine Lab

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Preston E. Reis

Project Number
J0926

Project Title
Battle of Ecosystems!

Abstract

Objectives/Goals
I wanted to see which ecosystem could out last, out live,and out grow all the other ecosystems.

Methods/Materials
I used, 6 2-litter,soil,3 pieces of cloth, 2tsp of lemon juice,arthropods,worms, water,aqua ferns, declorinization drop,sea snales,and gravel.First I cut the six 2-litter bottles in half. With the three that are open add water, gravel and then declorinization drops. Then I added sea snails to all the tanks. With the three bottles I didn't cut yet, I cut them horizontal. Then I fastened the cloth to all the spouts. I then added soil to the part with the cloth. Next, I added seeds to soil and added a little water. Next I added 2 tsp of lemon to both water and soil for acid rain tank, and worms and arthropods (rolly pollies) to the animal tank. Next, I added 4 sea snails to each water section of the ecosystems. Last, I sealed up the tanks and document daily, every 9 days photograph.

Results
I found that the animal tank did the best the control did the second best,and the acid rain did the worst, but it slowly recovered and in the end it got very, very close to tieing for second place.

Conclusions/Discussion
In my experiment I found that animals help their ecosystems, and because they help so much they make their ecosystem better than the other ecosystems. Second is the control because there were no disadvantages, but there were no advantages. And the very worst was acid rain because it damaged the water ecosystem so bad.

If I did this experiment again I would make a little hole in the acid rain tank, so that more acid rain could be added. Because normally humans would not stop pollution for such a long time period.

Summary Statement
I found out which ecosystem was the very best in all assets and the one which lasted the longest.

Help Received
Transportation to and from fish store (for aqua fernsand sea snales).

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Katelyn M. Ridgeway

Project Number

J0927

Project Title

Enterococcus Bacteria Alert! Which Popular North County San Diego Surf Beaches Are the Safest?

Abstract

Objectives/Goals

The purpose of this project was to determine which popular North County, San Diego Surf Beaches were the safest and most hazardous regarding Enterococcus bacteria. The following beaches were tested: Ponto Jetty, Grandview, 15th Street, Cardiff Reef, Fletcher Cove, Swamis, Beacons, and D Street.

Methods/Materials

She tested the eight popular North County Surf beaches by using the Index-Quanti Tray method. To do this, she worked along side with the Surfrider Foundation-San Diego Chapter. She tested each beach ten times on ten different Sundays. Materials included the following:Nasco Whirls-Paks, 10ml plastic pipettes, pipette pump, 100ml beaker, distilled water, Enterolert reagent packs, Quanti-trays, Quanti-tray sealer, incubator that can be set to 41'C, lunch size cooler, ice, notebooks, blacklight, rubber boots, Enterococcus charts, thermometer, trash bags, beach water samples, surgical rubber gloves, eye goggles. Disposal: After the Quanti-trays were incubated, any of the Quanti-trays that had a bacteria level over 104 were given to the Surfrider Foundation who took them to an autoclave. All materials and Quanti-trays that had a safe level of Enterococcus bacteria were thrown away in the regular garbage as was instructed by the Surfrider Foundation-San Diego Chapter.

Results

On days of rain (tests 4,5,6) a lot of the beaches' Enterococcus levels reached extremely high levels, 1520 being the highest. On the days before the rain came (tests 1,2,3) the highest level was only 70. On the days after the rain (tests 7,8,9,10) the highest level was 250.

Conclusions/Discussion

Note: Enterococcus levels:0-79=acceptable;80-104=poop;Over 104=unacceptable
When rain came, the researcher got some shocking results from the beaches that had a storm drain (Fletcher Cove and Beacons) or a river mouth (Ponto Jetty and Cardiff Reef). Fletcher Cove reached 570 while Ponto Jetty reached 1520! Beaches that have storm drains or river mouths are extremely dangerous to venture into during rain. The worst beach during rainy weather is Ponto Jetty at an average of 560! The safest during rainy weather is D Street at an average of 30. With no rain and good weather conditions, Cardiff Reef is the worst at an average of 70. The best is Beacons at a mere average of 3! With both of those categories combined, the most hazardous is Cardiff Reef at an average of 183! The safest and most surfer friendly is 15th Street at an average of 17!

Summary Statement

The safest and most hazardous popular North County, San Diego Surf beaches regarding Enterococcus bacteria.

