



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Aliza D. Arya	Project Number J1701
Project Title Elodea Plants Get Killed When Oil Is Spilled!	
Abstract Objectives/Goals This experiment was designed to test if exposure of Elodea plants to different amounts of motor oil affected oxygen production during photosynthesis. It was expected that plants exposed to motor oil would produce less oxygen. Methods/Materials Ten Stems of Elodea Plants were placed in separate beakers filled with 250 ml of water. Different amounts of motor oil were added to the beakers. Elodea plants in water without any motor oil served as control. The level of oxygen was recorded every hour for five hours. Results A study decline in the oxygen level was observed in beakers with motor oil. On the contrary, the control group recorded an increase in the oxygen level. The group of Elodea stems exposed to motor oil for five hours had average oxygen levels of 0.22-0.24 cm, whereas the control group produced an oxygen level of 3.33 cm. Conclusions/Discussion Motor Oil interfered with the ability of plants to produce oxygen during photosynthesis. Several plants died after exposure to motor oil. The effect of motor oil and other pollutants on the survival of several aquatic plants should be tested.	
Summary Statement To test if exposure of Elodea plants to different amounts of motor oil affected oxygen production during photosynthesis.	
Help Received Teacher helped finalizing the project.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Finnegan N. Barry	Project Number J1702
Project Title Can Crabs Beat Global Warming?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to find if ocean acidification and global warming affect the thermal tolerance of crabs.</p> <p>Methods/Materials Crabs were collected from the intertidal and put them in tanks of either a pH of 8.0 or 7.1. An infrared sensor was attached to the crabs and connected to a heartbeat recording system. The heartbeats were converted to a heart rate. I attached the crabs to this system and then set them in a water bath in a jar of water at the pH level they had been living in. Over the course of an hour I increased the temperature of the water bath and simultaneously recorded water temperature and crab heart rate. I then compared temperature and heart rate to find the critical temperature.</p> <p>Results The crabs under the influence of the lowered pH had a lower critical temperature. I found that females were also more vulnerable to the lowered pH than the males.</p> <p>Conclusions/Discussion I concluded that crabs' thermal tolerance is affected by global warming in a negative way. This is important because this could also affect other crustaceans in the same way and affect the food web.</p>	
Summary Statement My project is about how ocean acidification affects crabs thermal tolerance.	
Help Received Dr. James Barry helped with experiment; Used MBARI lab equipment.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Alyssa R. Boedigheimer; Kenrick Koo	Project Number J1703
Project Title Effects of Pollution on Plants	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to determine if plants produce less oxygen in the presence of pollution. This was thought to be true, based on the facts the stomata size decreases in the presence pollution and pollution damages critical plant parts such as the roots and leaves.</p> <p>Methods/Materials This experiment measured the oxygen output of the aquatic plants, Lemna minor and Elodea canadensis, which were contained in 175 mL bottles with 100 mL of water. The environments were polluted with either hydrogen sulfide (H₂S), Miracle Gro, or gasoline. At the end of the experiment, the amount of accumulated dissolved oxygen was measured by using a colorimetric assay ampule, the pH was measured using pH strips, and the fogginess of the water was measured on a gray scale.</p> <p>Results The data suggests that gasoline severely affects the oxygen output for both plants, Miracle Gro has little to no effect, and that H₂S affects Lemna minor less than Elodea canadensis though both plants were affected. This shows that pollution has an effect on the oxygen output of plants.</p> <p>Conclusions/Discussion The decrease in oxygen output observed by in the presence of the majority of the pollutants indicates that the hypothesis speculated was accurate. The severe drop in oxygen output thoroughly supported the hypothesis.</p> <p>Further experiments could test potentially milder pollutants, different concentrations of pollutants, and a wider range of plant species.</p>	
Summary Statement By measuring the effects of pollutants on two plant species, we show that some species maintain overall health and biological function substantially better than others, and this information identifies plants useful to treat polluted water.	
Help Received Guidance and supplies - Ms. Abrams (teacher), Rebecca Crites (mother), Patricia Tavormina(mother) and Patricia Tavormina for microscopic images using lab instruments at California Institute of Technology	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Caroline G. Chihak	Project Number J1705
Project Title Wash N' Grow: Can Plants Tolerate Grey Water?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Do you ever think of how much water you're using every day, how this could affect the world. Are we able to conserve by using water twice? The purpose of my project is to see if we can reuse water, known as grey water from the laundry. The question investigated was if the amount of grey water would affect the growth of corn.</p> <p>Methods/Materials I tested 3 variables for each group of detergent/water and control (water). Four seeds were planted in each pot (variable). Every 4 days I would water the plants. The grey water mix is made by hand. The ratio for detergent/water is based on the fl. oz. of detergent/number of loads. In the day the plants were kept in full sunlight then taken in the house for warmth. I recorded any observations and measured the plant height each day. I also labeled each sprout with the new measurement. I took pictures and after 3 weeks got my results.</p> <p>Results The tallest plant is Tide low; it was 35.5 cm, compared to water's tallest plant at 31.4 cm. Natural low's tallest plant was 33.3 cm. In average though water: 26.01 cm, Tide low: 28.25 cm, Tide high: 7.6 cm, Natural low: 27.1 cm, and Natural high: 21.6 cm</p> <p>Conclusions/Discussion My hypothesis was that the Natural low and Tide would grow at the same rate as water. These variables were actually a beneficial factor to the corn and grew taller. High Natural was taller than high Tide. Water was taller than both of the high variables. This experiment proved that a low amount of grey water is good for plants.</p>	
Summary Statement My project's purpose is to see if using grey water-different detergents and different amounts- would affect the growth of a corn plant.	
Help Received My mom helped me put together the board.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Hunter C. Crawford-Shelmadine	Project Number J1706
Project Title Bioluminescence: The Lights under the Sea	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine how exposure to light affects how bright bioluminescent dinoflaggelettes glow and how exposure to increased acidity in the water affects how bright they glow.</p> <p>Methods/Materials Fourteen vials of dinoflaggelettes were ordered and labeled. Three environments were set up and placed under a florescent light 24/7 to reverse the day/night cycle so I can test during the night. The light-only vials (2) were placed in a clear glass; the dark-only vials (2) were covered in foil and placed in a box, the light/dark vials (2) rotated every 12 hours between the two. All 8 vials testing for impact of acidity were placed in the light/dark environment. The vials were: control (2), one drop of vinegar (2), 2 drops (2), 3 drops (2). The pH was tested and recorded. The brightness data was recorded up to 4 times a day in a pitch black setting for 5 days.</p> <p>Results The trend for the dinoflaggelettes in the dark-only environment and the light/dark environment was that their luminescence peaked up to a value of 6 at the beginning of the day and dropped back down to 0 by the end of the day. The light-only cycle organisms stayed at the mid-range (3-4) of brightness throughout most of the day and dropped to 0 at night. Surprisingly, the dark-only dinoflaggelettes produced the brightest and most consistent luminescence. Exposure to light actually suppressed their luminescence. All organisms affected by any increase in acidity died after the first 12 hours.</p> <p>Conclusions/Discussion My first hypothesis was partially correct, as the luminescence of the dinoflaggelettes in light/dark environment organisms reached a 6 (the brightest glow), but so did the dinoflaggelettes in the dark-only environment. In fact, the dinoflaggelettes in the dark-only environment were recorded at a 6 more times than the others. My second hypothesis was correct, as the dinoflaggelettes were negatively affected by increased acidity and did not glow as bright and died quickly. These results show that exposure to light does not increase luminescence but actually suppresses their ability to glow. They also show that increased ocean acidification will easily harm dinoflaggelettes. This research calls for further studies on the impact of ocean acidification on other bioluminescent organisms.</p>	
Summary Statement This project is a study of how exposure to light and an acidic environment impacts the luminescence of dinoflaggelettes.	
