



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Lakshman S. Athappan</b>	<b>Project Number</b> <b>J2201</b>
<b>Project Title</b> <b>Effects of Oil Spills on Aquatic Plants</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective is to find the rate of photosynthesis in aquatic plants during oil spills. I believe oil will not let the sunlight pass through and reduce the rate of photosynthesis.</p> <p><b>Methods/Materials</b> In this project there are 2 experiments. In the first experiment, a small sprig of Elodea densa (aquatic plant) is kept in a test tube filled with sodium bicarbonate solution (CO<sub>2</sub> source for photosynthesis). The bubbles produced by the cut end of the plant are counted. The same experiment will be repeated with 5 ml of oil on top. In the second experiment, small pieces of Elodea are kept in a funnel inside a 2 liter bottle filled with NaHCO<sub>3</sub> solution. A test tube is inverted on top of funnel to collect oxygen evolved during photosynthesis. Another setup is made with 50 ml of oil added on top. Both setups were wrapped with foil to block the sunlight from entering through sides and left in the sun. The amount of liquid displaced in the test tube will be measured to find how much oxygen has been produced by photosynthesis.</p> <p><b>Results</b> In the first experiment, the plant with oil on top generated less than half the number of bubbles when compared to control. In the second experiment, the plant with oil on top produced half the amount of oxygen as control.</p> <p><b>Conclusions/Discussion</b> Both experiments showed that rate of photosynthesis is reduced by half when oil is present. Limited amount of sunlight available to aquatic plants during oil spills can cause detrimental effects to ocean ecosystem.</p>	
<b>Summary Statement</b> My project is focused to find out the rate of photosynthesis in aquatic plants during oil spills.	
<b>Help Received</b> I would like to thank my mom for helping me with the experimental setup and Dr. Cecelia Zurita-Lopez from Cal State LA for providing the glassware.	



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<b>Name(s)</b> <b>Olivia C. Borsch</b>	<b>Project Number</b> <b>J2202</b>
<b>Project Title</b> <b>How Do Different Levels of Carbon Dioxide Affect the Height and Biomass of Radish Plants?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> If two times the amount of carbon dioxide is added to the plants, then the height and biomass will increase.</p> <p><b>Methods/Materials</b> Homemade carbon dioxide generators, plant containers with lids, radish seeds, soil, water. Measured height and weighed biomass of each plant after 10 days.</p> <p><b>Results</b> The height of the plants with two carbon dioxide generators was 0.99cm shorter than the control group and their biomass was 0.0085g lighter per plant.</p> <p><b>Conclusions/Discussion</b> The hypothesis of this project was unsupported. The biomass and height of the plants with added carbon dioxide were generally lower and less productive.</p>	
<b>Summary Statement</b> Radish plants that received extra carbon dioxide showed negative effects as measured by their height and biomass.	
<b>Help Received</b> My science teacher helped me look up information on carbon dioxide generators. Then I built and performed the experiments myself.	



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<b>Name(s)</b> <b>Natalie H. Bui</b>	<b>Project Number</b> <b>J2203</b>
<b>Project Title</b> <b>Not So Nano</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of the experiment was to find the effects of silver nanoparticles of various sizes on the CO<sub>2</sub> production and cellular respiration of yeast cells.</p> <p><b>Methods/Materials</b> Hot plates, Distilled water, 400 mL beakers, 1 L beaker, 200 mL beaker, Electric balance, Stirring rods, Weigh boats, Thermometer, 125 mL Erlenmeyer flasks, Vernier CO<sub>2</sub> sensor and Logger Pro software, Gloves, Silver nitrate solution, Sodium citrate solution, Sugar, Budding Yeast, Goggles, Sharpie, Parafilm, Aluminum foil, Graduated cylinders, Timer</p> <p><b>Results</b> To test the effect of the nanoparticles on eukaryotic cells and their processes of cellular respiration, active budding yeast will be used. To measure the effect of the nanoparticles on the yeast, the CO<sub>2</sub> production will be measured within the reaction chamber in parts per million before and after the nanoparticles are added. If the nanoparticles slow down the increase of CO<sub>2</sub>, then the nanoparticles are disrupting the cell's cellular respiration process. In measuring the amount of CO<sub>2</sub> in the reaction chamber the effects of the silver nanoparticles can be pinpointed.</p> <p><b>Conclusions/Discussion</b> My hypothesis proved to be correct in this experiment. The silver nanoparticles that are less than 20 nm in diameter had the most effect on the yeast's cellular respiration. In testing the CO<sub>2</sub> levels in parts per million, it was clear that the silver nanoparticles of the yellow, amber color were the most effective at slowing down the increase of CO<sub>2</sub> levels of the yeast cells' respiration. Furthermore, I observed the effects of the silver nanoparticles in and of themselves and it is clear that they are extremely toxic to eukaryotic cells. In addition, by checking the silver nitrate and the sodium citrate that synthesized the particles I was able to pinpoint that silver as a whole has some antimicrobial effects.</p>	
<b>Summary Statement</b> After measuring the CO <sub>2</sub> production of yeast cells with the addition of silver nanoparticles, I found that silver nanoparticles about 20 nm in diameter had the most fatal effects on the yeast cells' respiration.	
<b>Help Received</b> The head of the advanced science program at Fairmont Preparatory Academy taught me how to use the software and synthesize the nanoparticles. She also allowed for me to use the high school's lab and lab equipment.	



