Name(s)	Project Number
India G. Bolding	**J1001**

Project Title

Measuring Seawater Mixing in Pillar Point Harbor, Half Moon Bay

Abstract

Objectives/Goals
To determine if Pillar Point Harbors man-made breakwaters allow the wind, tide and surf action to mix the water in the harbor.

Methods/Materials
I tested four different spots in Pillar Point Harbor and one control spot at Surfers Beach for dissolved oxygen, pH, temperature, salinity and conductivity. I had 87 pieces of data from five sampling trips. In order to test for conductivity I built a probe that attaches to a voltmeter that measures resistance which I converted to conductivity. Salinity tests, done at the San Francisco Water Department, were compared with my conductivity measurements to see if the voltmeter probe worked.

Results
In all the tests the numbers I got did not vary very much and I found almost no difference between the inner and outer harbors and my control site at Surfers Beach. The conductivity probe was not sensitive enough to pick up differences in our salinity range. When I graphed the data against the salinity measurements I got a scatter plot that showed no trend.

Conclusions/Discussion
A comparison of the averages for sites in the harbor versus the control site showed very little variation. My results suggest the harbor waters are well mixed with no sign of stagnation. The results of my voltmeter data compared to the salinity data showed that the probe I built was not sensitive enough to show differences in conductivity in the concentration range for our seawater.

Summary Statement

My project explored whether the seawater in Pillar Point Harbor is well-mixed by wind, tide and surf action.

Help Received

Father helped build probe. Mother helped figure out which tests to use and taught me Chart Wizard on Excel. Both parents drove to sampling sites. Salinity tests, used as a check on conductivity readings, were performed by the San Francisco Water Department.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

Navdeep S. Dhaliwal

Project Number

J1002

Project Title

How Safe Is Our Water to Swim?

Abstract

Objectives/Goals

Objective of my science project is to find out the level of total coliform bacteria, E. Coli bacteria, chlorine, heterotrophic plate count (HPC) in my friend#s swimming pool water, Kern River water, and water in the lakes inside the local Riverwalk City Park and based on the results, determine if it would be safe to swim at these locations and whether or not it would be safe to drink water from these locations during a crisis.

Methods/Materials

Methods: Collection of water samples from various locations in the City; testing of pH, temperature, chlorine residual in water samples; testing for total coliform and E.Coli bacteria in water samples using Quanti-Tray method; Heterotrophic Plate Count (HPC) in Colony Forming Units per milli liter (CFU/mL) using petri dishes.

Results

Inlet Source for Riverwalk Park Lakes showed the highest (1299.7 MPN/100 mL) followed by Kern River, Riverwalk Park Eastside Lake, Riverwalk Park Westside Lake, and Swimming Pool water with lowest (1.0 MPN/100 mL) total coliform bacteria.

Riverwalk Park Westside Lake showed highest (17.1 MPN/100 mL) E.Coli bacteria folowed by Ker River, Inlet Source for Riverwalk Park Lakes, and Riverwalk Park Eastside Lake and Swimming Pool both with the lowest (less than 1 MPN/100 mL) E.Coli. bacteria.

Swimming Pool water showed highest (4000 CFU/mL) average HPC followed by Inlet Source for Riverwalk Park Lakes, Riverwalk Park Eastside Lake, Kern River, and Riverwalk Park Westside Lake with lowest (295 CFU/mL) average HPC.

Conclusions/Discussion

All water samples collected from the Swimming Pool, Kern River, Riverwalk Park Eastside Lake, Riverwalk Park Westside Lake, and Inlet Source for the Riverwalk Park Lakes showed E.Coli bacteria lower than 235 MPN/100 mL (maximum level considered safe for swimming in fresh water per State and EPA guidelines). Swimming Pool water showed the highest average HPC possibly due to the reason that there was no chlorine present in the swimming pool water. Due to winter weather, the pool was not in use. The Swimming Pool water could be used for drinking in a crisis after adding chlorine in the water or after boiling it for one minute.

Summary Statement

My project is to determine if our local fresh water from various locations in the City would be safe for swimming based on testing for total coliform bacteria, E.coli bacteria, and HPC.

Help Received

Help from dad in transportation of water samples from different locations and delivery to laboratory, analysis of water samples by McRay Laboratory, parents' help in proof reading of project documents , review of graphs, charts, and tables, cutting and pasting on the board.

Name(s)	Project Number
Madison M. Dutra	**J1003**

Project Title

Save the Wetlands: Investigating Pond Water Quality and Water Sources

Abstract

Objectives/Goals

California has lost more than 90% of its wetlands in the past 200 years. Environmentalists say that due to this wetland loss, artificial reservoirs and farm ponds have become important replacements for lost habitat. Evans Pond is a local farm pond established over 100 years ago from runoff. Many types of birds and migratory ducks inhabit the pond. Many turtles also make Evans Pond their home. Evans Pond has been having trouble maintaining an adequate water supply. The goals of this project were to evaluate the water quality of Evans Pond, document the animals living there, and go to the community to seek long-term solutions for supplying Evans Pond with water.

Methods/Materials

For this experiment I obtained water quality testing kits and materials from La Motte and Hach chemical companies. I performed a total of 338 water quality tests using 21 different water samples obtained over six months. I tested water samples for pH, alkalinity, ammonia, hardness, nitrate, nitrite, phosphate, chlorine, chloride, turbidity, dissolved oxygen, biochemical oxygen demand, total coliform, and E. coli. I recorded wildlife observations each time I visited the pond.

Results

Half of the available dissolved oxygen values fell below the recommended ranges. The pH levels were also sometimes too high, and ammonia values at these pHs were high enough to possibly cause stress to animal life. Coliform counts were above desired ranges. Phosphate levels were high enough to promote excessive plant growth which speeds eutrophication. I was happy to see many migratory ducks, such as the Ring-Necked Duck, American Wigeon and Gadwall at the pond. However, I am not positive the Clemmys (Actinemys) marmorata pallida resides at Evans Pond. Since the days have become sunnier, I have seen that some of the turtles that are definitely not Red-Eared Sliders are also not Clemmys.