Help Received My mentor suggested that I combine my two ideas into this project and gave suggestions to improve my graphs. My mom printed the display labels and helped me get the materials I needed for this project.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jessica Cronin; Alicia Hoxie	Project Number J1707
Project Title A Study in Parasite Resistance in Horses	
Abstract Objectives/Goals The objective of this project was to determine the effectiveness of anthelmintics against intestinal parasites in select horses in Mendocino County. Methods/Materials We collected fecal samples from 6 different facilities that practice different deworming regimens or none at all. We did fecal flotation samples using sodium nitrate and a fecal diagnostic kit. Samples were examined under a compound microscope for the presence or absence of intestinal parasites. Results Barn 1:13 tested. 13 were negative. (this is a closed population of older horses) Barn 2:10 tested. 7 negative, 3 positive. (breeding farm with transient population) Barn 3:12 tested. 12 positive. (breeding farm) Barn 4:12 tested. 10 negative, 2 positive. Barn 5:7 tested. 7 negative. (closed herd) Barn 6:6 tested. 6 positive. (rodeo horses) Conclusions/Discussion Our results did not support our hypothesis. Some factors complicating our results include the age of horses, contamination of property, and deworming routines. Our background research indicates that resistance to anthelmintics does exist and is a real problem. Just because resistance did not show in our results does not mean it does not exist. We think that some of the reasons for it not showing is the fact that the majority of the horses we tested were older and well cared for, most of them didn't travel and most of the barns were closed. Age is important here because older horses usually build up their own immunity to parasites therefore needing to be dewormed less and not giving the parasites opportunity to build up resistance. The kind of test we used was a qualitative test which lets us see the eggs/larvae and what species they are but not how badly the horse is infected and an exact calculation of worms as a quantitative test would. We would use a quantitative test if we were to redo this project.	
Summary Statement Our project is about intestinal parasites in horses and the effectiveness of anthelmintics against them.	
Help Received Used lab equipment at Dr. Sheri Cronin's veterinary lab, at her home, under her supervision.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Suchitra Dara	Project Number J1708
Project Title How Can Farmers Use a Friendly Fungus for Environmentally Safe Pest Control?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study is to find out an ideal time interval for applying a beneficial fungus-based biopesticide (used for controlling pests) and some fungicides (used for controlling plant diseases) so that environmentally safe pest control is encouraged in practical agriculture.</p> <p>Methods/Materials Plastic containers, insect pathogenic fungus, fungicides, mealworms, etc. Worms were exposed to treated surfaces and daily mortality was observed for 7 days. Total mortality in each treatment due to the fungus indicates the impact of fungicides on fungus.</p> <p>Results There was no natural death in untreated control during the experiment. All the mealworms treated by <i>B. bassiana</i> alone died by the end of the experiment. Fungicides alone did not have any impact on mealworms. Time interval between fungicide, Pristine and <i>B. bassiana</i> had a positive correlation, but it took 6 days for the fungicide effect to decrease. Increasing time interval between Merivon or Switch and <i>B. bassiana</i> had positive correlation up to 3 days and then showed a negative correlation from 4-6 days. Efficacy of <i>B. bassiana</i> was reduced to 80% even when Pristine# was applied 6 days earlier. Merivon and Switch reduced the efficacy of <i>B. bassiana</i> to 90% and 70%, respectively, with a 3 day interval between applications.</p> <p>Conclusions/Discussion Insect pathogenic fungi like <i>B. bassiana</i> are commercially available as biopesticides. However, farmers frequently apply fungicides for controlling diseases. As this practice is detrimental to beneficial fungi, farmers use chemical pesticides which are not safe for the environment. Increase in mortality with a short time interval between fungus and fungicide applications is ideal for practical agriculture. In the case of Pristine it took 6 days for the fungicidal impact to wane. Negative impact of Merivon and Switch was reduced within 3 days after application, but they have become detrimental to the fungus afterwards. Change in the fungicide chemistry or chemical breakdown in the environment could have made these two fungicides to become harmful after three days. Results of this study are important in determining safe time intervals between fungicides and a beneficial fungus so that farmers know an appropriate time to apply beneficial fungi for pest management. This will promote safe pest management practices, reduce the use of chemical pesticides, and thus improve environmental safety.</p>	
Summary Statement Evaluating the compatibility of fungicides and a fungus-based biopesticide for safe pest management and improving environmental safety.	
Help Received Father helped with fungicide and biopesticide application and analyzing results.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Ivann U. De la Cruz	Project Number J1709
Project Title A Cactus' Worst Enemy: Cochineal	
Abstract Objectives/Goals The objective is to find an efficient mixture that can protect cacti from being plagued by Wild Grana Cochineal for the longest amount of time. Methods/Materials I washed different cacti every 15 days using only the mixture corresponding to the cactus. The mixtures used were: a mix of different chilies, alcohol and soap, garlic extract/ juice, oregano tea, and Spectracide. I also used different sized brushes to facilitate the cleaning of the cacti. Results The alcohol and liquid soap mixture protected the cacti against the Wild Grana Cochineal for the longest amount of time, along with the oregano tea. The least effective were the chili mix and garlic extract/ juice. Conclusions/Discussion The alcohol and liquid soap were the most effective mixtures at keeping the cacti from being plagued by the cochineal.	
Summary Statement Find what mixture protects cacti from cochineal.	
Help Received Mother helped wash cacti, short interview with Professor Gregory Walker	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jack H. Donohoe	Project Number J1710
Project Title Tubifex Effects: Are Gasoline and Ethanol Harmful to Aquatic Life, and Is Their Toxicity Increased when Combined?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study determined if adding ethanol to gasoline increased its toxicity to Tubifex worms, when compared to either ethanol or gasoline alone.</p> <p>Methods/Materials Five dilutions of ethanol (vodka), gasoline, and gasoline + ethanol were prepared with spring water and poured into petri dishes. Ten worms (<i>Tubifex tubifex</i>) were transferred to each treatment and their activity level, clumping behavior, and bleeding were observed after 0, 3, 6, and 10 minutes. Recovery in spring water was observed after 3, 6, and 10 minutes and 24 hours.</p> <p>Results Ethanol reduced worm activity the most, while gasoline and gasoline + ethanol equally reduced movement. Ethanol was the only treatment that caused the worms to not fully recover, causing mortality at the high dose.</p> <p>Conclusions/Discussion Based on the concentrations tested in this experiment, adding ethanol to gasoline did not increase the mixture's toxicity. Overall, the results of this experiment indicate that the average amount of ethanol added to gasoline today will not increase acute impacts to aquatic life, as represented by <i>Tubifex</i> worms.</p>	
Summary Statement My project tests if adding ethanol to gasoline increases its toxicity to aquatic life.	
Help Received Mother and teacher helped acquire materials. (vodka, gasoline, pipettes, beakers, and graduated cylinders.)	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) John P. Drain	Project Number J1711
Project Title BPA: Safe or Not? The Long Term Effects of Exposure to Bisphenol A (BPA) from Canned Food on the Spatial Memory of Mice	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I set out in this experiment to determine if exposure to bisphenol A (BPA) from canned food has long-term effects on the spatial memory of mice. I hypothesized that the mice that were exposed to BPA through canned green beans would retain their spatial memory the least.</p> <p>Methods/Materials All 28 mice were given unlimited access to regular mouse food for the entire experiment. There was one control group and the rest of the mice were given one gram per mouse of either Del Monte French Cut canned green beans, Libby's BPA Free French Cut canned green beans, or fresh green beans once daily. The mice were trained in the Morris Water Maze for six days. Testing began one day after training and continued with intervals increasing by one day between each test until there was one week in between each test for a total of 6 days of testing.</p> <p>Results I found that BPA from canned food does not affect the overall memory of mice. However, I did find that BPA affected how well the mice were able to learn the Morris Water Maze, because on day 6, the last day of training, the mice that were exposed to BPA took five to six seconds longer to find the platform on average than the other groups, but after the first two tests there was no consistent difference between the times.</p> <p>Conclusions/Discussion Most canned food in the U.S. contains the chemical BPA in their linings, and 95% of Americans have a detectable amount of BPA in their urine. The data from my experiment rejects my hypothesis but it does suggest that the mice's learning was impaired. The mice that were exposed to BPA took significantly greater times to find the platform only on day 6, the last day of training, but not consistently throughout the experiment. In addition, the mice exposed to BPA weighed less on average than the mice in any other group, which contradicts literature, and more studies should be done to investigate. Americans eat canned food on a daily basis and many cans contain the chemical BPA in the linings, which then leaches into the food. Current studies point toward the possible risks of BPA, but no published studies tested the effects from a human food source. My study shows possible effects of BPA from canned food on learning and weight.</p>	
Summary Statement This project investigated the long term effects of exposure to bisphenol A (BPA) from canned food on the spatial memory of mice.	