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<b>Name(s)</b> <b>Jennifer M. Cresap</b>	<b>Project Number</b> <b>J2204</b>
<b>Project Title</b> <b>Shell Shocked: The Effects of Ocean Acidification on Shell Mass</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study is to determine whether or not ocean acidification is really the cause of decreasing shell mass in the ocean.</p> <p><b>Methods/Materials</b> Variety of scallop shells, carbon dioxide pills, electronic scale, litmus paper/pH test, spring water</p> <p><b>Results</b> Overall there was a visible decrease in the mass of the shells in the acidic solution, mostly averaging around 0.05 grams per shell. However, mostly none of the shells in the normal water had any decrease, and the ones that did were due to slight inconsistencies in the massing.</p> <p><b>Conclusions/Discussion</b> This project is crucial because it shows that ocean acidification is the true cause of what is causing the mass of shells to decrease. Now that this information is known, there can be measures implemented to slow down or prevent ocean acidification from happening.</p>	
<b>Summary Statement</b> I tested whether or not ocean acidification is really causing the mass of shells to decrease by comparing the masses of shells over a thirty day period.	
<b>Help Received</b> None. I designed, built, and performed the experiment by myself.	



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<b>Name(s)</b> <b>Dominic Cricitiello; Ashley Grace Leith</b>	<b>Project Number</b> <b>J2205</b>
<b>Project Title</b> <b>The Fragrance Freak Out</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of our project is to test out the toxicity of perfumes, colognes, and body sprays.</p> <p><b>Methods/Materials</b> The materials that we used are, plastic cups, saran wrap, cotton balls, and crickets. The perfumes we used are Tease by Victoria's Secret, Wonderstruck by Taylor Swift, Miss Dior by Dior, and Viva la Juicy by Juicy Couture. The colognes we used are Signature Gold by Axe, Wolfthorn by Old Spice, 212 by Carolina Herrera, and Prada by Prada.</p> <p><b>Results</b> Several crickets were tested and we thought that Wonderstruck by Taylor Swift and Signature Gold by Axe would kill the crickets the fastest which we were wrong. Viva la juicy by juicy couture and Wolfthorn by Old Spice killed the crickets the fastest.</p> <p><b>Conclusions/Discussion</b> In the end our hypothesis was wrong and our testing revealed to be careful about what you put on to your body and to be careful about the toxins you put on to yourself.</p>	
<b>Summary Statement</b> Our project is about how toxic perfumes and colognes are to the human body.	
<b>Help Received</b> Alex Hofsteen, Peter Hofsteen, Imani Banks, Camren Cabanilla, Jason Khan, James Dodson, Tina Santillanes, Maria Andalio- Angeles	



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<b>Name(s)</b> <b>James Dodson; Jason Khan</b>	<b>Project Number</b> <b>J2206</b>
<b>Project Title</b> <b>How Does Wood Ash Affect Plant Growth?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to answer a question that has special significance this year in California. Fires, like the Sobranes, have swept the state, leaving behind burnt residue and ash. Could this ash actually improve the growth of plants?</p> <p><b>Methods/Materials</b> The hypothesis of this project is, if beans are planted in soil augmented with ash mixed in, ash on the surface, and normal soil, and are given the same amount of water and sunlight, at the same time, then the ash mixed in will outperform normal soil, and ash on the surface. The plants were given 75 ml of water every other day. Then they were measured in mm, and the average plant height for each category was calculated.</p> <p><b>Results</b> After about three and a half weeks of testing, we found that the normal dirt had the highest average height. The ash on the surface grew next to fastest, and the ash mixed in grew slowest. In comparison, the compost soil grew slower than the normal soil and the ash on the surface, but it outperformed the ash mixed in.</p> <p><b>Conclusions/Discussion</b> The results show that our hypothesis should be: if beans are planted in soil augmented with ash mixed in, ash on the surface, and a different natural fertilizer, compost, and they are given the same amount of water and sunlight, at the same time, normal soil will outperform ash on the surface, and ash mixed in. Upon reviewing this project, it could be expanded on and improved by extending the amount of time the plants are given to grow, growing plants indoors under plant growing lamps, and planting more of each plant. This would eliminate some of the randomness that comes with growing living things, and make for more reliable results.</p>	
<b>Summary Statement</b> By measuring bean plants grown in soil with ash, we found the ash has a negative affect on the growth of plants.	
<b>Help Received</b> Mr. Hofsteen, our 7th grade teacher mentored us through the entire project. And looked over all writing samples and gave great feedback. Mr. Dodson and Mrs. Broz, James parents, helped bring plants inside during bad weather, and helped write down data as it was recorded. Mr. and Mrs. Khan helped gather dirt	