Conclusions/Discussion

The community is now developing a plan for supplying water to the pond. They are interested in my project as documentation of the wildlife. Evans Pond receives imported water approximately one to three times a year. I believe there should be a pipe connected to a known nearby reclaimed water source (or other permanent solution) to provide enough water for Evans Pond since many animals rely on it as their habitat.

Summary Statement

The goals of this project were to evaluate water quality in a local pond, document the wildlife, and find long-term solutions for maintaining an adequate water supply to the pond.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

Nader Elaskary; Marty Ettema; Dylan McManus

Project Number

J1004

Project Title

Air Quality Comparison: Particles and Ozone

Abstract

Objectives/Goals
The goal for our project is to inform and educate others on the quality of air that is around us and the potential hazards in the atmosphere.

Methods/Materials
Particles: 1. Find locations for experiment to conduct experiment. 2. Measure distance from testing site to the source (major roadway). 3. Creat trapper fro collecting particles. - 3" by 5" index card - 4 by 7.5cm hole. 4. At location attach tape on one side and stick the trap to the testing site. 5. Return three days later and cover the tape with more tape and put more traps up. 6. Repeat steps 4 - 5 untill desired ammount of data is obtained. 7. As data is obtained look under a high powered microscope and measure the size of the particles that were collected by the traps. 8. Analyze data and form a conclusion.
Ozone: 1. Find locations for teating (high power lines). 2. Obtain correct ammount of ozone readers. 3. Place the ozone indicator at the source, 10 meters, and 36 meters away. 4. Retrieve ozone idicator after one hour after put up and come part to the idication card. 5. Repeat steps 3 - 4 untill desired number of data is obtained. 6. Analyze data and form a conclusion.
Materials: - 3" by 5" index cards (105); - square hole puncher; - clear packing tape; - ozone strips (100); - microscope; - calculator; - meter wheel.

Results
Particles:
At the first location, 100 meters away (luigi) there was on average 41 particles and an average size of .26 milimeters. At the second location, 400 meters away (solosano) there was on average 53 particles and an average size of .34 milimeters.At the third and final location, 1000 meters away (rucker) there was an average of 42 particles and an average .41 milimeters.

Conclusions/Discussion
Our hypothesis was supported because the farther away the particle traps were from the source the larger the particles were and the ozone would be less occuring the further away it would be from the source. But our data may have been inconclusive because we had some flaws.

Summary Statement

Our project was about us comparing the air quality at different schools in our area and ozone occurrace arround high power lines.

Help Received

Our teacher helped overall.

Name(s)	Project Number
Sam Falkenhagen	**J1005**

Project Title

The Effect of Precipitation on Nitrate Concentrations in San Francisquito Creek

Abstract

Objectives/Goals
The purpose of my project was to determine how the level of nitrate (NO3-), a common pollutant coming mainly from fertilizers, varied in different locations along Los Trancos-San Francisquito Creek. I was especially interested in how the nitrate levels varied before, during, and after a torrential rainstorm that dropped more than 4 inches of rain across the Bay Area on January 4th, 2008.

Methods/Materials
On January 3, I took 5 water samples along a 10 mile stretch of San Francisquito-Los Trancos Creek the day before the driving rains were forecasted. As heavy rains hit the Bay Area on January 4, I went out and collected 7 more samples, again working my way down the creek. On January 6, after the storm had passed and I had allowed enough time for immediate run off to drain down the creek, I collected 8 more water samples. After organizing my samples, I used a Horiba Ion Meter (NO3-) to measure the concentration of NO3- in each sample (ppm).

Results
-    Water samples taken during the rains had 5 to 6 times more nitrates (100-200 ppm) than samples taken before the rains (15-30 ppm).

-     Sediment laden samples contained significantly higher nitrate levels than the same samples measured subsequently, after sediment was removed.

-    On every day I collected samples, nitrate levels generally increased through the town of Portola Valley, decreased through Stanford#s more rural property, and then increased through Palo Alto, an urban area.

Conclusions/Discussion
Since sediment laden samples had more nitrate than the same samples without sediment, I conclude that much more nitrate is contained within the soil itself, than the amount of nitrate dissolved in the water. If one can filter out the sediment in a heavily nitrate-polluted creek, many of the negative effects of high amounts of nitrate can be mitigated. Since the samples taken in the rural, Stanford area had lower amounts of nitrate than the samples in urban areas, I conclude that human presence, whether it be on a Portola Valley farm or in a concrete apartment building in Palo Alto, is the main cause for nitrate pollution. Soil that is generally untouched by humans can not contribute large amounts of nitrate to a water system.

Summary Statement

The goal of my project was to determine how the nitrate concentrations in Los Trancos/San Francisquito Creek varied at different locations along the creek and also to see how these concentrations were affected by a torrential (4+ inches) ra

Help Received

Name(s) Krystal M. Flores	**Project Number** **J1006**

Project Title

Determining Which Lawn Fertilizer Is More Environmentally Harmful to Living Organisms, Organic or Inorganic

Abstract

Objectives/Goals
I am determining how toxic fertilizers are to the environment. I am simulating run-off water that would travel into the streams and effect the aquatic environment by testing the toxic levels on daphnia.

Methods/Materials
I am using three different types of fertilizers. Organic fertilizer, liquid fertilizer, and granule fertilizer. I applied the fertilizers to 12in by 12in pieces of sod. I then simulated run off water from the sod, by running the fertilizer through the sod, and filters into cups.
I then placed the daphnia into the different cups and checked the death rate of the aquatic organisms. Repeated process for ten trials. (controlled environment had no fertilizer)
Daphnia was obtained from Boreal Science Supply company)

Results
The non-organic fertilizer kept the daphnia alive the longest of all the fertilizers tested. They lived an average of 4.9 days. The daphnia in the control group stayed alive for an average of 5.3 days. All the other fertilizers. All other fertilizers kept the daphnia alive only for a certain amount of minutes.