Help Received My parents bought the mice and necessary supplies for my project and tolerated the mice in their house for the duration of the experiment. Jeff Rawson helped identify the gender of the mice. Ms. Fisher supplied me with mice cages and general guidance.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Makenzie G. Flach	Project Number J1712
Project Title What Is the Effect of Ammonium Chloride Supplementation on Urine pH in Meat Goats?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I was interested to learn if supplementing a Boer goat's diet with ammonium chloride would affect the urine pH levels in meat goats to help prevent urinary calculi. My ultimate goal is to help goat farmers, like myself, prevent urinary blockage diseases in goats and possibly other livestock.</p> <p>Methods/Materials 1. Divide 15 Boer evenly goats into 3 separate pasture spaces. 2. One week prior to start of project, feed each group alfalfa and pasture grass so that each goat has a neutral starting point to see if the ammonium chloride really affects the pH levels in their urine. Collect urine pH levels from each goat to obtain baseline levels & record data. 3. At start of project, feed each group of goats the assigned type of feed daily for 6 weeks. 4. Weigh feed daily each morning using an electronic scale to ensure proper feed amounts given to each group. 5. Observe all goats daily to ensure good health and feed consumption. 6. Using a homemade urine collection tool to obtain urine sample, collect urine sample from each goat 2 times per week for 6 consecutive weeks. 7. Obtain urine pH levels from each sample using a pH meter probe.</p> <p>Results Data shows that the urine in goat groups A and B who were fed ammonium chloride in both medicated feed or as a supplement had a lower urine pH level (resulting in higher acidity). Group C, who did not receive ammonium chloride, had a higher urine pH level over groups A and B.</p> <p>Conclusions/Discussion My investigation showed that the urine pH levels in goat Groups A and B who were fed ammonium chloride in both medicated feed or as a supplement did have a lower average urine pH level over a 6 week period. Group C who did not receive ammonium chloride in the feed at all had a higher average urine pH level over the 6 week study. The lower average pH level measurements in Groups A and B means that their urine was more acidic which is beneficial to the goats' health because the acidity in the urine breaks down the calcium (stones) and prevents urinary calculi disease. I noticed in my data that there is an indication that the intake of ammonium chloride already produced in the feed is perhaps more efficient than feeding ammonium chloride as a supplement in alfalfa hay.</p>	
Summary Statement Determining if feeding meat goats ammonium chloride would have a favorable effect on urine pH that would result in a lower risk of urinary blockage and ultimately producing healthier goats.	
Help Received Mother helped type project, Father helped make urine collection tool, Supervised by veterinarian	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Trevor B. Frisbee	Project Number J1713
Project Title Can Sodium Bicarbonate Fix Viscous Cystic Fibrosis Mucus?	
Objectives/Goals The objective is to determine if sodium bicarbonate (NaHCO ₃) will decrease the viscosity of cystic fibrosis (CF) mucus.	
Abstract Methods/Materials To model the high viscosity of CF mucus, sterile vaginal cow mucus was used in the experiments due to its similar properties to CF mucus. A capillary viscometer combined with a manometer was built. A sample of 5 mL of raw mucus was tested with the viscometer to establish a baseline flow rate at a pressure of 20 cm H ₂ O. Five test sets were established by mixing different volumes of 8.4% NaHCO ₃ with the 5 mL of raw mucus. The selected volumes of 8.4% NaHCO ₃ were 0.125, 0.25, 0.5, and 1.0 mL. The flow rate for each mixture of mucus and NaHCO ₃ was measured at pressures of 5, 8, 11, 14, 17, and 20 cm H ₂ O. 5 mL of mucus or mixtures were used for all flow times. To determine if sodium (Na) or bicarbonate (HCO ₃ ⁻) is responsible for changing the viscosity of mucus, the tests were repeated with 8.4% NaCl.	
Results The flow time of mucus decreased with increased concentrations of NaHCO ₃ . The flow time for 5 mL raw mucus at 20 cm H ₂ O was 271 seconds, while adding 0.125 mL 8.4% NaHCO ₃ decreased the flow time to 64 seconds. Some of the decrease in flow time was due simply to dilution of the mucus. Further tests showed that bicarbonate influenced the viscosity reduction more than sodium or dilution. Comparing the flow times at 20 cm H ₂ O for the mucus mixtures of 0.5 mL of 8.4% NaHCO ₃ to 0.5 mL of 8.4% NaCl showed a flow time of 29 seconds for the NaHCO ₃ mixture, and 71 seconds for the NaCl mixture.	
Conclusions/Discussion The results of the experiments show NaHCO ₃ decreases the viscosity of cow mucus, and possibly of CF mucus. Further results show that bicarbonate has more effect on mucus viscosity than sodium or simple dilution. CF is a life threatening genetic disease. The viscous mucus in the CF lung prevents the cilia from clearing the mucus, causing lung infections, leading to early lung failure. Decreasing the viscosity of CF lung mucus could help cilia to work correctly, resulting in better mucus clearance and fewer infections. Further research should be done to test the effectiveness of NaHCO ₃ on CF mucus, with the possibility of treating CF mucus in the lungs with nebulized NaHCO ₃ inhalation.	
Summary Statement The objective is to determine if sodium bicarbonate (NaHCO ₃) will decrease the viscosity of cystic fibrosis (CF) mucus.	
Help Received Dr. Paul Quinton of UCSD helped with technical details over video chat. My father taught me how to use power tools and Excel.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Tanvi V. Gaitonde	Project Number J1714
Project Title Radioaction: Effect of Cell Phone Radiation on Plants	
Abstract Objectives/Goals Objectives/Goals: Which personal device is most harmful from a radiation standpoint for living things? Purpose: Do you ever use your phone or tablet as an alarm? Did you ever think that its radiation was harmful for you? Did you know that scientists are trying to find out if cell radiation causes brain cancer? My experiment is testing the effects of personal device radiation on living things, and identify the most harmful personal device. Methods/Materials Materials: Materials used in this project: 6 similar plants, and 5 different personal devices # 1) Android Tablet, 2) iPhone, 3) iPad, 4) Blackberry, and 5) Non-smart cell phone. This device radiation level is published as the Specific Absorption Rate (SAR), measured in watts per kilogram. A cell phone's SAR is a measure of the amount of radio frequency (RF) energy absorbed by the body when using the handset. In the United States, the maximum SAR level must be 1.6 watts per kilogram, in order to be approved for use by the Federal Communication Commission (FCC). Method: I executed this experiment by putting the personal devices close to the plant, monitoring it every day for three weeks, and gathering data about the number of dead flowers and leaves. Results At the end of the experiment, I found out that the Android and the Blackberry did the most harm to the plants, followed by the iPhone, then the iPad, and lastly the non-smart phone. All of the devices did some damage to the plants, as compared to the control. The control plant was still strong and healthy, till the end. Conclusions/Discussion Even though the Blackberry has one of the lowest SAR levels, it destroyed the plant. Based on my research, the SAR levels of devices keep changing. My conclusion is that, the Blackberry's SAR level would have sustained at a higher level. However, the SAR levels of the other devices like the iPhone or the iPad could have dropped, causing less damage to the plant. This experiment proves how harmful cell radiation can be to living things. I hope people realize that they should put time limits on electronics-for their own health.	
Summary Statement Which personal device is most harmful from a radiation standpoint for living things?	