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<b>Name(s)</b> <b>Mason S. Dougherty</b>	<b>Project Number</b> <b>J2207</b>
<b>Project Title</b> <b>Determining the Detrimental or Beneficial Effects of Various Levels of Salt and Sugar on Drosophila melanogaster</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study is to determine any harmful or beneficial effects that sugar and salt may have on Drosophila melanogaster longevity. <b>Methods/Materials</b> Commercially obtained Drosophila melanogaster cultures and food, and prepared sugar and salt concentrations. Record daily the number of living versus nonliving Drosophila melanogaster in each of the salt and sugar concentration cultures over the course of their lifespan. <b>Results</b> Living versus nonliving Drosophila melanogaster were evaluated daily in various concentrations of salt and sugar, as well as the controls. It was found that sugar concentrations showed greater longevity when compared to salt concentrations and the controls. <b>Conclusions/Discussion</b> Multiple trials of various concentrations of salt and sugar, compared to the control trials, revealed that all sugar concentrations increased the average lifespan in Drosophila melanogaster. All of the salt concentrations decreased the average lifespan of Drosophila melanogaster. Due to the sugar concentrations outliving both the control and salt trials, it is concluded that sugar solutions may have beneficial effects on Drosophila melanogaster longevity.	
<b>Summary Statement</b> I showed that salt and sugar concentrations have detrimental and beneficial effects on Drosophila melanogaster longevity.	
<b>Help Received</b> I assembled the Drosophila cultures and prepared the salt and sugar concentrations myself. I received help with the statistical analysis of my graphs from Mr. Carl Gong, Sanger Unified District Science Coordinator.	



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<b>Name(s)</b> <b>Larissa G. Flores</b>	<b>Project Number</b> <b>J2208</b>
<b>Project Title</b> <b>Could Nanosilver in Consumer Products Affect Pond Life?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my study is to investigate the effects of different concentrations of nanosilver on the water organism <i>Daphnia magna</i> . <b>Methods/Materials</b> <i>Daphnia magna</i> cultures, water pipettes, 100mL graduated cylinder, 1 one-gallon jug of pond water, 6 petri dishes, clear 18oz cups, 1 fluid oz of Natural Path Silver Wings colloidal silver mineral supplement 500ppm, magnifying glass, camera. Placed 10 daphnia in 3 different concentrations of nanosilver then calculated the heart rates and the mortality rate every 2 hours. <b>Results</b> <i>Daphnia magna</i> were studied in pond water where different concentrations of nanosilver were applied to their environment. The concentrations of nanosilver were 0 ug/L (control), 5 ug/l, and 25 ug/L. Over a period of six hours I studied the effects of these various concentrations to see how the <i>Daphnia magna</i> 's heart rate and mortality rate were affected. I noted that the heart rates increased from 75 BPM to 193 BPM in the higher concentrations, and the mortality rate grew where there was more nanosilver present. <b>Conclusions/Discussion</b> I repeated my study twice and both times I noted that the <i>Daphnia magna</i> were adversely affected by higher concentrations of nanosilver. I realized this because at higher concentrations the heart rates of <i>Daphnia magna</i> increased and their mortality rate did as well.	
<b>Summary Statement</b> I showed that nanosilver, an antibacterial used in everyday objects, poses a threat to the environments organisms such as the <i>Daphnia magna</i> .	
<b>Help Received</b> None, I created all of the concentrations and collected all of the data on my own.	



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<b>Name(s)</b> <b>Arti Gnanasekar</b>	<b>Project Number</b> <b>J2209</b>
<b>Project Title</b> <b>Investigating the Effects of Different Chemical Composition of Pesticides on the Survival of Honeybees</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment is to uncover which neonicotinoid or brand of pesticide is most harmful to honeybees. If pesticides prove to be harmful to honeybees, this project will bring awareness to scientists to take steps in mitigating and even preventing the way humans contribute to Colony Collapse Disorder.</p> <p><b>Methods/Materials</b> Greenhouse, food, flowers, plastic containers, and honeybees. Observe how many bees die in a course of 3 consecutive days when released to higher or lower concentration of pesticide.</p> <p><b>Results</b> Out of the 3 pesticides, Imidacloprid killed the most bees that the other two neonicotinoids. Clothianidin and Acetmaiprid were harmful to the honeybees through the 5 trials, but not as harmful as Imidacloprid. Control barely killed any bees. This project elucidates how humans are contributing to Colony Collapse Disorder and bee death by constantly using pesticides that may be harmful to bees.</p> <p><b>Conclusions/Discussion</b> The results was that Imidacloprid did kill the most honeybees in all. In the 5 trials, out of 10 bees in each trial, Imidacloprid killed the range of 7 to 9 bees in the lower and higher concentration in a course of three consecutive days. The Acetamiprid and Clothianidin proved to be harmful to the bees to a certain extent as well, killing 4 to 6 honeybees in each trial.</p>	
<b>Summary Statement</b> I am testing the effects of different pesticide concentrations on the survival of Honeybees.	
<b>Help Received</b> I tested the experiment by myself but I recieved training on how to handle the bees by the local San jose beekeeper named Art Hall.	