Help Received

Mother and father drove to beaches and helped process samples for incubating; Used lab at Grauer Prep. Academy under supervision of Surfrider Foundation (also provided materials); Dad helped attach chains to board.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Mary T. Rizk

Project Number
J0928

Project Title
Venice Canals: Picturesque or Contaminated?

Abstract

Objectives/Goals
Study of coliform bacteria contamination in the Venice Beach canals. Hypothesis: If coliform is present in the Venice Beach canals, then coliform levels will be the highest in the canal area the furthest away from the canal system water inlet.

Methods/Materials
Materials: Water sampling containers, SimPlate Single Test Medium Kit, Incubator, UV light (366 nm)
Method: Collect water from each Venice Beach canal location, fill individual test containers, shake well to blend water sample with test medium, remove the lid from the SimPlate device and pour the sample/medium mixture onto the center of the test plate and distribute evenly,incubate in the dark for 24 to 28 h at 35 ± 1ºC. observe color change of the liquid in the wells, count the number of wells showing a color change showing fluorescence under UV light.

Results
Sampling points A through C can be considered to be the furthest away from the entrance at sampling point J. Sampling points G through I can be considered to be the least distance from the entrance at sampling point J. The total colonies found in points A through C is 2213 while the total colonies found in points G through I is 4824. These data indicate a much higher level of coliform at the entrance locations than at the far reaches of the canal system.

Conclusions/Discussion
From the results of my experiment, I reject my hypothesis. Coliform levels are actually the highest in the canal area closest to the canal system water inlet. The hypothesis should be restated to: If coliform is present in the Venice Beach canals, then coliform levels will be the highest in the canal area closest to the canal system water inlet.

Summary Statement
This project studied and compared the levels of coliform at various locations in the Venice, CA canal system.

Help Received
Mother took me to Venice, CA to take samples, helped type report.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Madison Russell; Kathryn Smith

Project Number
J0929

Project Title
Fators that Affect Pesticide Toxic Longevity Levels in Soil

Abstract

Objectives/Goals
Our objective was to determine how long pesticide will remain toxic in different soils and in different environments. We also looked at how advertising can be misleading on the pesticide label when the company states how long pesticide will last. How long will pesticide help farmers? How long is the environment safe for humans and animals?

Methods/Materials
We used a Triazicide, an over the counter pesticide. We mixed the recomended amount and sprayed into three different soil types. Clay loam, Sandy loam, and a "regular soil". We then created a summer, winter, and spring evironment. We did this with the use of heat lamps, thermometers, and outdoor temps. (project was done in Jan. where average temp was 45-55 degrees). We placed samples of all three soil types into all three environments. We then placed crickets into the soil samples in the different environment to test for toxcitity. Continued to place and record cricket death rate until pesticide was no longer active.

Results
Soils:
Clay Loam- Pesticide did not last very long average of only 3.6 days
Sand- Pesticide remained toxic for 7.6 days
Regular- The pesticide remained longest in this soil. 12.6 days
Environments:
Spring - remained toxic in longer in sand and soil. evaporated very quickly in the clay loam. huge gap depending on type of soil. 2 weeks for sand and soil. 3 days for clay
Summer- remained toxic for very short period of time. 3 days for sand and soil. 2 for clay. evaporated very quickly.
Winter- results were fairly consistent with Spring for sand and soil. There was a big difference however for the clay. Pesticide lasted twice as longin this environment. From 3 to 6 days

Conclusions/Discussion
We believe that the advertising labels are very misleading. The brand we tested said it would last for two months. Maybe in perfect conditions with right soil. Farmers need to be aware that environment and the type of soil they have can effect pesticide longevity. Also, if you are spraying around schools, where there are children, or animals, you need to be aware of how long the pesticide will remain toxic.
Are tests show that environment and soil type definitley effect toxic logevity

Summary Statement
Our project is about determining how long pesticide last in different soils and in different environments.

Help Received
Mr. Russell helped supervise and display project

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Catherine G. Soloway

Project Number
J0930

Project Title
Fungus Is Your Friend

Abstract

Objectives/Goals
The purpose of this enviromnental science project is to demonstrate that lichens, which are a symbiotic union of fungus and algae, can be used as effective bioindicators. Since lichens act like sponges that draw all nutrients they require from the air and rainwater, people should be able to determine whether or not air is safe to breathe simply by identifying the types of lichens in an ecosystem and evaluating how those lichens react to acid rain air pollution.