Help Received My dad helped me with gathering all the devices and charting the data.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sydney S. Gannon	Project Number J1715
Project Title Does Wi-Fi Make Plants Die?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to study the growth of wheatgrass seeds in 2 environments. The 1st environment is next to a Wi-Fi router. The 2nd environment is away from a Wi-Fi router. A negative or positive impact on plant growth in the Wi-Fi environment may suggest a negative or positive impact on human health.</p> <p>Methods/Materials Materials: containers, bowls, plates, plastic wrap, potting soil, wheatgrass seeds, water, strainer, pitcher, tablespoon, measuring cup, ruler, thermometer, Wi-Fi router, paper, marker, camera, notebook, pencil</p> <p>Methods: 1) Sprout the wheatgrass seeds 2) Plant one tablespoon of sprouted seeds in each container 3) Give each container ½ cup of water 4) Place 4 containers next to a Wi-Fi router and 4 containers away from the Wi-Fi router. All containers are placed 65 inches from the ground with a similar amount of sunlight and temperature. 5) Water each container daily with ½ cup of water 6) For 10 days, measure the height, number of sprouts, and wheatgrass color 7) Record data and take photos daily 8) I determined it would be helpful to measure the room temperature and started measuring the room temperature on the 4th day.</p> <p>Results -The sprouts growing next to the Wi-Fi were 20 to 25 mm taller than the sprouts away from the Wi-Fi. -The number of sprouts growing next to the Wi-Fi was 100 to 180 sprouts greater per container than the number sprouts growing away from the Wi-Fi. -Both sets of sprouts turned from white to light green to darker green. The sprouts growing next to the Wi-Fi grew darker sooner over the 10 days. -After the 3rd day, I noticed the sprouts next to the Wi-Fi were growing better. I therefore decided to measure the room temperature. The room temperature was one to two degrees higher in the area with the Wi-Fi router.</p> <p>Conclusions/Discussion The results did not support my hypothesis because the sprouts next to the Wi-Fi router grew taller, thicker, and darker during the 10-day measurement period. I believe more research should be done regarding Wi-Fi routers and radiation to protect all living things.</p>	
Summary Statement The point of this project is to determine if Wi-Fi radiation has a positive or negative impact on plant growth.	
Help Received My mom helped purchase the materials and gave guidance during the measurement phase. My dad taught me how to use Excel to great graphs from spreadsheets.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Gina R. Gwiazda	Project Number J1716
Project Title The Ideal Meal: A Study of the Glucose Response to Protein and Energy Bars	
Abstract Objectives/Goals My goal in this project was to look at the blood glucose response to eating cereal bars and bread with different protein:carbohydrate ratios, with and without the consumption of protein 30 minutes beforehand. Methods/Materials The blood glucose of two subjects was measured two hours after consuming white bread and cereal bars with different protein:carbohydrate ratios in separate trials. The experiment was repeated with consumption of protein thirty minutes before eating the bars. Results There is an inverse relation between peak blood glucose and protein:carbohydrate ratio of the cereal bar without any pre-protein consumption in both subjects. The blood glucose response to eating white bread fall in the same trend observed for the cereal bars, although there is a lot of variability in the blood glucose response. The younger subject peak glucose is observed at either earlier or at the same time as in the older subject and generally returns to the initial or close to the initial blood glucose value earlier than in the older subject. In the oldest subject consumption of protein before the cereal bar moderated the peak blood glucose response. For the younger subject, the results were inconclusive. The difference in results between subjects could be based on factors that were not controlled in this study such as the subjects age, weight, history of diabetes in their family, daily amount of exercise, etc. Conclusions/Discussion My conclusion is that eating a high protein, low carbohydrate cereal bar moderates the increase in blood glucose, and protein consumption beforehand appears to reduce the increase even farther.	
Summary Statement I looked at the blood glucose response to eating cereal bars and bread with different protein:carbohydrate ratios, with and without the consumption of protein 30 minutes beforehand.	
Help Received My mom participated in my study and my father helped me create my graphs on excel.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Maya V. Hanck	Project Number J1717
Project Title Kaffeinated Kids	
Abstract Objectives/Goals The purpose of my experiment was to see whether children ten and under or children over ten would have a higher increase in heart rate after drinking 60mL of Mountain Dew. Methods/Materials There were many materials that were used to complete this experiment that included: 3 chairs, 40 Dixie cups, deck of cards, heart rate monitor, 20 cans of Mountain Dew, 40 participants, pencil, timer, table, 1/4 measuring cup. The procedure for this experiment was: take the subject's resting heart rate with a heart rate monitor, have subject sit down and drink 60mL of Mountain Dew, wait ten minutes, and take the subject's heart rate again with the heart rate monitor, and record the results to see whether the ten and under age group or the over ten age group had a higher increase in heart rate. This will be done with 40 participants. Results The results of this experiment were that the over ten age group had a higher increase in heart rate than the ten and under group, which contradicted my hypothesis. The average resting heart rate for the ten and under age group was 81.85, and for the over ten's it was 77.5. As for the heart rates taken after drinking Mountain Dew, the ten and under's was 86.65, and for the over ten age group it was 93. Conclusions/Discussion My hypothesis was proved incorrect, because I thought that children ten and under would have a higher increase in heart rate, but the children over ten actually had a higher increase in heart rate by 20%. There are some factors that might have affected the outcome of this experiment including the weight of the children, gender of the children, and the sugar levels in Mountain Dew.	
Summary Statement The purpose of my project was to see whether kids ten and under or kids over ten would have a higher heart rate after drinking 60mL of Mountain Dew.	
Help Received Science and Language Arts teacher helped edit report; Mom and Dad helped with buying supplies and writing papers.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Navya Hari	Project Number J1718
Project Title Does BPA Have an Effect on Fish?	
Abstract Objectives/Goals My science fair project is a biology-based investigation that addresses the question: Does Bisphenol A have an effect on fish? The purpose of my science fair project is to discover the impact of Bisphenol A on a male fish's memory, health, and physical attributes. Bisphenol A or simply BPA, is a man-made chemical used in the hardening of many plastic products. BPA has had a significant impact on both human physical and mental traits. Through humans, BPA has entered water and nearly one-third of male fishes in every one hundred water sources have been affected. The BPA poisoning of male fishes is a rising crisis in our world today, and I hope to see the effects of Bisphenol A on male fishes through my science fair project. Methods/Materials To discover the effects of my Bisphenol A, my independent variable, on male fishes, I intend to perform a series of long tests to view the effects on male fishes, or the dependent variable. I plan to introduce male fishes to BPA over a course of eight weeks, and view the changes. I will compare and contrast fishes that are introduced to BPA and those who are not. While this introduction is in effect, I will take note of the changes, diseases, health, interaction and other base physical and mental attributes of the developing fishes. To finish, I plan to dissect the fishes and note internal changes. Results I found that the fishes exposure to BPA resulted in many mental issues. Many of the fishes refused to eat, and some also became very confused. They became less territorial and aware of their surroundings. I then discovered that the fishes experienced abdomen inflammation, female organs, and even changed color. Conclusions/Discussion I found that BPA did have an effect on the fishes. I compared the fishes that were not introduced to BPA to the ones that were. The fishes that were not introduced to BPA remained in normal conditions, however the fishes that were introduced to BPA went through a series of unstable and unhealthy changes. I was able to prove that BPA did affect fishes.	
Summary Statement My science fair project is a biology-based investigation that addresses the question: Does Bisphenol A have an effect on fish?	
Help Received Teacher provided Dissection kit. Parents helped buy materials and helped cut paper.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Destiny Anne Hernandez	Project Number J1719
Project Title Weed Killer	
Abstract Objectives/Goals My objective was to see which product would be the fastest and most effective weed killer versus my base which is Roundup weed killer. Methods/Materials I needed Roundup weed killer(32oz or 16oz), antacid tablets(12 pack), dark corn syrup(16oz bottle), hair dye(1 box any color), and four rows of weeds. My methods include getting all of these materials and splitting weeds into four equal rows. Then putting all of the materials on each row on only the first day and take pictures everyday to see the progress. Results The dark corn syrup row died in four days, being the fastest. The hair dye row was the second fastest which died in five days. Next, the Roundup weed killer row died in nine days and last was the antacid tablet row which in the end did not die at all but in fact grew. Conclusions/Discussion In conclusion my hypothesis was incorrect and dark corn syrup was the fastest and most effective weed killer out of all of my products.	