Conclusions/Discussion
I learned that not all organic fertilizers are best for the environment. My test showed that the non-organic fertilizer was less harmful to the aquatic environment than the organic fertilizer. Organic fertilizers broke down very quickly which may have been why it was more harmful to the daphnia.

Summary Statement

My project test the toxic levels of fertilizers and how that effected the aquatic animal daphnia.

Help Received

Mom helped obtain materials and put board together. Teacher went through scientific method an supervised

Name(s)	Project Number
Maddison J. Goss	**J1007**

Project Title

Mission Bay at Risk: Investigating Soil and Water Contaminants

Abstract

Objectives/Goals
I read an article on October 26, 2006 in the Union-Tribune that an area around San Diego#s Mission Bay had once been a hazardous waste landfill. I wondered if substances from the unlined landfill might be contaminating Mission Bay. I hypothesized that unacceptable levels of lead, copper, chromium, or iron might be present in water and soil samples.

Methods/Materials
For this experiment, a total of 205 tests were performed. I collected water and soil samples from areas around Mission Bay. The test site areas were Fiesta Island (north, south, east and west), Sea World Research Center (and the landfill which covers 120 acres), the east side of the Sea World Parking Lot and the foundation of the attraction Journey to Atlantis. Water samples were taken approximately 30 cm from land. The soil samples were collected after removal of approximately 10 cm of the top soil. After 24 hours the soil and water samples were tested for contaminants. The soil was reduced to a liquid by adding 120 mL of distilled white vinegar added to 2.5 cc soil sample (in order to test for metals in non-liquid materials the substance must be combined with a liquid and the metal leached).

Results
The allowable level for lead in soil according to #Federal EPA Standards# is 400-500 ppm. The #CA Proposition 65# maximum allowable level for lead in soil is 350 ppm. In seven of the soil samples I tested, the estimated lead content was 1250 ppm. Six of the seven lead contaminated soil samples were taken from areas over the old landfill, the landfill is immediately east of the Sea World parking lot. For chromium, the highest amount I obtained was 30 ppm in three samples located over the hazardous waste landfill. 150 ppm copper was the greatest level I recorded. I found this amount at two test sites, both on the landfill. The highest level for iron was 750 ppm in seven tests, all located over the old landfill. In my water samples, the lead high was three ppm, slightly north of the landfill; copper#s high was 1.5 ppm north of Fiesta Island. Also, the high for iron was located north and north-east of Fiesta Island in three samples; 0.5 ppm was the high for chromium located on the north-east side of Fiesta Island.

Conclusions/Discussion
It is possible groundwater carries lead and other metals through contact with the, unlined dump site deposits these contaminants I San Diego#s Mission Bay area water and soil.

Summary Statement

This project examines possible contamination in soil and water through contact with an unlined, hazardous waste landfill at San Diego's Mission Bay and Sea World locations.

Help Received

Mother and Father made sure I tested safely; science teacher gave specific areas to research

Name(s)	Project Number
Conor G. Goulart	**J1008**

Project Title
Toxins: Fresh Water Microorganisms vs. Household Chemicals

Abstract

Objectives/Goals
I chose this science project because I was concerned about the effect on the environment through the use of certain household chemicals. I wanted to know which household chemicals effected local fresh water micro-organisms the most.

Methods/Materials
Windex, Shout & Lime Away were added to samples of local lake water containing three types of micro-organisms. I confirmed that all water samples contained the same micro-organisms. I placed 100ml. of the water sample into a jar then added 3 drops of one household chemical to it. I waited 5 minutes prior to observing the sample. 2 drops from the jar were placed on a slide and examined for any impact on the micro-organisms. Each test was repeated increasing the chemical one drop per 100ml. of water with a maximum of 7 drops for each chemical. Observations were recorded regarding color, shape an activity changes for each micro-organism.

Results
The experiments & data confirmed my hypothesis by proving that Windex, Shout & Lime Away had a toxic impact on the micro-organisms. Windex & Shout caused less damage than Lime Away to the micro-organisms. 3 to 4 drops per sample of Windex or Shout harmed the micro-organisms but did not kill all of them. When the amounts were increased to 6 to 7 drops per sample all the micro-organisms died. In comparison, Lime Away killed all the micro-organisms with 3 to 4 drops. The ingredients were not listed on any of the cleansers but Lime Away had the most severe warning on the label.

Conclusions/Discussion
I was able to confirm that Windex, Shout & Lime Away had a harmful impact to fresh water micro-organisms. The more potent the cleanser, the more toxic results were observed. These tests are important because they tell us that toxins are potentially more dangerous than we think and simply using them & pouring them down the drain will introduce these chemicals to our environment. The knowledge gained from this experiment is useful because it also applies to people who illegally dump chemicals into the environment. It also helps realize that synthetic, non-natural, or man-made chemicals can be lethal and deadly to the environment.

Summary Statement
Testing the toxic impact household chemicals have upon fresh water micro-organisms.

Help Received
A note of thanks to my Mom who helped transfer data onto a spreadsheet; to my Dad who helped in my abstract & graph; to Renee Culver, who read my report and gave great advice, and to all the mentors affiliated with San Joaquin County Office of Education who helped me prepare for the State Science Fair.

Name(s)	Project Number
Taylor Hamermesh	**J1009**

Project Title

Radiation: Silent Killer, or Life Saver?

Abstract

Objectives/Goals
My experiment's question was, "Can a person receive harmful levels of radiation by visiting a hospital, oncology center, a radiologist, surgery center, or a doctor/dentist office?" I hypothesized yes; visitors and workers could receive harmful levels of radiation at our chosen locations because anyone administering a test involving radiation, the patient receiving the test, or everyone in the area of the test would receive some level of radiation. I used the U.S. Government standard of acceptable exposure for occupational and non-occupational radiation as measurement of "harmful."