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<b>Name(s)</b> <b>Japnoor Kaur</b>	<b>Project Number</b> <b>J2210</b>
<b>Project Title</b> <b>Comparing Peppers and Store-Bought Products as Mosquito Repellents</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study is to determine whether various store-bought products or various peppers are more effective in repelling mosquitoes. I believe that one of the store-bought products will be the most effective in repelling mosquitoes when compared to the other repellents.</p> <p><b>Methods/Materials</b> Various repellents, a bin, cups, mosquito larvae, an attractant, and window screen were the main materials used in this project. Once these materials were gathered, I first created my attractant, and then I distributed this attractant evenly amongst 9 cups for every trial. After that, I sprayed a different repellent into each cup of attractant, and I also placed the mosquito larvae into a separate cup that had water in it. Once all of these cups were in the bin, I glued window screen onto the top edges of the bin so that all the exits were blocked. These bins were left alone so that the mosquitoes could hatch. These procedures were repeated 10 times because 10 trials were performed.</p> <p><b>Results</b> When the results from all the trials were added up and distinguished into categories, I found that pepper repellents attracted 39 percent fewer mosquitoes than store-bought repellents, and the control attracted 14 percent less mosquitoes than the pepper repellents. When the results from all the trials were added up and the products were compared individually, black pepper attracted 2 less mosquitoes than Sawyer Fisherman's Formula Picaridin and 8 less mosquitoes than the control. Repel Lemon Eucalyptus, on the other hand, performed the worst and attracted 22 more mosquitoes than the control.</p> <p><b>Conclusions/Discussion</b> Again, in this project, I compared peppers and store-bought products as mosquito repellents. I found that the overall category of pepper repellents did better than the store-bought repellents group, but the peppers did not do as well as the control group. Instead, when products were compared individually and not by category, I found that black pepper performed the best- better than the control and any store-bought product. I also found that the worst-performing repellent was a store-bought repellent. This all proves that black pepper is more effective than any other repellent I used, making it a smart alternative to other repellents. This means that instead of using chemical-filled repellents that are store-bought, we can use natural products that are not only more safe, but actually more effective!</p>	
<b>Summary Statement</b> After counting the number of mosquitoes that were attracted to each type of repellent, I found that black pepper is the most efficient mosquito repellent that was used in my project.	
<b>Help Received</b> I did all the experiments, research, and work by myself, but Gary Bye at the Fresno Mosquito Abatement District helped me out by providing me with mosquito larvae and an informational interview.	



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<b>Name(s)</b> <b>Simone Kilby</b>	<b>Project Number</b> <b>J2211</b>
<b>Project Title</b> <b>What Are the Effects of Various Pollutants on Aquatic Plants?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this science project is to determine what common pollutants are the most toxic. Also, to show people how badly they can really harm the aquatic world. The project is conducted by putting three different types of aquatic plants in a 1-gallon container. Then each pollutant is poured in their assigned container. Next, check every three days for nine days. After this investigation, you will have a better understanding of how pollutants affect aquatic life. Hopefully, you will learn to respect mother nature more. You will also learn about many different pollutants, their facts, and background information.</p> <p><b>Methods/Materials</b> 5-(1) gallon containers 4 cups of fluorite black aquatic plant soil in each one-gallon container. Planted an aquatic plant combination in each one-gallon container. Took blue aquarium gravel and spreader one cup on top of the soil. Filled each one-gallon container with .75 gallons Used glass cleaner on the glass one-gallon containers so the glass looks nice for pictures. Added labels to each one-gallon container. Took my dropper and dropped 20 drops of each container it went to except for one because there needs to be a control.</p> <p><b>Results</b> The result of this project is that chlorine is the most damaging to the aquatic plants. The reason I think that the chlorine affected the most is because it is water soluble that mean it spreads evenly in the tank. Unlike motor oil and used motor oil.</p> <p><b>Conclusions/Discussion</b> In conclusion, chlorine will kill the plants the most due to its toxic effect.</p>	
<b>Summary Statement</b> The purpose of this science project is to determine what common pollutants are the most toxic.	
<b>Help Received</b> mom helped pay and provided transportation.	



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<b>Name(s)</b> <b>Li F. Meinhold</b>	<b>Project Number</b> <b>J2212</b>
<b>Project Title</b> <b>The Mutagenic Effects of Gentian Violet</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this study was to determine the mutagenic effects of a common type of dye, gentian violet on fruit flies.</p> <p><b>Methods/Materials</b> This study used commercially available dye, wingless fruit flies and culture kit from pet supply industry, scale, magnifying lens, microscope. Flies were divided and exposed to different concentrations of dye, and the mutation rate was measured after each generation for three generations.</p> <p><b>Results</b> There was measurable mutagenic effect that varied with concentrations that was up to two and a half times that of the control.</p> <p><b>Conclusions/Discussion</b> This study shows that azo dyes do have mutagenic potential in fruit flies. This fact, and the prevalence of these dyes suggests that further study into their mutagenic potential is warranted.</p>	
<b>Summary Statement</b> This study demonstrated that gentian violet dye causes mutations in fruit flies.	
<b>Help Received</b> I designed this experiment myself, attempting to recreate the results of "Comparative Mutagenic Effects of Laboratory Dyes on Drosophila Melanogaster". I had a half hour interview with graduate student James Mondo who helped put the experiment in scientific context.	