Summary Statement My project is about which product can kill weeds the fastest.	
Help Received Grandmother helped get materials:Dad helped me type;	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sophia M. Hewitt	Project Number J1720
Project Title Inducing Cellular Senescence in Tetrahymena Thermophila Using Epigallocatechin Gallate to Shorten Telomeres	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Cancer cells, unlike healthy human cells, have perpetually active telomerase, which allows their cells to reproduce indefinitely. I wanted to see if I could interfere with this process in an organism that has telomere and telomerase properties similar to cancer cells. I tested epigallocatechin gallate, an organic compound found in green tea, as a telomerase inhibitor to see if it would cause a shortening of telomeres in the samples where it was applied.</p> <p>Methods/Materials I grew twelve samples of Tetrahymena thermophila divided equally into three groups: control (no EGCG), low dose (0.01 mg/ml), and high dose (0.1 mg/ml), for the duration of one week. The EGCG was replenished every other day, as it is an unstable compound. At the end of the week, I lysed the T. thermophila and extracted their DNA. I ran this DNA in a qPCR machine and measured for the amount of telomere in each sample (using primers of my own design) as well as the amount of a single copy gene in each sample. I divided the amount of telomere at the threshold by the amount of single copy gene at the threshold to determine the average length of telomeres in each sample.</p> <p>Results On average, the high dose group had the shortest telomeres, the low dose group had slightly longer telomeres, and the control group had the longest telomeres.</p> <p>Conclusions/Discussion This shows that the EGCG shortened the telomeres and that there was a dose dependent reaction. This means that EGCG has potential as a cancer treatment, though more tests would have to be run.</p>	
Summary Statement Can epigallocatechin gallate, a chemical found in green tea, shorten telomeres, thus interfering with cellular reproduction and ultimately leading to cell death in an organism that has properties similar to that of cancer cells?	
Help Received Used lab equipment at L.A. Biohackers lab under supervision of Cory Tobin (Caltech graduate student), interviewed the following doctors: Dr. Edward Miracco, Feigon Lab (Tetrahymena thermophila, telomerase), Dr. Qing-Yi Lu, UCLA (EGCG).	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Genevieve M. Jackson	Project Number J1721
Project Title Silkworms and Colored Silk	
Abstract Objectives/Goals The objective is to determine whether silkworms will spin colored silk if artificial or natural dye is added to their native food of mulberry chow. My goal was to find an "greener" alternative to coloring silk, since the textile industry is one of the most polluting industries in the world. Methods/Materials Three groups of 25 silkworms each were fed a combination of their natural food (mulberry chow) either with nothing added (control) or with green food coloring or with wheatgrass powder. The worms were allowed to grow until cocoons were formed, at which time the color of the spun silk was observed and recorded. As I followed the growth of the silkworms, I also recorded my observations of their rapidity of growth between the three groups as well as worm size, and the time it took for each group to form cocoons. Results I did not observe any color change from white to green silk for any of the three study groups. It does not appear that silkworms are able to uptake natural or artificial dye from their food and incorporate the dye into silk in this experiment. Some secondary observations included that the silkworms in the wheatgrass powder group grew faster than the other two groups; they spun their cocoons the fastest; and they produced the most cocoons by the end of the experiment. Conclusions/Discussion My results did not support my hypothesis: namely, I hypothesized that either natural or artificial dye could be added to a silkworms diet, then either dye (most likely the artificial dye) would change the silkworms cocoon color from white to green. Future investigation might include testing different dye concentrations, or different types of naturally occurring or artificial dyes. If dyes can be added to the silkworm food to attain colored silk, then the textile industry might not be so polluting to the environment.	
Summary Statement Finding a natural method for dyeing silk.	
Help Received Mother helped edit and revise report.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Saachi Jhandi	Project Number J1722
Project Title Uncovering the Gastrointestinal and Cardiac Safety of Supplements Commonly Used by Patients with Parkinson's Disease	
Abstract Objectives/Goals My experiments objective was to assess the safety of Alpha Lipoic Acid, CoQ10, Vitamin D and combinations of these supplements on the gastrointestinal and cardiac systems. These supplements are commonly taken by patients with Parkinson's disease. 96% of patients with Parkinson's are over the age of 50 years, and there is increase in incidence of cardiac and gastrointestinal problems with age. I believed that these supplements and their combinations would be safe for the gastrointestinal and cardiac systems. Methods/Materials In vivo experiments were conducted on Daphnia Magna for the cardiac testing. Cardiac Safety Test (safe under normal stress conditions): 0.5 ml of water containing 1 daphnia was placed on a blank microscope slide. A timer was started for 15 minutes. The heart rate of the daphnia was recorded. Once the timer stopped, 1 drop of CoQ10 was placed on the daphnia being examined, 15 minute timer was started once again. These steps were repeated three more times. This method was used for all other supplements and combinations. Cardio-Protective Test (protective against elevated stress conditions): Hydrogen Peroxide was used to induce cardiac stress in the daphnia. The daphnia were placed in set amounts of the supplements and their combinations for 24 hours, and the same procedure as the cardiac safety experiment was used except 1 drop of H2O2 was added to the daphnia in 15 minute intervals. Gastrointestinal Safety Test (in vitro test): Kirby Bauer method was used. Petri dishes were inoculated with MRS agar and L. Acidophilus. Filter disks containing various concentrations of the supplements and combinations were placed on the petri dishes, which were incubated for 72 hours. The zones of inhibition were measured and data was statistically analyzed. Results My hypothesis was partially supported by my findings. All supplements and their combinations were cardiac safe. Alpha Lipoic Acid, CoQ10, their combination, and the combination of all three supplements were found to be cardio-protective. CoQ10 was the only supplement that didn't create a zone of inhibition and was found to be completely safe for the gastrointestinal system. Conclusions/Discussion The use of vitamin D can adversely effect the gastrointestinal and cardiac systems. Alpha lipoic acid and CoQ10 were safe for cardiac and gastrointestinal systems, and protective against oxidative stress.	
Summary Statement This experiment examined the cardiac and G.I. safety of three supplements commonly used by Parkinson's disease patients, my research showed that Alpha lipoic acid and CoQ10 were safe, but vitamin D should be used with caution.	
Help Received Dr. Paramjit Singh for his continual support and teaching me about Parkinson's Disease; My mother for proofreading my work; Mrs. Kelly Coombe for letting me borrow her lab equipment.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Alexandra M. Maggiacomo	Project Number J1723
Project Title Is There a Way to Repel Fruit Flies with Herbs?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The experiment was done to see if there is a natural way to repel fruit flies with herbs.</p> <p>Methods/Materials Six fruit fly traps were created using 6 small glass containers, 6 12.2 mm slices of banana, 25.4 mm samples of 5 herbs (basil, lavender, mint, rosemary, thyme), fruit flies (<i>Drosophila melanogaster</i>), and plastic wrap. All banana slices were taken from the same banana and all herb samples were taken from the same plant. Each small container trap contained a piece of banana and an herb sample (the control contained banana only), then it was sealed with 2 pieces of plastic wrap. Four holes were punctured in each top to allow the flies to access the trap. The traps were then placed in a larger clear container, along with the fruit fly specimens which were gathered in a jar lid and positioned centrally. The large container was sealed with plastic wrap secured with the large rubber band. After 24 hours, preliminary research showed that any live flies would have dispersed to the various herb traps or large container bottom. The contents of the fruit fly traps were then submerged, and after a few hours, poured through coffee filters to separate them from the water. Banana and herb samples were also extracted. Fruit flies were counted from each trap by photographing the flattened coffee filters and flies with an iPad, then using a Paint program to indicate which flies were counted.</p> <p>Results On average, lavender repelled fruit flies better than everything else (attracting only 7.7% of total fruit flies released), followed by the banana control at 9.1%. The other herbs -- basil (24.3%), mint (13.1%), rosemary (18.2%), and thyme (11.6%), -- actually seemed to attract more of the fruit flies released than the control.</p> <p>Conclusions/Discussion My hypothesis was that lavender would repel fruit flies more effectively than the other 4 herbs (basil, mint, thyme and rosemary) and control sample was strongly supported by the results. One project related to this one could be 'Which fruits attract fruit flies more than others?' By repeating this experiment with a different fruit we might get an idea if the type of fruit affects the herbs' effectiveness in repelling the flies, or how different fruits attract flies as compared to a banana.</p>	
Summary Statement This experiment was performed to see if there was a natural way to repel fruit flies using herbs, testing basil, lavender, mint, rosemary and thyme versus a control sample.	