Methods/Materials
I rented a Geiger counter, a machine that measures the amount of radiation in the air, and measured the gamma ray radiation at sixteen locations which included two oncology centers, a hospital, dentist office, two medical buildings, and a surgery center. I put the Ludlum MuR Meter in a large handbag and went as close to the source of radiation as I could and wrote down my datum.

Results
I then used an equation in order to figure out what the amount of radiation that was received at each indiviual location independently. First, take the reading of what you received in MuR. Next, multiply it by the time you were irradiated in seconds. We used 40 seconds to have a consistant equation. Next, multiply it by your variables. For our example involving a oncology center, we multiplied the numbers by 4 repetitions multiplied by 30 patients a day and then multiplied it by 240 for what we estimated would be a technicians days worked per year. Finally, take your answer and divide it by 3600 seconds per hour = the MuR exposure projected over a year.

Conclusions/Discussion
I discovered that the amount of radiation was so small at each location that a visitor or a technician exposed for an entire year never reached the government's non-occcupational level of "harmful" and never came close to the "occupational" level the government allows for technicians. Therefore, I disproved my hypothesis!

Summary Statement

To discover whether there is harmful levels of radiation visiting a hospital, oncology center, a radiologist, surgery center, or doctor/dentist office.

Help Received

Mother helped edit experiment and drove the car, Christopher Westbrook, our physicist, let me into the oncology center and gave me advice how to carry out the experiment.

Name(s)

Bryton A. Horner

Project Number

J1010

Project Title

Legal Pollution: Geographic Distribution of Wind-Borne Particulates Surrounding Irvine Cement Plants

Abstract

Objectives/Goals

This project is based on air particulates surrounding Irvine Cement Plants. How do Irvine Cement Plants affect the city's air pollution in terms of dirt particulates in the air?

Hypothesis: Based on research, I hypothesize that Irvine Cement Plants are a significant contributor to the city's air pollution.

Methods/Materials

Calibrated Air Sampler; 400x Magnification microscope; 20 Glass microscope slides prepared with double-sided tape; Global Positioning System; City Map; Wind Vane; Anemometer; Stopwatch; Vehicle.

Data Collecting Procedure:

1. Using the city map, travel to 10 points up and downwind of the Irvine Cement Plants.
2. Record wind direction, speed, GPS coordinates, map location and time.
3. Run the air sampler for 5 minutes

Analysis:

1. View slides at 400x on the microscope.
2. Count the number of dirt particulates in 2 random spots near the center of the slide.
3. Use the following equation to find Particles Per Liter of air (PPL):

PPL = (Particles in Field 1 + Particles in field 2) / (5 * the number of liters drawn by the air sampler per minute)

Results

The average PPL of the upwind samples was 4.5 particles per liter.

The average PPL of the downwind samples was 8.5 particles per liter.

Conclusions/Discussion

According to the results of the tests, my hypothesis was supported. The number of particles in the air was significantly greater downwind of the cement plants compared to the upwind samples, which were noticeably cleaner. The strong correlation between the position of the samples and the number of particles is strong evidence indicating wind blows the piles of dirt in the Irvine Cement plants into the air, causing major air pollution in Irvine and possibly greater portions of Southern California.

Summary Statement

I took air samples surrounding Irvine cement plants to determine the distribution of dirt particulate air pollution.

Help Received

Dad helped print photos, drive and use power tools.

Name(s)	Project Number
Jace R. Jackson	**J1011**

Project Title

Feathered Friend or Foe

Abstract

Objectives/Goals
The goal of my project was to discover an environmentally safe, effective and harmless deterrent to keep unwanted pest birds from damaging a desirable food source such as a garden, berry patch or orchard.

Methods/Materials
A bird feeding site that was established fifteen years ago was choosen for testing. The consistent feeding patterns of the birds provided excellent data.
Four different deterrents were introduced and removed at even intervals: an artificial owl, and artificial crow, a windmill and shiny tinsel that moved in the wind. I observed and recorded the effects of these deterrents on the bird visitation to the previously unprotected food source.

Results
The averaged data collected from my trials show that the owl decoy was by far the most effective deterrent to the species of birds that frequented the feeding area. The owl was followed by the crow, the windmill and finally the tinsel.

Conclusions/Discussion
In conclusion, I found that nature can supply answers to it's problems. The bird's natural predator, the owl, proved to be the most effective and harmless alternative to pest bird control.

Summary Statement

My project is about trying to find an environmentally sound solution to pest birds damaging crops.

Help Received

Mother helped type project papers, a tenant provided the bird feeding station, father provided supplies.

Name(s)	Project Number
Bianca J. Jeffs	**J1012**

Project Title

How's Your Beach?

Abstract

Objectives/Goals

To find out how animals that live in the sand are affected by people and also if people affect the total number of animals as well as the diversity of species that can be found? It was important to find out if people do have an affect and what activities are the most harmful?

Methods/Materials

I made a 3 ft. square from pipes that we could take to the beach; other equipment included: bucket; shovel; notebook; pencils; camera and tide chart so that we could always dig at low tide. I chose five beaches, Manresa, La Selva, Hidden Beach, Rio del Mar and Capitola. All of the beaches have streams or drainages that flow through them. I dug at each beach twice on different days at about one week apart. At each beach I dug to a depth of 6" and in the same place each time, around 15 to 20 feet from the waves. If I found any animals I noted my results in my notebook, took photographs and put the animal in the bucket.

Results

I found a total of seven different species. The species that I found were: Sand Crabs; Sand Fleas; Clams; shrimp; two types of clam worms and also one small fast swimming triangular shaped creature. There was a big difference between the five beaches that I studied, Manresa and La Selva had more creatures as well as greater diversity of species, Hidden Beach had some sand animals but not so many, and Rio del Mar and Capitola had almost no wildlife, also the sand seemed oily. At my second dig, which was after heavy rain, there were way less animals than the first dig!