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<b>Name(s)</b> <b>Rachel Meyer; Jasmine White</b>	<b>Project Number</b> <b>J2213</b>
<b>Project Title</b> <b>Marinas: Toxic or Safe?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This, wonderful project may help recent environmental concerns associated with copper based boat hull paints. This years project continues our science experiment from 2015. Our results from 2015 showed cayenne pepper when added to environmentally safe hull paint was more effective than adding nothing and adding vanilla extract or lemon extract. Since cayenne pepper was our spicy substance in 2015, this year we have chosen even spicier powdered peppers. Copper based boat hull paint contains biocides and heavy metal which can harm sea creatures and even humans. There are other kinds of boat hull paints that are environmentally safe and not as toxic to the marine life. However, these environmentally safe boat hull paints are not considered as effective as the copper based boat hull paint. Therefore, to try and improve the effectiveness of the environmentally safe hull paint we added cayenne pepper, habanero pepper, ghost pepper, and Carolina Reaper (all powders). We thought that the Carolina Reaper pepper would have the least amount of marine growth because on the Scoville Heat Unit scale it registers 2,200,000 SHU while cayenne pepper registers 50,000 SHU.</p> <p><b>Methods/Materials</b> When first setting up the project we cut marine grade plywood into six 8 in by 11 in boards. We then added the spicy powders to the environmentally safe hull paint. Next we painted each of the boards, one with copper based paint, one with environmentally safe paint, one with cayenne pepper, one with habanero pepper, one with ghost pepper, and one with Carolina Reaper. Every week for the past 8 weeks (January 8 through March 7), week we counted marine life observed on each of the painted boards and using our grid calculated the percentage of algae growth covering each board.</p> <p><b>Results</b> We put our painted boards in the water on January 8th, and of course, at that time there was no growth. Between weeks 1 and 6, no growth was observed on our boards. Our latest check on March 7th (week 9), still no algae growth or other life on Board A. While we observed algae coverage of 52% on Board B, 48% on Board C, 38% on Board D, 43% on Board E, and 59% on Board F. Therefore, currently the habanero powder added to the environmentally safe paint is doing the best.</p> <p><b>Conclusions/Discussion</b> At this time in our experiment we have found habanero pepper to be most effective of the added substances but still not as effective as the copper based boat hull paint.</p>	
<b>Summary Statement</b> Copper based boat hull paints are effective but toxic to the environment, our experiment adds spicy substances to environmentally safe paint to make it more effective.	
<b>Help Received</b> Phil Pritting, donated environmentally safe paint, which is highly appreciated.	



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<b>Name(s)</b> <b>Jason E. Poole</b>	<b>Project Number</b> <b>J2214</b>
<b>Project Title</b> <b>Do Different Types of Wood Ash Affect Plant Growth?</b>	
<b>Objectives/Goals</b> If an area is covered with wood ash, will plant growth be negatively affected	
<b>Abstract</b> <b>Methods/Materials</b> In two burn barrels, burn samples of orange tree and oak tree wood. Next day collect 4 cups of each sample of wood ash. In clear plastic solo cups, layer pea sized gravel, organic potting soil, and either radish seeds and fescue grass seeds. A total of 60 cups should be prepared. Use the ash collected to apply 1 teaspoon to each type of cup to be grown. Label; oak tree/ radish, orange tree/ radish, radish, oak tree/ fescue grass, orange tree/ fescue, fescue. Apply 1/6 cup water to each cup. Cover with cellophane. Allow plants to grow for 14 days, observing and recording data every other day. After 14 days, remove cover, measure plant growth and record results.	
<b>Results</b> The results of my investigation regarding if different types of wood ash effect the growth of plants indicate that orange tree ash and oak tree ash have a negative effect on the growth of both radish plants and fescue grass. The radish plants and fescue grass that did not have orange tree ash or oak tree ash grew taller than the plants that had ash added to the soil.	
<b>Conclusions/Discussion</b> After completing my project, I found my hypothesis to be correct, plants grown in an area covered with wood ash would be negatively affected. Plants grown without ash added to the soil grew better. My experiment proved that there is a relationship of different types of wood ash to the effect on how plants grow. The information can be important to farmers in the Central Valley as they choose to burn old crops and plant new crops without removing the remaining ash. This could also be important, as California continues to suffer from a drought leading to record number of wildfires.	
<b>Summary Statement</b> I proved that different types of wood ash negatively affect plant growth.	
<b>Help Received</b> My dad helped be burn the wood samples	



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<b>Name(s)</b> Aisha K. Randhawa	<b>Project Number</b> <b>J2215</b>
<b>Project Title</b> <b>Cell Phone Microwave Radiation: Does It Zap the Lifespan of the Fruit Fly?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study is to measure the lifespan of larvae and adult fruit flies exposed to cell phone microwave radiation. <b>Methods/Materials</b> 24 larvae fruit flies and 24 adult fruit flies were exposed to "airtime on" cell phones (either a Samsung Galaxy or Casio GZ which have different specific absorption rates) for 10 or 20 minutes daily compared to no airtime for controls. <b>Results</b> The Samsung cell phone exposed larvae fruit flies had a 35% reduction in lifespan compared to the controls while the Casio exposed larvae fruit flies had a 50% reduction in lifespan compared to controls. The adult fruit flies showed no major reduction in lifespan for the Samsung exposed group. However, for the Casio 20 minute exposed adult group there was a 30% reduction in lifespan. <b>Conclusions/Discussion</b> Larvae fruit flies are more vulnerable to cell phone radiation as shown by their significantly decreased lifespan whereas the adult fruit flies seem minimally affected. Therefore, cell phone microwave radiation exposure is potentially more harmful to the health of young and developing organisms.	
<b>Summary Statement</b> I found that the young (larvae) fruit flies exposed to cell phone microwave radiation had a significantly decreased lifespan compared to the adult fruit flies that received the same exposure.	
<b>Help Received</b> I designed and conducted the experiments by myself with guidance from my father (Ruvdeep Randhawa) and science teacher (Bobbi Goldstein).	