Methods/Materials
Crustose, Foliose and Fruticose lichens were subjected to thrice-daily applications of solutions of varying levels of acidity. I sprayed a sample from each of three species of lichen with a mild acidic solution (with a pH of 6.0), a sample from each species with a strong acidic solution (with a pH of 5.4, which is the level of acid rain), and samples from each species with distilled water, which has a neutral pH of 7.0. The effects of each solution on each type of lichen were monitored to reveal whether lichen can serve as a simple, low-technology means of monitoring the safety of the air we breathe.

Results
This experiment's results were not entirely what I had expected, since certain of the lichen samples died earlier than predicted. Fruticose lichen, which survive in wilderness areas, are sensitive to acid rain and did die rapidly. The Fruticose lichen sprayed with water died as rapidly as those subjected to acid, which was not anticipated and points to its sensitivity to elevated levels of acidity.

Conclusions/Discussion
This experiment proved that lichen can serve mankind as bioindicators of adverse levels of acid in the air we breathe. When the numbers of lichen in an ecosystem decrease, the lichen are telling us, by their absence, that something is wrong.

This experiment was difficult to quantify because I had no accurate, measurable means of assessing how much damage the solutions were doing to the lichen. My only means of evaluating the damage was visual observation, and interpretation of the changes observed.

Summary Statement
Lichens are an effective, low-technology way to monitor the presence of harmful acids in our air and rainwater.

Help Received
My Mother typed a portion of the report; My science teacher suggested that I use color as a means of tracking the failing health of the lichen.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

Devesh M. Vashishtha

Project Number

J0931

Project Title

The Effect of Variations of pH, Nitrogenous Fertilizer, and Temperature on the Growth of Echinochloa crusgalli

Abstract

Objectives/Goals

The purpose of the experiment was to study the growth of Echinochloa crusgalli (Japanese millet) under variations of temperature, pH, and nitrogenous fertilizer. The goal was to find if the growth of Japanese Millet under these variables would be enough to potentially reduce carbon dioxide in the atmosphere, and therefore mitigate the effects of global warming.

Methods/Materials

The main materials used included Lolium Multi-Forum Japanese Millet seeds and a Precision low temperature illuminated incubator. The solutions used included: 2L of ambient pH and ambient nitrogen solutions (Solution 1), 2L of ambient pH, high nitrogen solutions (Solution 2), 2L of low pH, ambient nitrogen solutions (Solution 3), and 2L of low pH, high nitrogen solutions (Solution 4).

Sixteen pots were filled with a dirt-vermiculite mixture, and ten seeds of Japanese millet were placed in each pot. The pots were divided into four groups and watered with each of the four solutions described above. Then they were kept in an incubator at 13.3 degrees C, and were watered once a week with 60 mL with their respective solutions. At the end of the two weeks, the shoots were clipped at soil level, dried, and weighed to find their biomass. The experiment was repeated with another set of sixteen pots at 17.3 degrees Celsius.

Results

In the control experiment, the four pots watered with solution 4 grew the most. The pots watered with solution 1 produced the second most biomass. Then came the pots watered with solution 3, and finally the pots watered with solution 2.

In the variable experiment at higher temperature, the pots watered with solution 2 grew the most, followed by the pots that were watered with solution 4. Thirdly came the pots that were watered with solution 1, and lastly came the pots watered with solution 3.

Conclusions/Discussion

Through the data, it was proven that a noticeably larger amount of biomass was produced by the Japanese millet growing in the variable experiment at 17.3 degrees Celsius. Higher temperature simulated global warming, added nitrogen simulated the presence of nitrogenous fertilizer in soil, and low pH simulated effect of acid rain. Japanese millet grown with high nitrogen content in soil and ambient pH grew the most at higher temperatures. From this study, it was found that Japanese millet can be grown in soil containing high nitrogen to prevent the harmful effects of global warming.

Summary Statement

This experiment studied the effect of higher temperatures on the growth of Echinochloa crusgalli (Japanese Millet) under various soil conditions.

Help Received

Used lab equipment at University of California in Irvine under the supervision of Professor Kathleen Treseder; Professor Kathleen Treseder helped interpret results; Mother helped glue together the board.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Max T. Wilkerson

Project Number
J0932

Project Title
Storm Drain Effluent: A Place for Children to Play?

Abstract

Objectives/Goals
During the summer, many people enjoy a trip down to the beach on a hot day. Sometimes, they find what they think to be a stream that#s perfect for their younger children to play in. What they are most likely doing is setting their children in a sewage drain run-off effluent that may be contaminated with bacteria such as E.coli and coliforms. In this project I checked for bacterial contamination at two storm drain effluent locations: Cottonwood Creek and San Elijo.