Conclusions/Discussion

Why was there such a big difference in the beaches when they are not very far away from each other and why did rain make such a big difference? It could be recreational use, because the beaches further North are the busiest, but the main reason is water bourne pollution from runoff. Capitola and Rio have major creeks with large watersheds which flow all winter. The creeks at the other three beaches only flow after big storms or long periods of rain. This explains why I found so much less wildlife in my second digs. Also creeks at Manresa, La Selva and Hidden Beach run through areas with less development so the water is less polluted. Hidden Beach is however affected by long-shore drift from Rio del Mar. The health of our beaches is difinitely affected by people, who sometimes live far inland and not just when they play in the sand.

Summary Statement

The question I was asking myself was: How much are we affecting our beaches? because if we are affecting our beaches it is a good example of just how much we are affecting our planet.

Help Received

My Dad helped me to build a 3 foot square transect that I could take to the beach and he also helped me to dig. My sister helped dig and catch the animals with me. My Mom helped me find out what the worms were and she also helped me to type my report and make my board look nice.

Name(s)	Project Number
Victoria P. Johnson	**J1013**

Project Title

Comparing Particulates around a Small Town

Abstract

Objectives/Goals
I am comparing the amount of air particulates in and around the town of Sanger, to see which activity: transportation, agriculture, or residential, produces more air particulates.

Methods/Materials
The materials I am using are milk cartons, clothes hangers, magnifying glass, Vaseline, Popsicle stick, and a utility knife. I will draw one inch test area on each milk carton square, numbering and color coding each square with the location and trial number. Three squares are then attached to a clothes hanger with a thin layer of Vaseline spread over the circles. The clothes hangers will be hung on a tree branch, fence, sign post, or pole at each of the twelve locations. The squares will be left for three days, then replaced with new test squares. The polluted squares will be placed on a peg board and covered in a plastic container to prevent contamination while transporting back to my house. I will count the particles stuck to the Vaseline using a magnifying glass and record my findings, repeating these procedures for a total of six trials.

Results
The results of my investigation were that the transportation routes produced the most amounts of air particulates, residential areas produced the second most, and agricultural areas produced the least amount.

Conclusions/Discussion
My conclusion was that transportation activity produced the most air particulates. Air in the Central Valley is considered to be very unhealthy by government standards. However, despite the results of my study, the San Joaquin Valley Air District continues to put restrictions on residential and agricultural activities, but not on transportation.

Summary Statement

Comparing the amount of air particulates around a small town to see which activity: residential, agricultural, or transportation, is the greatest source of air particulates.

Help Received

Mr. Larry Casado, orchard owner; Mrs. Sandy Western, vineyard owner; Mr./Mrs. Albrecht, vineyard owners; Mr./Mrs. Wolfe, orchard owner; offered houses as test sites: Lacy family, Arredondo family, Milam family, Mangrum family; Steve Johnson, helped with equipment and transportation; Kathy

Name(s)

Kevin C. Johnston

Project Number

J1014

Project Title

Suburban Skyglow: Using Astrophotography to Analyze Light Pollution

Abstract

Objectives/Goals

The objective of my project was to measure the amount of light pollution in a California suburban area. The goal of my project was to compare the light pollution of points at several distances from the center of a small city (population 80,000). My question is: How does the skyglow of a suburban community affect viewing capability? My hypothesis is: Viewing capabilities of the stars and constellations will be drastically reduced by artificial light pollution when a suburban area is compared to an unpopulated area.

Methods/Materials

In my project, I used a Nikon D40x digital camera and tripod to take pictures of the night sky facing North, South, East, and West. I used three different locations; one in the center of a small city(point A), one at my house just outside of the city limits (point B), and one far from the center of the city in a remote location (point C). I downloaded these images onto my computer and used the histogram tool in Adobe Photoshop Elements to analyze the light intensity. I transferred the data, shown on the histogram, to Microsoft Excel. Once all of the data was transferred, I made several graphs to anaylze the light pollution data. I also used Walker's Law, $I=0.01PD^{(-2.5)}$, to find expected values of skyglow from various sources.

Results

The results of my project turned out to be slightly different than I expected them to be. For one, the point at the remote site had more skyglow than my house on certain days in certain directions (ex: 2/11/08 1.58 times greater skyglow at point C than at point B, south). However, the skyglow at the remote site had the least skyglow for most of the days and directions (ex: 2/11/08 2.72 times greater skyglow at point B than at point C, west). Of course, the city center always had the most skyglow and least viewing capability.

Conclusions/Discussion

Surprisingly, my hypothesis was not completly correct. In some cases the skyglow was higher at the remote location than at the city limit! This may be caused by the light being blocked by trees or other houses in the suburban area and very open in the unpopulated area. Also, facing South at the remote location there is another very large city (pop. ~1,000,000) 35km away which caused the light pollution to be much higher than if the city was not present. Prior to having done this experiment, I had not realized the effect of light pollution from large cities even at a great distance.

Summary Statement

In my project, I measured and analyzed the light pollution near a suburban area.

Help Received

Parent drove me to the remote locations, Mom proofread the final board.

Name(s)	Project Number
Farina J. Kazi	**J1015**

Project Title

Orange County or Ozone County?

Abstract

Objectives/Goals

The purpose of my project was to research the occurrence of Ozone at ground level and investigate Ozone levels in the local area. I wanted to see if there are harmful levels of Ozone in our county and surrounding areas.

Methods/Materials

I used water, corn starch, potassium iodide and filter paper to prepare color paper strips known as Schoenbein paper that helps measure Ozone at ground level.

Results

I measured Ozone in four different local areas which are Costa Mesa, Orange Fullerton and Riverside. The results show the Fullerton area in Orange County had the highest ground level Ozone, even higher than Riverside. A very interesting result of my research was that I found that the Ozone levels I measured were much higher than the levels shown in the website of the government organization called Air Resource Board (ARB). The levels I measured were all above the levels that ARB says could be harmful to health.