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<b>Name(s)</b> <b>Rayhan Y. Razzak</b>	<b>Project Number</b> <b>J2216</b>
<b>Project Title</b> <b>A Caffeine Kick</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objective was to learn if and how caffeine affects Daphnia's heart rate. <b>Methods/Materials</b> Pipette, Daphnia Magna Culture, Caffeine, Petri Dish, Tripod and Camera, and Graduated Cylinder <b>Results</b> Several Daphnia Magna were placed in various solutions of caffeine and spring water. Repeated trials were run to determine the effects of each solution on Daphnia Magna's heart rate. The difference between each solution's results were that as more caffeine is added to the solution, the heart rate is increased. <b>Conclusions/Discussion</b> Repeated trials with multiple Daphnia Magna in different solutions revealed that the more caffeine added to the solution, the higher the beats per minute. It is concluded the caffeine has a significant effect on the heart rate of Daphnia.	
<b>Summary Statement</b> As discovered by the change of heart rate of the Daphnia Magna by the different solutions, I found that as more caffeine is added to the solution, the heart rate is increased.	
<b>Help Received</b> With the help of online research and my science teacher, I was able to design the way to collect and test my data. However, I performed the experiment myself.	



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Grayson C. Rushworth</b>	<b>Project Number</b> <b>J2217</b>
<b>Project Title</b> <b>Algae's Effect on a Water Ecosystem</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My question is to find out how much fertilizer that runs off into a body of water is harmful. My hypothesis is that the more concentrated the fertilizer dilution series, the more algae will form.</p> <p><b>Methods/Materials</b> I used the following materials: One package of 16 oz. Styrofoam cups, one package of 8 oz. cups, one box of graduated cylinders, one box of Hyponex fertilizer 21-0-0, 16-16 oz. hard plastic cups, thermometer, one bag of Sta-Green fertilizer- Color Bloom 15-30-15, three 4 liter containers of pond water, lake water, and reverse osmosis water, two 4 liter empty containers, one 2 liter empty container, Hydroponic light (T-5), one 4 liter bottle of distilled water, heat mat, and tray.</p> <p><b>Results</b> The results of my first trial were as follows: nothing happened. At that point, I decided to research my fertilizer further and found out that I needed a fertilizer that was higher in Phosphate than Nitrogen. I then decided to move my cups away from the window and into the center of the room, where it is warmer and used a hydroponic light (T-5) for 8-hours a day along with the natural lighting of the room. In trial 2 algal growth was definitely present. One observation I noticed was that Red Hill Pond produced a brownish-red algae and that Puddingstone Reservoir produced a green algae. For my third trial I also used a heat mat to keep the temperature of the water constant. I found that with the lighting and the heat mat Trial 3 was the most successful.</p> <p><b>Conclusions/Discussion</b> I think that my project could really help humanity and save a lot of water ecosystems. I feel that public knowledge about how fertilizers harm the ecosystems, by creating algae growth, would help humanity. If a few people at a time, could be more conscience of their water runoff when they use fertilizer, it would help. If the public could be educated that just a tiny amount of fertilizer could create such algal blooms, they would want to help. It all starts with a few people. I also think that if fertilizer companies were more aware of my project, that in trying to go #green#, maybe they could come up with a fertilizer that wouldn't create algal bloom and be ecologically safe.</p>	
<b>Summary Statement</b> My project was about growing algae in different dilution series to see which concentration would grow the most algae thereby being the most toxic to a water ecosystem.	
<b>Help Received</b> My mom- Ms. Wendi Schwab and my teacher - Mrs. Rodriguez. My mom helped collect the water I needed. Mrs. Rodriguez helped guide me in the right way.	