Help Received My mother helped proof the board and photograph me as I did the experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Robyn G. Mauritzen	Project Number J1724
Project Title Poisonous Plastics	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal is to prove which plastics are the most dangerous when microwaved.</p> <p>Methods/Materials I microwaved water in each different type of plastic for three minutes. After I microwaved it, I let it cool and split the water among three plants labeled for that plastic. I repeated these steps for each plastic and the other plants. I measured the height of the plants every other day. Three control plants were given regular water.</p> <p>Results Polystyrene was the most harmful and caused its plants to decrease the most. They decreased from 5.6 cm to 4.7 cm. Polyvinyl chloride began to decrease towards day eight. The control increased from 5.3 cm to 8.1 cm. Types number four and five was the least affective but did not have any large increases.</p> <p>Conclusions/Discussion This project proves that polystyrene is the most dangerous. Take-out boxes from restaurants are made out of this type and, many people bring their take-out box home and microwaves their food in it. Long term use of microwaving food in plastic can be harmful to humans.</p>	
Summary Statement It is about which plastic is the most harmful when microwaved.	
Help Received My dad bought me supplies and my mom bought me the plants.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Cassidy M. McKee	Project Number J1725
Project Title How Does X-Ray Radiation Affect a Seed's Germination?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine if x-ray radiation affected a seed's growth, or germination. The experiment involves x-raying a seed then watching it grow. I chose this topic because people like worried mothers who have a child going under an x-ray, curious farmers, and even doctors who specialize in diseases such as cancer that is caused by an x-ray, can use this information.</p> <p>Methods/Materials This experiment was done by taking three x-rays of six seeds, three x-rays of another six seeds, and nine x-rays of a different six seeds. Next, soaking the seed starters until they were raised and soaked through with water. Then planting the seeds, plus another six for no radiation, and labeling each number of times they were x-rayed. Next, watching them grow for ten days, and recording everything that happens. Materials were: one x-ray machine, twelve radish seeds, one bag of seed starters, one source of water, three sheets of white paper, one notebook, one ruler or measuring tape, one pen or pencil, and four plastic bags.</p> <p>Results The results showed that the seed that was not exposed to any radiation at all started growing first, and grew to be the tallest. In second place, were the seeds that had nine x-rays taken of them. The seeds that were x-rayed three times grew to become third place and started growing third fastest. Finally, the seed that was x-rayed six times started growing last and grew to be the shortest out of all the amounts of radiation exposure.</p> <p>Conclusions/Discussion As stated in my hypothesis, I believe that x-ray radiation would slow a seed's growth, and the more times a seed was x-rayed the slower it would grow and the shorter it would turn out to be. The experimental did not support my hypothesis indicating that my hypothesis should be both rejected and supported. I believe the reason I got these results is because it didn't really matter if the seeds were x-rayed or not. This is because, even though human and plant cells are similar, there are still differences in many cases. For a human cell it might take less radiation than a plant's before it starts breaking down because of its protective layers, so the actual cell might be more flimsy than those of a plant. Therefore, a plant's cell could take anywhere from thirty to one hundred x-rays before you could get any sort of reaction. However, for a human you could get ten x-rays and already start to get early cancer or a disease.</p>	
Summary Statement The purpose of my project is to determine if exposure to x-ray radiation affects a seed's growth, or germination.	
Help Received Auburn Animal Medical Center let me use equipment under supervision of Dr. Ashley	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Nitya P. Mehrotra-Venkat	Project Number J1726
Project Title The Effect of Natural Sweeteners and Herbal Remedies on Alleviating Hyperglycemia in Type 2 Diabetes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The foremost goal of this project was to help diabetics keep low glucose levels without any medicines. Two different diet-related strategies were explored for this purpose: using alternative sweeteners to replace ordinary sugars and using different plants and herbs that are widely used to lower high blood glucose.</p> <p>Methods/Materials In vitro testing with 11 natural sweeteners and 6 herbal remedies were done to find their glucose levels. After that, in vivo testing of two herbal remedies was done and, after that, interviews with diabetics were done.</p> <p>Results The in vitro testing of the assorted solutions with invertase (an enzyme to accelerate hydrolysis) yielded interesting results. Pure fructose crystals had the lowest glucose levels but were found unsafe due to possible side effects in other research; however Erythritol (a bark sugar) presented low glucose levels was found to be safer. The two natural remedies that worked the best among those tested were fenugreek and okra#human and animal testing conducted in other research indicated similar results. The results of the in vivo testing were that both fenugreek and okra had an impact on one of the subjects, but not the other. Interviews with diabetics were done to figure out how effective and common herbal remedies were in diabetics, without asking for data. It was found that most diabetics interviewed saw a reduction in blood glucose.</p> <p>Conclusions/Discussion Major findings of the study include: (a) different sweeteners have different levels of glucose-- fructose crystals have the least amount of glucose of sweeteners tested while monk fruit and stevia crystals contain a significantly higher amount of glucose and (b) herbal remedies do indeed lower the glucose levels with fenugreek powder and the okra fruit being the most effective. The experiments indicated a correlation between the effectiveness of the herbal remedy and the amount of fiber in the remedy, as exhibited by the level of solidification of the mixture over 24 hours. The higher the fiber in the remedy was, the more effective it was. (c) herbal remedies have an impact on diabetic patients more than non-diabetic patients and therefore may be safe to eat, as they will not cause hyperglycemia</p>	
Summary Statement This project explores two different ways that diabetics may possibly be able to use to lower blood glucose.	
Help Received Neighbor was my mentor and gave me advice; My teacher gave me advice; Mom helped me design backboard and helped type report.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Adrian M. Mendoza	Project Number J1727
Project Title The Effects of New and Used Auto Fluids and Detergents on Aquatic Azolla Plants	
Objectives/Goals Which pollutant is more toxic to the aquatic azolla plant?	
Abstract Methods/Materials Procedure for testing pollutants on aquatic plants 1.Pour 200 ml of water into the fish bowl. 2.Rinse the debris off the azolla. 3.Fill the circumference of the bowl with azolla. 4.Fill one pipette with 10 ml of the pollutant, and then pour the pollutant into the water of the fish bowl. 5.Then place outside for five (5) days and ten (10) days, 120 hours and 240 days. 6.Graph the discoloration (died) rate of the azolla. Material 70 small glass fish bowls # 70 plastic pipettes; Ten (10) ml of motor oil per bowl; Ten (10) ml of antifreeze per bowl; Ten (10) ml of detergent per bowl; Ten (10) ml of used detergent bowl; Ten (10) ml of used antifreeze per bowl; Ten (10) ml of used detergent per bowl; 200 ml of water per bowl; One one by one cm (1x1) transparency grid; One (1) 500 ml measuring cup; 57 cm ³ of aquatic azolla plant per bowl (70).	
Results The results of my investigation on the toxicity levels of new and used pollutants on aquatic plants indicate detergent and used motor oil are the most toxic pollutants on aquatic plants. The detergent was the most toxic to the azolla out of the new pollutants. Azolla discoloration rate with detergent: Average amount of discoloration= .99 The motor oil was the most toxic used pollutant to the azolla. Azolla discoloration rate with used motor oil: Average of discoloration= .98	
Conclusions/Discussion After completing my investigation on the toxicity levels of used pollutants and pollutants on aquatic plants, I found my hypothesis for the antifreeze was incorrect and my hypothesis for used motor oil was correct. My original hypotheses# were that antifreeze would be the most toxic pollutant and the used motor oil would be the most toxic for the used pollutants.bv	
Summary Statement The purpose of my science project is to determine the toxicity levels of new and used pollutants on aquatic azolla plants.	