Methods/Materials
I tested each site five times each on five different days. I evaluated the water samples in a laboratory at the San Elijo Water Reclamation Plant. The water samples were mixed into test tubes containing laurel tryptose broth (LtB) and then placed in an incubator for 24 hours. The next day if any of the samples were positive, they were transferred using an inoculation loop to test tubes containing brilliant green bile broth (BGB). All of the positive LtB samples transferred to BGB were again placed in the incubator for 24 more hours. These were checked the next day to see if more LtB tubes turned positive or if any BGB tubes were positive.

Results
On four different days, water samples were taken during periods of no rain. During this time one effluent location, Cottonwood Creek, averaged >1600 total coliform colonies per 100 ml of water while San Elijo effleunt averaged only 20 total coliforms per 100 ml. On a fifth day, samples were taken during a rainstorm. Total coliform levels for all these samples were >1600 total coliform colonies per 100 ml at both sites.

Conclusions/Discussion
Even during periods of no rain, Cottonwood Creek consistently averaged greater than 1600 coliform colonies per 100 ml of water.The total coliform counts were also very high at both effluent sites during the rain storm. I would recommend that this project be repeated with more tests conducted and more sites evaluated to determine the safety of effleunt run-off for public use.

Summary Statement
I evaluated storm drain effluent water samples from two different beach locations, during periods of no rain and rain, to assess levels of bacterial contamination.

Help Received
Suzanne Mandel-Mosko at San elijo Water Reclamation Facilities allowed me to use her lab and showed me how to conduct my tests.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Laura A. Wright

Project Number
J0933

Project Title
Water! Water! What's in Our Water?

Abstract

Objectives/Goals

I decided to investigate bottled water such as: purified water, well water, spring water, and artesian water. I then tested it against our tap water and water from our local creek.

I tested each water sample for six (6) primary contaminants (known to be dangerous to our health): bacteria, chlorine, lead, nitrates/nitrites, and pesticides, and two (2) secondary contaminants (which affect taste and appearance, and may or may not be dangerous to our health): hardness and pH. I then compared the results to our tap water in San Mateo, California. I also tested the San Mateo Creek water as a control sample to show that the tests were working. To determine whether each bottled water was safe to drink, my results were compared to the US EPA (Environmental Protection Agency) guideline standards for maximum allowed contaminant levels.

Bottled water has become part of our daily life. In the past, we would go to the drinking fountain at school or run into the house and get a drink from the faucet. Today, we often carry water bottles everywhere we go.

I personally like the convenience of water bottles, but I started to wonder about whether drinking bottled water is more dangerous to our health than drinking our tap water.

Overall, because of the differences in the secondary contaminant tests, Dasani ranked the best, and the San Mateo tap water ranked the second best in total score. Due to the fact that we do not know whether the hardness or pH in bottled water affects our health, my recommendation is to stick with tap water or buy Dasani bottled water.

Summary Statement

I decided to investigate bottled water such as: purified water, well water, spring water, and artesian water. I then tested it against our tap water and water from our local creek.

Help Received

My Mom and Dad helped me purchase the tests, bottled waters and go to the San Mateo Creek to get water samples.

CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Ean Z. Staedler

Project Number
J0999

Project Title
What Do You "Lichen" Your Air? Biomonitoring using Lichens as Bioindicators

Abstract

Objectives/Goals
Using lichens as bioindicators for biomonitoring, my project objective is to determine whether the air quality in my home town Aptos is cleaner where the point source air pollution is the freeway than the air quality in Moss Landing where the pollution source is a natural gas-fired power plant and a freeway.

Methods/Materials
Two one foot square quadrats were made using PVC pipe and monofilament line. These were used to determine percent coverage of lichen growth and type of lichen seen. Six 4# X 5# acrylic squares covered with petroleum jelly were made and hung in areas of lichen observations to capture particulates. A GPS was used to record locations of five tree sites and one graveyard site in Aptos and four tree sites and one gravesite in Moss Landing. Locations were plotted using Arc View#. Three types of lichens, crusty, leafy and feathery and their amounts of coverage were compared between the two towns.

Results
Areas closest to the pollution sources (<200 meters) of the freeway and the power plant had little to no lichens. Moving further away from the pollution sources percent coverage of lichens and different types increased.

Conclusions/Discussion
Based on the type of lichen growth and percent coverage that I found, Aptos and Moss Landing appear to have similar air quality environments.

Summary Statement
Biomonitoring using lichens as bioindicators.

Help Received
Dad helped with power tools; Mom helped type and drove me to sites; Dr. Tinker helped with Arc View