Conclusions/Discussion

I researched more and found that the ARB stations were all located in higher levels than my measurement locations which were close to ground. In fact, I communicated with Mr. Ken Stroud of the ARB and he could not give me a good answer for this observation. In the future, I would recommend researching this difference with the ARB data more and find out what the cause of this difference is.

Summary Statement

Measurement of ground level ozone in local areas which shows harmful levels above limits.

Help Received

Father helped in boiling liquid and pick up data strip from various locations

Name(s)	**Project Number**
Griffin R. Lay	**J1016**

Project Title

Making Acid Oceans: The Effects of Anthropogenic Atmospheric Carbon Dioxide Increase on the pH of Earth's Oceans

Abstract

Objectives/Goals

The goal of this project is to assess the potential effects of increasing amounts of atmospheric carbon dioxide resulting from anthropogenic activity on the pH of the oceans. Over the past 150 years oceanic pH has dropped, while atmospheric carbon dioxide has increased. Are these two phenomena causally related?

Methods/Materials

An enclosed aquarium was partially filled with distilled or ocean water of known initial pH, and the carbon dioxide level of the overlying air mass was increased by injection of known amounts of carbon dioxide. The water was gently circulated by a pump and the sealed system allowed to equilibrate, with the carbon dioxide content and pH measured after equilibrium. Changes in water pH were plotted as functions of atmospheric carbon dioxide concentration.

Results

The water pH decreased in proportion to the carbon dioxide contribution in the air up to a limiting value that appears to be a saturation level. The drop in pH was as large as -1.4 for very high levels of carbon dioxide, and -0.5 for factor of 10 increases in carbon dioxide which are in the range envisioned by unabated anthropogenic contributions over the next century. It is clearly established that atmospheric carbon dioxide level and ocean pH are causally related and past and future changes in ocean pH can be attributed to human induced increases in carbon dioxide emissions.

Conclusions/Discussion

As atmospheric carbon dioxide concentration increases in the future, oceanic pH will decrease from its current slightly basic level (pH ~8) to less basic or acidic levels. Global observations indicate that this has already occurred in the last 150 years: as the industrial revolution increased atmospheric carbon dioxide concentration, ocean pH dropped by about -0.1 in pH. This ocean/atmosphere coupling occurs irrespective of contentious global warming consequences from the role of carbon dioxide role as a greenhouse gas. With oceanic organisms having evolved within a narrow pH level, there should be concern that oceanic acidification may disrupt the metabolic processes of diatoms at the bottom of the food chain and essential for production of free oxygen. Unabated, this poses a global threat to the ecosystem.

Summary Statement

A controlled experiment demonstrates that increase in carbon dioxide concentration in air overlying a water mass lowers the pH of the water, a fundamental cause of ocean acidification due to anthropogenic carbon dioxide emissions.

Help Received

Father obtained high resolution CO2 and pH meters, and helped type the report.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)	Project Number
Rose Leopold; Ella Madsen	**J1017**

Project Title

Sandy Beaches: Pleasure or Pollutant? An Analysis of Sand Bacteria as a Possible Source of Ocean Contamination, Year 2

Abstract

Objectives/Goals

We tested as a continuation of previous years in which we found that beach sand could be a possible contaminant of oceanwater and groundwater. We tested to see if sand could be a filter for Escherichia coli (E.coli) and coliform bacteria. We used local beaches as our case studies. We tested for E.coli and coliform bacteria before and after filtering oceanwater and groundwater through the sand. Our null hypothesis stated that there would be no significant difference between the amount of E.coli and coliform bacteria filtered by the sand; and the amount of E.coli and coliform bacteria added by the sand when oceanwater and groundwater are run through sand cores. Our alternative hypothesis stated that when the oceanwater and groundwater run through the sand, the sand will filter out the E.coli and coliform bacteria. When the clean water runs through the sand, the water will not pick up any bacteria.

Methods/Materials

We collected sand cores from three different beaches at three spots each at the high tide line. Then groundwater and oceanwater were run through the sand cores. After the filtered water was collected, it was tested for E.coli and coliform bacteria, in regulation of the state standards. Then the water was put in an incubator for 18-22 hours and read for bacteria counts. Sand at 6 inches in the beach was collected and tested to find out the original bacteria counts for the sand. The sand was collected at 6 inches because previous tests indicated that there was the most bacteria at 6 inches in the sand.

Results

Capitola Beach oceanwater E.coli filtration overall acted as a filter. Capitola Beach groundwater E.coli and coliform for oceanwater and groundwater filtration the sand did not act as a filter. For Cowell's Beach and Rio Del Mar Beach oceanwater and groundwater E.coli and coliform filtration the sand did not act as a filter.

Conclusions/Discussion

Overall, the sand did not act as a filter. Our null hypothesis was rejected, as was our alternative hypothesis because there was a significant difference between ocean water and groundwater filtration. The sand did not filter bacteria and the groundwater became unclean.

In the future we would test more beaches, at different seasons and make sure to be very exact with our measurements.

People could use this information to educate the public about safety of their local beaches. Also, this could be reason why oceans are so contaminated.

Summary Statement

The purpose of our project is to see if beach sand can act as a natural filter for Escherichia coli (E.coli) and coliform bacterias in the oceanwater and groundwater.

Name(s)	Project Number
Jacqueline Lopez; Gloria Munoz	**J1018**

Project Title

Do Pollution Levels in the Los Angeles River Increase as It Moves through LA County?

Abstract

Objectives/Goals
The purpose of our project was to find out if pollution levels in the Los Angeles River increase as it moves through the Los Angeles County. Before beginning our science project we knew that the Los Angeles River was not clean. We wanted to gain enough knowledge about the river, to be able to share the information with the public so that we can help clean up the water quality of the River. We wanted to find a way to help both the residents of Los Angeles and all our local sea creatures.