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Chamidu Sagara</b>	<b>Project Number</b> <b>J2218</b>
<b>Project Title</b> <b>The Study of How Microwave Radiation Impacts the Growth of a Plant</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study is to find the effect of microwave radiation on seeds and how it affects plant growth. <b>Methods/Materials</b> 35 pinto beans are soaked overnight. Five seeds are designated to either the control, five second (5sec), ten second (10sec), fifteen second (15sec), twenty second (20sec), twenty-five second (25sec), or thirty second (30sec) group. Each seed is taken at a time and put in the microwave for its designated amount of time. Following this, the seeds are planted in the cups. The cups are labeled with the time of the designated seeds. All the heights are measured and recorded daily. During this period, each cup is watered with 15 milliliters of water. This process is continued for 22 days, after which the data is plotted in a graph. <b>Results</b> After 22 days, the seeds microwaved for 5 seconds showed the most growth, at an average of 12.3 centimeters. The next tallest ones were the 10 second seeds, which were 10.1 centimeters on average. Control seeds at 10 centimeters. It was observed that the 5 second group had an average height over 2 centimeters taller than the next tallest group. It was also seen that the 10 second and control group had nearly identical averages at 10.1 and 10 centimeters. After the top three tallest growing plants, the next four group of plants experience a significant drop-off. The 15, 20, 25 and 30 second seeds come next at 4, 3, 1.5 and 1 centimeters respectively. <b>Conclusions/Discussion</b> It was hypothesized that the plants would slowly decrease in height as the time exposed to microwave radiation increased. Ultimately, the hypothesis was proven to be false, as the results show that the seeds that microwaved for 5 and 10 seconds grew taller than the control. This can be explained by research that shows that seeds remain dormant until they feel the warmth of spring. The seeds microwaved for 5 seconds may have been somehow "activated" by the heat. This might have been just the right temperature. Also, the 10 second seeds grew almost identically as the control seeds, possibly showing a time when the radiation does not benefit or harm an organism. Only a few seeds that were microwaved 25 or 30 seconds started grew. However, their heights were much shorter than 5 or 10 second seeds. This kind of experiment could be used in other seeds such as wheat, corn or soy beans that are planted in a large scale in the U.S.	
<b>Summary Statement</b> I analyzed the effect of microwave radiation on plant growth	
<b>Help Received</b> My dad helped me finding a project that interested me. At the end, he showed how to layout each category in the poster. My mom reminded me to water the plant and take measurements every day.	



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2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Chiara N. Savage Schwartz</b>	<b>Project Number</b> <b>J2219</b>
<b>Project Title</b> <b>Does Ocean Acidification Affect the Weight of Shellfish Shells?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project was to test whether increasing ocean acidification, which is caused by rising levels of atmospheric carbon dioxide, affects the weight of shellfish shells.</p> <p><b>Methods/Materials</b> 3 types of local shells. 5 pH levels corresponding to different levels of atmospheric carbon dioxide. Weight before/after soaking for 4 weeks. 10 replicates of each shell type at each pH level.</p> <p><b>Results</b> For both crab shells and sand dollars, as pH levels decreased (and acidity levels increased), shell weight generally decreased. I set up my test on assorted shells incorrectly so my results for them did not follow the same pattern.</p> <p><b>Conclusions/Discussion</b> My results from crab shells and sand dollars confirmed my hypothesis, that as ocean acidification increases, shell weight decreases. For the assorted shells I got quite varied results, that did not match my hypothesis. This is because I did not evenly distribute shell types within each pH level. Doing this project raised my awareness that ocean acidification is a growing problem facing marine life around the world. This short experiment shows that we need to investigate the impact of climate change on marine species, and we need to work to protect marine ecosystem health.</p>	
<b>Summary Statement</b> I found that as ocean acidification increases and pH levels decrease, the weight of shellfish shells decreases.	
<b>Help Received</b> I designed and performed this experiment myself. I discussed my design with Dr. Jen Skene, who has her PhD in marine biology, who suggested I add an extreme pH level (3.0) in case my experimental pH levels did not work.	



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2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Malia G. Tarazon</b>	<b>Project Number</b> <b>J2220</b>
<b>Project Title</b> <b>How Does Nicotine Affect the Heart Rate of Daphnia magna?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this experiment was to find out how different amounts of nicotine would either increase or decrease the heart rate of Daphnia magna by exposing them to a 1%, 10% and 25% nicotine solution. <b>Methods/Materials</b> Stopwatch, compound microscope, Daphnia magna, nicotine, purified water, 10 milliliter cylinders. Measured the heart rate of Daphnia magna in 30 second increments for up to four (4) minutes, after exposing them to a 1%, 10% and 25% nicotine solution. Multiple trials were conducted for each solution. <b>Results</b> In all levels of the nicotine solution, it was found that nicotine decreased the heart rate of Daphnia magna over the time period tested. The lower the nicotine solution the slower the rate at which the heart rate decreases. The 1% solution and 10% solution had relatively steady declines in heart rate. The 25% nicotine solution caused the heart rate to decrease at a steady pace for one minute and then drastically decrease. <b>Conclusions/Discussion</b> Multiple trials found that nicotine causes a decrease in heart rate for Daphnia magna, with higher concentrations of nicotine having a stronger effect. My project is important because it provides information about how nicotine affects the heart specifically. In addition, because nicotine is a stimulant, which should initially cause an increase in heart rate, this project may be used to get an understanding of the point in which nicotine actually causes a decrease in heart rate.	
<b>Summary Statement</b> My project showed that nicotine causes a decrease in Daphnia magna's heart rate when added to the water they live in.	
<b>Help Received</b> I received assistance during the actual testing of my project from my science teacher who supervised my testing and assisted in making the nicotine solutions.	