Help Received Parents helped matting board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Patcharada Promprasert	Project Number J1728
Project Title Speed of Heart	
Objectives/Goals To test the effects of nicotine, alcohol , and caffeine on the heart.	
Methods/Materials Using Daphnia Magna, a water flea with a transparent carapace to be able to see the heart under a microscope. I made solutions of .5%, 1%, and 5% of all the manipulated variables. To record the data, a smart phone was used to record the effects on the D. Magna then airplayed to magnify it for accurate results.	
Results Nicotine and Caffeine sped up the heart while alcohol slowed it down.	
Conclusions/Discussion My prediction was proven true. Caffiene and Nicotine are stimulant drugs while alcohol is a depressant drug. If I had to re-do the experiment, more trials would be needed and a future project could be the effects of combined drugs, such as the alcohol and caffeine to see whether it would cancel each others' effects/ what the result would be.	
Summary Statement The effects of nicoine, caffeine, and alcohol on a heart.	
Help Received Mr.Hobbs (teacher) helped order the supplies and mother helped by holding the camera.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Ananya J. Rao	Project Number J1729
Project Title Effects of Diesel Oil on Hatching and Survival of Brine Shrimp	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to measure the effects of diesel oil on the hatching of brine shrimp eggs and the survival of live brine shrimp. The hypothesis of this experiment was that the presence of diesel will slow down the hatching and survival of brine shrimp starting at a concentration of 5 mL of diesel in 1 liter of water, and that brine shrimp will not survive at any concentration greater than 8 mL of diesel in 1 liter of water.</p> <p>Methods/Materials Brine shrimp eggs, live adult brine shrimp, and diesel were purchased. 11 glass beakers with 400 mL capacity were used to hold the seawater, brine shrimp, and varying concentrations of diesel oil (0.17 mL/L to 56.67 mL/L). The newly hatched brine shrimp (7 repeats) were examined under a microscope and counted at 24, 36, and 48 hours. The adult brine shrimp (3 repeats) were counted at 6, 12, 18, and 24 hours.</p> <p>Results It was observed that both newly hatched brine shrimp & adult brine shrimp died even at the lowest tested diesel concentration of 0.17 mL/L. The results also showed that some of the hatched brine shrimp continued to survive even at the highest concentration of 56.67 mL of diesel in 1 liter of seawater. It was noticed that the longer the exposure to diesel, the higher the death rate. The results did not support the hypothesis.</p> <p>Conclusions/Discussion The results showed that diesel oil concentration of 0.17 mL/L was enough to show a negative effect on hatching and survival rates. For newly hatched brine shrimp, results after 48 hours showed that about 71% survived at the lowest tested diesel concentration 0.17 mL/L, and about 18% survived at the highest tested diesel concentration 56.67 mL/L. For the adult brine shrimp, results after 24 hours showed that about 66% survived at the lowest tested diesel concentration 0.17 mL/L, and about 32% survived at the highest tested diesel concentration 1.67 mL/L. 24hour LC50 for diesel oil on adult brine shrimp is estimated to be between 0.50 and 0.75 mL/L diesel oil concentration. It was observed that diesel oil bubbles surround the appendages of newly-hatched and adult brine shrimp. It is possible that this in turn has a negative effect on locomotion, respiration, feeding, and blood circulation which leads to death. Oil bubbles have a similar effect on hatching. The results from this experiment show that even small amounts of oil pollution can have a harmful effect on marine ecosystems.</p>	
Summary Statement The presence of diesel oil, even in small amounts, has a harmful effect on hatching and survival of brine shrimp.	
Help Received I received encouragement and guidance on the project from Mrs. Gillum. Dr. Aluwihare (Scripps Institute of Oceanography) provided mentoring, and my parents provided support, proofreading, and advice about statistical calculations.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Allyson M. Rosenblum	Project Number J1730
Project Title Can Your Mind Play Tricks on You?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to study the the placebo effect in a blind study using caffeinated and decaf coffee.</p> <p>Methods/Materials Method- This was a blind study where subjects were told they were drinking regular coffee. My mom prepared the coffee and did not tell me whether the coffee was caffeinated or decaf. Before drinking the coffee the subject's BP, pulse were taken and recorded and they played the board game operation according to the instructions of the game. Any misses in the game were recorded. Then the subjects drank the 6 ounces of coffee and waited one hour for the caffeine to enter the blood stream. After an hour, the subject's blood pressure and pulse was taken and recorded and they again played the operation board game. The misses were recorded. After this they subjects filled out a survey that basically asked how they were feeling, whether they felt more awake, jittery and asked them number the change of how they felt before and after drinking the coffee on a scale of one to ten. One being no change and ten being a very significant change. Materials: # 1 Coffee maker; # 1 Tablespoon; # 1 Digital sphygmomanometer; # 22 Informed consents; # 22 Explanations of experimental procedure to give to subjects; # 22 Questionnaires; # 11 heaping tablespoons of decaf coffee; # 11 heaping tablespoons regular coffee; # 132 ounces of water; # 1 Operation board game; # 1 piece of paper; # 1 Pen; # Coffee cup; # Timer.</p> <p>Results In the caffeine group there were both physical and psychological changes as BP and Pulse rose and fine motor skills diminished. In the decaf group BP, pulse and fine motor skills were unaffected, only psychological changes were significant.</p> <p>Conclusions/Discussion The placebo effect was shown to occur in the decaffeinated group and was psychological not physical. The caffeine group showed a significant change in fine motor skills where there was no change in the decaf group. Physical changes were more significant in the caffeine group.</p>	
Summary Statement A test on the placebo effect using caffeinated and decaffeinated coffee.	
Help Received Mother helped in blinding	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Ethan W. Schletewitz	Project Number J1731
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Project Title
The Effects of Non-Prescription Pain Relievers on Liver Tissue

Abstract

Objectives/Goals
The purpose of this experiment is to successfully determine if and what effects acetaminophen, ibuprofen, and aspirin have on beef liver cells and tissues. The liver is about the size of a football and sits just under your rib cage on the right side of your abdomen. The liver is like a filter it helps digest food by filtering out bad chemicals and substances from food we eat. The liver is a vital organ found in vertebrates. It is responsible for detoxification, protein synthesis, and production of bio chemicals responsible for digestion. The liver is necessary for survival there is no way to compensate for the absence of liver function in long term situations, however new dialysis techniques can be used for short term care. The liver is prone to damage by different chemicals and diseases.

Methods/Materials
Liver Cell Damage/Crush medications, Mix each medication in a test tube with saline, Let sit and dissolve for 1 day at room temperature, Cut liver into 6X6 cm sections, Add a 6x6 cm liver piece and 3mls of medication solution to water to 40 test tubes, Add a 1 cm liver piece and 3mls plain saline to 10 test tubes for control, Leave in test tube for ten days, Look at solution under microscope at 40X using a methylene blue stain, Observe damage to liver cells, Take pictures and record results. Liver Tissue Damage/Cut liver into (10) 6x6 cm pieces, Place 10 pieces in a container, Add saline to each container, Crush medication, Add 5mls of medicine to container, Observe results every two days for ten days to measure liver tissue damage, Repeat steps 1-6 for each medication and plain saline for control

Results
The results of this investigation to determine the effects of Aspirin, Ibuprofen, and Acetaminophen on liver tissue resulted that all test specimens did in fact have an effect on liver tissue. However Acetaminophen caused the most damage.

Conclusions/Discussion
In conclusion, I have learned that all the medication caused damage to the liver tissue tested. However the aspirin caused the least amount of damage. After all the research and testing I performed I have found that all medication in excess will cause damage to the liver, compromising all of the other organs that work together to filter and digest in our body. By limiting the medications consumed we can reduce damages caused to the liver and other organs.

Summary Statement
The object of this study is to determine what damage can be caused by different medicines to liver cells and tissues, this study should aid in making better pain medication choices.

Help Received
Mom took pictures. Microscope supplied by Mr. Alto SHS



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Anthony A. Stenzel	Project Number J1732
Project Title Does <i>Bacillus thuringiensis israelensis</i> (Bti) Affect Non-Target Aquatic Invertebrates of the Madrona Marsh?	