Methods/Materials
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Results
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Conclusions/Discussion
The purpose of our project was to find out if pollution levels in the Los Angeles River increase as it moves through the Los Angeles County. Before beginning our science project we knew that the Los Angeles River was not clean. We wanted to gain enough knowledge about the river, to be able to share the information with the public so that we can help clean up the water quality of the River. We wanted to find a way to help both the residents of Los Angeles and all our local sea creatures.

Summary Statement

Our project was to test the different levels of nitrate, nitrite, copper, and pH along the LA River.

Help Received

Parents provided transportation to LA River, Hollenbeck Magnet provided C 200 Multiparameter Ion Specific Meter, Mr.Cueva and Mr.Quintrell helped edit work and 7th graders helped us use Multiparameter.

Name(s)	Project Number
Nathaniel J. Mooi	**J1019**

Project Title

What Are You Breathing? Measuring Ozone and Particulates

Abstract

Objectives/Goals
My objective was to determine if the levels of ozone and airborne particulates varied at different locations close to, and distant from highways, and in a downtown environment. I am interested in this topic because my grandfather has emphysema, and because I noticed that the area around our house near the highway had a coat of dust and grime.

Methods/Materials
Ozone and particulates were measured by setting up collecting devices that included Shoenbein paper and sticky-tape particle collectors at 5 different sites: the hill in my backyard, in my front yard, next to the road near a park, in the park, and in a downtown setting. Data were collected every day at each site for a week in October and another in November. The color of the Shoenbein paper was compared to a standard chart to obtain a comparative numerical value. Particle counts were made by counting all the particles in the microscope field.

Results
I found that the levels of ozone and particle counts were low at all of the sites and there was only a little change among the sites. However, the ozone was highest next to the highway on weekdays. The particle counts were highest in downtown San Mateo.

Conclusions/Discussion
Closeness to a highway can cause slight elevation of ozone levels. On weekends, the ozone level tended to drop slightly at every site except downtown, suggesting that traffic levels are about the same all week in the urban environment. Overall particle counts were highest downtown, possibly because traffic and activity keeps dust in the air.

Summary Statement

Ozone levels and particle counts do vary from site to site depending somewhat on weather conditions, but mostly on human activity.

Help Received

My parents drove me to the various sites to set up and retrieve the collection kits and helped make the Shoenbein paper. The California Academy of Sciences let me use one of their microscopes to make the particle counts.

Name(s)	Project Number
Bill R. Morris	**J1020**

Project Title
If Global Warming Continues, Will the Ocean Be Safe?

Abstract

Objectives/Goals
To find out if the ocean#s temperature continues to increase, will its qualities such as pH, oxygen, density, and salinity hurt the ocean environment?

Methods/Materials
2 1-gallon milk cartons, Pot large enough to hold 2 gallons of water, Microwave, pH paper, Thermometer, Paper, Pencil, Ocean water, Hydrometer Kit (used to test salinity), Scientific Calculator (density), 3 30 mL beakers, Potassium Iodine, Potassium Hydroxide, Manganese Sulfate, Sulfuric Acid, Starch, Syringe, Thiosulfate

Results
The salinity, density, pH, and oxygen levels of the water all hurt the ocean, and would hurt everything living in that environment.

Conclusions/Discussion
It is very apparent that as the water temperature rises, the qualities of the ocean will seriously effect the environment, so we need to try to help the environment as much as we can, and we need to find a way to save our ocean environment.

Summary Statement
My project is about what will happen to the ocean environment if global warming continues.

Help Received
Dana Point Ocean Institute supplied me with my materials, under the supervision of Catie Graver

Name(s)	Project Number
Leah M. Ostermann	**J1021**

Project Title

Acid Rain: A Good Thing?

Abstract

Objectives/Goals

Acid rain changes soil chemistry by leaching plant nutrients in the form of salts from the soil and lowering the soil pH. Soil salinity is the salt content of soil. As soil salinity increases, plants cannot grow, like in playas or dry lakes. The objective of this experiment is to determine if acid rain can leach salts from different soils to help plants grow. My hypothesis is that soil from China Lake playa will contain the most salts and the salts will leach the most, so that plants can grow.

Methods/Materials

Four soils were tested: 1) China Lake playa soil; 2) Mirror Lake playa soil; 3) desert soil; and 4) potting soil. Each soil (360 mL) was placed in a coffee filter. Water (960 mL) was poured over each soil. After the water filtered through the soil, a sample of each soil was tested with a soil test kit that measured plant nutrients: nitrogen, phosphorous, and potassium. Soil pH was also measured with pH paper. Then water & vinegar (960 mL) at pH 2.5 (acid rain) was poured over 360 mL of each soil using the coffee filter. After the water/vinegar filtered through the soil, a sample of soil was tested for pH & plant nutrients. Each soil was also tested for pH & plant nutrients before water or water/vinegar were poured over them.

Results

Water poured over potting soil does not change soil pH of 6 and amount of plant nutrients. Vinegar/water lowers soil pH from 6 to 3.9 and nitrogen & potassium. Water poured over desert soil lowers soil pH from 7.3 to 6.1 and lowers plant nutrients. Vinegar/water lowers soil pH from 7.3 to 3.5 and only lowers nitrogen. Water poured over Mirror Lake playa soil does not change soil pH of 8 and lowers nitrogen & phosphorous a little. Vinegar/water lowers soil pH from 8 to 7.2 and lowers nitrogen & phosphorous. Water poured over China Lake playa soil changes soil pH from 10.3 to 10 and only lowers nitrogen a little. Vinegar/water lowers soil pH from 10.3 to 8.3 and does not change plant nutrients.

Conclusions/Discussion

My hypothesis was not proven. Acid rain has little change on China Lake soil. The pH dropped but not to the ideal soil pH of 6 (potting soil) and plant nutrients did not change. The results were probably because China Lake soil salinity and pH were very high to start. The best results for acid rain was for Mirror Lake soil, probably because the soil salinity and pH were not too high to start. Water also worked well with desert soil and potting soil.