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2017 PROJECT SUMMARY**

<b>Name(s)</b> Isabella V. Worley	<b>Project Number</b> <b>J2221</b>
<b>Project Title</b> <b>Investigating the Effectiveness of Natural Herbicides in Killing Pest Plants</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study is to investigate the effectiveness of natural herbicides in killing pest plants. <b>Methods/Materials</b> Sprayed the labeled and sectioned off areas of pest plants with: 20% vinegar plus dish soap 5% vinegar plus dish soap 20% vinegar plus orange oil plus dish soap 5% vinegar plus orange oil plus dish soap 22% ammoniated soap of fatty acid Then observed and took pictures at hours 0,6,9 and days 1 to 14 and day 60. <b>Results</b> I found that 22% ammoniated soap of fatty acids worked the fastest and was the most effective at 14 days followed by 20% vinegar plus dish soap, and then 20% vinegar plus orange oil plus dish soap. The combinations containing the 5% vinegar were not as effective. At 60 days, the 20% vinegar plus orange oil plus dish soap was the most effective followed by 20% vinegar plus dish soap, and 22% ammoniated soap of fatty acid. The combinations containing the 5% vinegar showed complete regrowth of pest plants at 60 days. <b>Conclusions/Discussion</b> Natural herbicides containing 22% ammoniated soap of fatty acid and the combinations containing the 20% vinegar are effective in killing pest plants. This means that there are some greener and safer natural herbicides that are effective and can be considered as alternatives to commercially available chemical herbicides.	
<b>Summary Statement</b> I found that natural herbicides are effective in killing pest plants.	
<b>Help Received</b> My science teacher provided some guidance in finding the research material.	



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2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Roy M. Yaghi</b>	<b>Project Number</b> <b>J2222</b>
<b>Project Title</b> <b>Comparing the Effect of Plastic, Aloe Vera, and Snake Plant on Photosynthesis by Cabomba</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective is to see how plastic and Aloe vera and snake plant (both houseplants) affect the rate of photosynthesis on a pondweed called Cabomba caroliniana.</p> <p><b>Methods/Materials</b> The materials used were small pieces of plastic, Aloe vera, and snake plant, sprigs of the pondweed Cabomba, tap water, glass beakers, funnels, and test tubes, Baking Soda, measuring tools and 2 lamps. I placed the Cabomba into a funnel in a beaker with the stem facing upwards. The beaker should be filled with water up to 1 liter, and the test tube on top of the stem of the funnel should also be filled with water. Inside the tunnel, I would either add the plastic, snake plant, or Aloe vera (it matters how the set was labeled, ex: Control: with Snake). The baking soda I sprinkle in the water and the light from the lamps allow the Cabomba to photosynthesize by releasing oxygen bubbles that are stored in the test tube and that can be measured.</p> <p><b>Results</b> The objective of the experiment was to see if plastic has an adverse effect on the rate of photosynthesis by Cabomba. The other idea that was tested was to see if snake plant and Aloe vera resulted in an increase in the oxygen production. Results indicated that Cabomba with snake plant produced the most oxygen (2.5 cm), followed by only Cabomba (2.4 cm), Cabomba with Aloe and Cabomba with Aloe and plastic (2 cm), Cabomba with plastic (1.8 cm) and Cabomba with snake plant and plastic (1.6 cm). The results of my experiment proved that my hypothesis was partially correct. I was correct when stating that plastic will decrease the rate of photosynthesis and Aloe and snake plant will increase it, but I was wrong when I said that Aloe will increase it more than snake plant. Snake plant alone with Cabomba produced the most oxygen.</p> <p><b>Conclusions/Discussion</b> Plastic does negatively affect the marine life, and in this case a pondweed. The houseplants helped by releasing oxygen and tacking in some toxins, and snake plant produced more oxygen than Aloe vera. I hope that this project would allow people to be more aware of how bad plastic really is, and how they could buy houseplants to help purify the air and release oxygen.</p>	
<b>Summary Statement</b> Comparing the effect of plastic, Aloe vera, and snake plant on Cabomba's rate of photosynthesis.	
<b>Help Received</b> I performed, set up, and thought of the experiment alone. My science teacher Mrs. Satya gave me some advice and instructions on the board.	



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Princesa Zavaleta</b>	<b>Project Number</b> <b>J2223</b>
<b>Project Title</b> <b>Sunscreen Pollution</b>	
<b>Objectives/Goals</b> The objective of my project was to see how 0.001 grams of sunscreen mixed in with 1000 milliliters of water affects the pace of a Sea Urchin.	
<b>Abstract</b>	
<b>Methods/Materials</b> I used pipe cleaners, beakers, sunscreen (SPF-30), water, buckets, cling wrap, rubber bands, sharpie marker, magnetic mixer and timer/stopwatch. Every 15 seconds I would mark where the Sea Urchin was last at in the bucket and at the end I would add up all the seconds.	
<b>Results</b> I did several trials to help determine the accurate DATA. There was a significant difference. the sea urchin moved 20% slower in sunscreen pollution than it usually does. Therefor, my hypothesis was partially supported because I hypothesized that the sea urchin was going to move 15% slower and it moved 20% slower.	
<b>Conclusions/Discussion</b> I feel like my project was life changing. Even though these animals are not common but they're living organisms just like us and if we want to help our world than we need to start being responsible and start picking up after ourselves. we need to make sure what were wearing is water proof. If i were to redo this project I would add the distances of the distance marks instead of adding the seconds. For further information I would like to test different concentrations of suncreen and different amounts.	
<b>Summary Statement</b> My project was to see how sunscreen pollution affects the pace of a Sea Urchin.	
<b>Help Received</b> I was provided with my supplies a the Cabrillo Marine Aquarium and I was helped by Andres Carillo and Jenine Rodriguez.	