Objectives/Goals To determine whether Bti (a biologically-active mosquito larvicide) is responsible for the recent decrease in Dragonfly populations at the Madrona Marsh.	
Abstract Methods/Materials 1) Maintain a live culture of Dragonfly Nymphs (Odonata). 2) Prepare the samples of <i>Bacillus thuringiensis israelensis</i> (Bti)solutions. 3) The Bti solutions were used to fill the aquaria in which the dragonfly nymphs would live. Prepare a test tube with 10 mL of the test solution. 4) Subjects were monitored for lethality daily over a period of two weeks. I also observed for activity level: active or lethargic.	
Results Having discovered that low levels of Bti did not have a lethal effect on the dragonfly nymph population tested. I increased the ITU levels of exposure in my follow-on trials. The amounts were 50, 100 and 150 ITUs of Bti. Of course, I ran a control group as well that had no Bti added to its habitat. I observed that all experimental groups suffered die-off. The most rapid rate of die-off was found in the tanks containing the lower level ITUs. The newly designed habitats worked in that there were now no deaths-by-decapitation. However, these results prove that there is not a direct link to the presence of Bti in the water and the life expectancy of the dragonfly nymphs.	
Conclusions/Discussion The results show that simple Bti exposure does not kill the dragonfly nymphs within 4-24 hours as it does with the mosquito larvae. The dragonfly gut, therefore, must not be an alkaline environment with enzymes that release the pro-toxins produced by Bti. Thus the results do not support my initial hypothesis that dragonfly nymphs will be lethally affected by Bti. However, there is still another untested hypothesis supporting a detrimental effect of Bti on the dragonfly populations. While the gut of the dragonfly nymph may not produce the deadly conditions that the gut of the mosquito larvae does in the presence of Bti, that same toxin is being ingested by the dragonfly nymph when it feeds on the larvicide-exposed mosquito larvae as a food source. A further study is indicated before I can completely abandon that there is no relationship between the decline of the dragonfly presence at Madrona Marsh and the recent dosing of Bti.	
Summary Statement Determining whether Bti (a mosquito larvicide) is responsible for the recent decrease in Dragonfly populations at the Madrona Marsh.	
Help Received My father, Bob Carr and Tracy Drake spoke with me about my project but I did all the research, came up with the ideas and performed the experiment on my own. My father never touched any part of my actual experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Tamarra E. Sylber	Project Number J1733
Project Title Does What You Drink Affect the Rate of Tooth Decay?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine if what you drink can affect the rate of tooth decay due to the acidity and increase in growth of oral bacteria.</p> <p>Methods/Materials Human teeth were incubated in distilled water, Coke, Gatorade, Apple Juice, and RedBull and was observed over time for evidence of tooth decay by weighing each tooth, as decay increases so does the weight of each individual tooth. Drinks were evaluated to determine which caused the most bacterial growth by incubating saliva and the drinks on agar plates. Each drink studied had its pH, sugar content, and initial tooth weight recorded as the start of the experiment.</p> <p>Results The results from the pH and sugar content analyzed proved that Gatorade was the most acidic drink with a pH of 1.5 and had 21 grams of sugar. Drink samples incubated on agar plates with bacteria from mouth swabs showed that Gatorade grew significantly more bacteria than any samples tested resulting in more tooth decay than the other drinks sampled.</p> <p>Conclusions/Discussion The leading cause of tooth decay in American teens is drinking highly acidic drinks like soda or energy drinks. Acid and sugar-fed bacteria invades the innards of the tooth when tooth enamel has decayed from saturation of the acid and bacteria causing tooth decay. Current research has shown that the worst factors to cause tooth decay is high acidity and an increase in harmful oral bacteria.</p>	
Summary Statement By understanding the content in what you drink, can you a make better choice in what you drink to maintain healthy teeth.	
Help Received My mother helped to obtain the human teeth used in this experiment from all the local dentists.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Claire I. Velez	Project Number J1734
Project Title Using Grey Water: Does Your Plant Care?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective or goal of my experiment was to determine if grey water can be successfully used to grow plants. Today, water is being wasted all over the world and we don't realize how important it is to conserve water. Re-using grey water can help the environment by saving fresh water. The purpose of my project was to see what kind of re-used water will be healthy for plant growth. By doing this, I was hoping to see both what we can re-use and whether the re-used water will still keep a plant healthy and strong.</p> <p>Methods/Materials In my project I used 16 euryop daisies with 4 plants in each water group. One group was given dishwashing water, the other bath water, and another was given hand washing water. My control group was given regular tap water. I measured the growth of each plant with a caliper and a ruler every other day and recorded the height of each plant in my notebook. To make sure I measured correctly and consistently, I put a red mark on the bottom of each plant stem and measured from the mark to the tallest leaf.</p> <p>Results Over a 24 day testing period I found that the plants that grew the least were given the water that had the most soap or food particles. The plants given bathwater grew an exceptionally larger amount than the other two sets of plants given dish water and hand washing water. Initially, I noticed that all of the plants grew similarly, which may have been because they had not felt the effect of the water yet. But after time, it became clear that some plants were growing more than others. In conclusion, my results showed that grey water was a successful means of growing plants. Two out of the three plant groups tested with grey water grew the same or more than the control group using tap water.</p> <p>Conclusions/Discussion These results indicate that grey water can be used to successfully water plants and in some examples, is actually better for plant growth than regular tap water.</p>	
Summary Statement The purpose of my project was to test the use of three different types of grey water on the euryop daisy to find out if grey water can be successfully used to irrigate growing plants.	
Help Received Mother and father helped proofread my report; Danica Taber, UCSB Greenhouse Manager, helped mentor me and answer questions on general plant growth.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Audrey Q. Webb	Project Number J1735
Project Title Frankenfood, Fertility, and the Food Chain: The Effects of Secondary Consumption of GMO	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of my project is to expand my experiment from last year when I observed the effects of GMO versus organic papaya diet on the longevity and fertility of fruit flies. This year, I wanted to take the observation up the food chain. I hypothesised that ladybugs fed pea aphids on a GMO diet of pea sprouts would have reduced fertility and longevity compared to ladybugs fed pea aphids on an organic diet of pea sprouts.</p> <p>Methods/Materials I sorted 100 newly hatched ladybugs, 50 males and 50 females, in a terrarium with pea aphids on organic pea sprouts grown in a styrofoam cup. In another terrarium, I put 100 newly hatched ladybugs, 50 males and 50 females, with pea aphids on a genetically modified pea sprouts grown in a styrofoam cup. I stored them in a garden shed away from direct light on mite paper. Every 5 days I would remove, count, and record any larvae and dead ladybugs. I would spray the terrarium with water. I would also replenish pea aphids equally in each terrarium.</p> <p>Results The ladybugs which were fed pea aphids on organic pea sprouts lived on average 37% longer than the ladybugs fed pea aphids on GMO pea sprouts. The population for the ladybugs fed pea aphids on GMO sprouts ended between day 35 and day 40. The population for the ladybugs fed pea aphids on organic pea sprouts is still going at 60+ days. Regarding dietary effects on reproductive rates, the ladybugs fed pea aphids on organic pea sprouts produced more larvae than ladybugs fed pea aphids on GMO pea sprouts by 71%.</p> <p>Conclusions/Discussion Based on the experimental data I observed, the results support my hypothesis that ladybugs fed pea aphids on a genetically modified diet will have a reduced lifespan and fertility compared to ladybugs fed pea aphids on an organic diet. I think the dramatic difference in the results is attributed to the fact that GM peas contain a protein functioning as a pesticide. This could have decreased the population and reproduction of pea aphids which would mean less food for ladybugs in the GMO terrarium. When ladybugs run out of food, they will perform cannibalism on eggs, larvae, and adults.</p>	
Summary Statement My project studies the effects of secondary consumption of GMO by observing the lifespan and fertility of ladybugs that consume pea aphids fed on GMO pea sprouts.	
Help Received My mother helped me with ordering the materials from a lab and stores. She also helped me count the ladybugs and larvae. My father helped me with the graphs and the formula for Excel Spreadsheets. They both taught me how to use Keynote and Pages to create my own display board.	