Summary Statement

My project determines if acid rain can be used in a good way to help plants grow in places, like playas, where the salts are too high for plants to grow.

Help Received

My Dad helped with the original idea and setup. My Mom helped me do the experiments and look at the data.

Name(s)	Project Number
Paul B. Smith, III	**J1022**

Project Title

Cool Landscaping for a Hot Planet: How Various Backyard Surfaces Influence Temperatures

Abstract

Objectives/Goals
My objective was to find out what backyard materials would cool down the area the most. I knew global warming is a big problem for the world and I wanted to discover if we could cool down the planet starting in our own backyards.

Methods/Materials
I prepared five materials in boxes and set up heat lamps on each box. I tested water, grass, bark, brick and gravel. I recorded the temperatures of the various materials in 30-minute periods with the heat lamps on. Then I shut off the heat lamps and recorded the temperatures after 30 minutes and 60 minutes. I recorded the results after five experiments and analyzed the data.

Results
I found out that water cools down the environment more than grass, gravel, bark or brick. Gravel increases the temperature more than other surfaces tested.

Conclusions/Discussion
Through my research I discovered that urban areas are hotter than rural areas and that the planet as a whole is getting warmer. This effect could cause many problems to the health of individuals and to the environment. We can all help to lower the temperature of the earth if we use materials wisely in our own backyards. Pools and water help reduce the effect of heat. Gravel, bark, brick and other materials are hotter than water and grass. In planning our landscaping, we can all use cooler materials.

Summary Statement

My project tested landscaping materials to determine what materials could cool down our planet.

Help Received

Mother helped type report. Father took pictures and bought supplies.

Ap2/08

Name(s)

Martin Valdivia

Project Number

J1023

Project Title

The Ocean's Fate

Abstract

Objectives/Goals

My goal is to present evidence to the public as to the amounts of E coli and total coliforms that are going through are storm drains into our oceans and beaches. This will eventually kill our ocean life and even kill us if we were to consume fish, clams,and shellfish that were inffected with E coli or total coliforms.I will test four storm drains and four beaches, for E coli and Total coliforms. I will use the method that chemist use, it is called Coliret 18.

Methods/Materials

methods: *get four water samples from the ocean and four samples from the storm drains. *Mix water samples with pure water. *Add reagent to water till it dissolves. *Pour into Quanti Tray/2000(counts from 1-2,419). *Seal in Quanti Tray Sealer and place in 35 degrees celcius incubator for 18 hrs. *Quanti-Tray-Read result: Yellow wells= Total coliforms, yellow/fluorescent wells= E.Coli.

materials: *gloves, *Pen, *sun glasses, *notebook, *8 Sterile sample bottles, *8 snack pack reagents, *8 quanti-tray 2000(49 large wells and 48 small wells), *quanti tray sealer and rubber mold, *biosaftey cabinet, *incubator at 35.0, *color and fluorescence comparator, *uv lamp, *glass pippet, *sterile pure water.

Results

My results were long beach had the most E coli and total coliforms for both storm drain and beach.Second was manhatan beach the del marina. the cleanest was hermosa beach.

Conclusions/Discussion

My opinion in this project is that are storm drain should not lead into are beaches te water should be recycled and used for irrigation.It would cost more but it wouldnt put the ocean in danger.

Summary Statement

To see wich beach is most contaminated with E coli and Total Coliforms.

Help Received

I used lab equipment and information from CRG labs under supervision of Anthony Basil a chemist at the lab.

Name(s)	Project Number
Maximillian F. Wolfe	**J1024**

Project Title

CFL: Compact Flourescent Lamps or Carelessly Fouling Landfills?

Abstract

Objectives/Goals
The Energy Independence Act of 2007 was signed on December 19, 2007. It says the incandescent light will be phased out by 2012. Will the amount of energy saved by CFL (compact fluorescent lamp) be enough to offset the harmful effects mercury will have on the environment?

Methods/Materials
I used a meter to measure the amount of kilowatts used in each bulb in a twenty four hour period. Calculated the cost by multiplying each figure by the cost of a kilowatt from an electric bill, and then totaled the cost for each household. I asked 100 people if they were aware that CFL bulbs contained mercury and could not be thrown in the trash. I researched hazards, health effects, EPA standards, and cleanup costs. After this I did a cost analysis between the two bulbs, and compared it to cost of cleanups, Superfund, health costs and hardships.

Results
Results demonstrate that CFL bulbs use less energy than incandescent. One CFL per household in California saved $931,221,052 per year. However, my survey showed a high percentage of people were not aware that CFL bulbs contained mercury, could not be thrown into the trash and not educated on proper handling. Recycling for one CFL bulb per household in California would cost $5,571,485 in order to prevent mercury from entering the landfills. Landfill cleanups can cost $2,000,000 and a mega Superfund can cost over $140,000,000. Clean ups could cost millions per year.

Conclusions/Discussion
I have proven that CFL bulbs save energy, but people are not aware that CFL bulbs contain mercury and should be recycled. Currently, the recycle rate is below 24%. With education, the percentage of recycling should rise to 80% by 2009. The mercury that enters the landfill can leach into the water and cause illness and birth defects. The incandescent should not be replaced with the CFL without informing the public of proper handling and disposal. Figures do not include medical costs and hardships caused from mercury leaching into the waters and mercury vapor. We can not predict how much damage CFL bulbs will actually cost until the damage is done. One broken CFL bulb has mercury vapor in excess of the EPA standards and without proper handling could cause harmful exposure. CFL bulbs are made in China where there are no regulations or guidelines. Education first, then we can save energy, money and then get rid of the incandescent.

Summary Statement
My project is about comparing the cost benefits between CFL bulbs and incandescent bulbs, and whether the savings are worth the harmful effects on the environment.

Help Received
People called from the EPA while I was in school,so my mother asked them the questions I made for them and wrote down all of their answers. She took photos for me. She printed all the emails I received from different people. She taught me how to do a table on the computer. She stayed with me to do my survey .