



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Krista Andreassen; Brooke Janusz	Project Number J2401
Project Title A Horse's Shoulder Height and Angle's Effect on Its Stride Length	
Abstract Objectives/Goals Our project was to find out if a horse's shoulder height and angle had an effect on its stride length. We believe if a horse's shoulder angle and height are bigger, then a horse's stride length will be greater. Methods/Materials 18 horses, all variations of quarter horses (such as a paint, which is a quarter horse with a different coloring) were used. The horses were all brought to an arena and a smooth area was created with a rake, so we could distinguish the hoofprints left by the horses. Each horse was measured for shoulder height, and we took measurements for the shoulder angle. Each horse trotted over the smooth area three times each, and the average stride length from the 3 trials was recorded. Results The horses with the largest shoulder heights on average had the biggest stride length. However, the horses with the biggest stride length also had the smaller angles. Conclusions/Discussion We accept half of our hypothesis and we reject half of our hypothesis. We accept the half of our hypothesis that stated horses with larger shoulder height will have a longer stride length, and we reject the half of our hypothesis that says horses with bigger shoulder angles will have the longer strides. Perhaps this is because since a smaller angle would be more parallel to the ground, it would allow it to move more freely.	
Summary Statement We wanted to test if a horse's stride length is affected by its shoulder height and angle.	
Help Received Neighbors let us borrow horses	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Taylor S. Byler	Project Number J2402
Project Title What Is the Texture Preference of the Coccinellidae?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I am doing an experiment in which texture ladybugs are most attracted to. I am doing this project because I want to know which types of terrain have a texture that ladybugs are attracted to, so they can be attracted to crops as an alternate to using insecticide on plants plagued with aphids, such as alfalfa. The need for an alternative is due to the phytotoxicity of some insecticides, which can cause death, yellowing, or destruction in tissues, growth retardation, stunting, abnormal growth, or defoliation. The reason ladybugs are a good choice is because just one ladybug and eat up to one thousand aphids in its life time, and is not harmful to plants. Another reason for an alternative is for the danger insecticide poses to pollinators. I hypothesize that the ladybugs will be attracted to the smooth, white section because most leaves are smooth.</p> <p>Methods/Materials My control variable was the sandpaper, smooth foam core, and bumpy cardboard. My dependant variable is the ladybugs attraction to the textures. I set the ladybugs in the clear plastic bucket and left them in there for twenty minutes checking at five and ten minute intervals to see which texture had the majority of ladybugs on it. I learned that not many like to walk on sandpaper. The most utilized texture was the bumpy cardboard.</p> <p>Results On average, the ladybugs were attracted to the bumpy texture the most, then smooth texture, and lastly the rough texture.</p> <p>Conclusions/Discussion My hypothesis was wrong. I thought that they would be attracted to the smooth texture, because leaves are closer to smooth than rough, or bumpy. i believe that the beetles were attracted to the bumpy texture because it provided the protection that the other textures did not have.</p>	
Summary Statement my project is how ladybugs may possibly be attracted by some textures so they can be used as an alternative to some insecticides	
Help Received my mom helped me count out 30 ladybugs to put into the bin while doing my experiment and she also gave me very much needed constructive criticism	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Sydney L. Crews	Project Number J2403
Project Title What's in the Gut?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine the best alternate solution (instead of surgery) that would decrease the size of an enterolith to the greatest degree. An enterolith is like a kidney stone, only in a horses gut. When a horse ingests a foreign body, such as a piece of plastic, it starts rolling around in the stomach and eventually rolls into a ball. When leaving the colon, frequently it becomes stuck. When this occurs surgery is needed. Without surgery, nothing can pass through the colon and eventually the horse will die.</p> <p>Methods/Materials The enterolith materials include- 1 piece of plastic 1cm/1cm, hay 1in/1in, grain 1/3 cup, dirt 1/3 cup, and water 3 Tbsp. Other materials- gloves, 9 Tupperware bowls, vinegar, apple cider, oil of pepper, ruler, hammer (crushing up grain), and measuring cups. After making the simulated enteroliths, every 24 hours I poured 1 tablespoon of each substance onto its specific enterolith. I did this for three days each week. The next trial, which was a week later, I used different enteroliths.</p> <p>Results There was no particular winner. The data had no trends. In comparison with the data, each substance decreased the size of the enterolith.</p> <p>Conclusions/Discussion I believed that the best substance or method of decreasing the size of an enterolith was to pour one tablespoon of vinegar on it daily. I believed the vinegar was the most acidic, although my data was inconsistent. For example, in trial three, the first day I poured vinegar on the enterolith it decreased zero centimeters. While on the second and third day it decreased one and half centimeters each day. My hypothesis was neither rejected nor supported.</p> <p>By using the same ingredients, and method, I made each enterolith fairly the same, but in the real world every enterolith is different. I believe the data results occurred as they did because of the difference of each individual enterolith. Without the ability to throw up, I didn't want to over medicate the horse, hence the three day trials. I wanted this project to be as close as possible to the real world. In this economy most people are searching for alternatives to expensive surgery. In conclusion, all three solutions are equally viable alternatives to surgery.</p>	
Summary Statement Can an enterolith be decreased in size by using easily accessible solutions as an alternative to expensive surgery.	
Help Received Dad was a helping hand while making the simulated enterolith; Mom bought the materials	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Laila Y. Dadabhoy	Project Number J2404
Project Title Did You Bite Off More Than You Can Chew?	
Abstract Objectives/Goals Does the sharpness and size of a beak affect how hard a bird can bite or puncture? Methods/Materials First I will gather the different birds I will use. My project is designed to inform first time pet bird owners. I will collect different birds, then I will perform two different tests. In the first test, I will provide different objects for the bird to break. The easiest thing in this group will be the toothpick and the most difficult will be the wooden dowel. I will use the leather glove to hold the bird before securing my grip on their stomachs. After recording my results in the journal and camera I will host the second test. The next experiment will test how many layers the same birds can pierce. The thinnest item in this group will be three layers of cardstock and the thickest will be fifteen layers of cardstock. I then record the facts in my journal and take pictures of the evidence to put in my report and on my board. Results Pierce Break African Grey 15 4 Parrotlet 6 3 Love Bird 6 3.5 Parakeet 4 3 Cockatoo 10 4 Conclusions/Discussion After my experiment and research I have to conclude that my hypothesis was partially correct. Due to prior knowledge on the topic of birds I hypothesized that the largest of all the birds I tested will pierce the most items and crush the most objects. The African Grey Parrot did pierce the most layers of cardstock; however it failed to break the wooden dowel placing it at the same level, strength wise, as the cockatoo. In my research I learned that the structure of a beak is similar for every bird, the only thing that differs is the size and sharpness. Piercing is where the African Grey excelled because of its long curved beak and how sharp it was. The parrotlet most likely had the ability to pierce more of the cardstock, but because its beak was so small it didn't. As for crushing items and breaking them, the birds had a difficult time. It was because none of the birds I chose to test were strong enough to break a wooden dowel. So in that area of my experiment my hypothesis was correct, but not completely. I had said that the largest of birds would crush the most, but both the largest and second largest birds tied in that part of the test. Based on all of that I conclude saying, yes the size and shape of a bird's beak play key roles in the number of objects they	
Summary Statement My project is designed to tell whether the size and shape of a bird's beak affect how hard the bird can bite and pierce.	
Help Received I would like to thank my uncle for letting me use a few birds from his bird farm.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Natalie A. Davis	Project Number J2405
Project Title Moon Phase Effects on Polish Rabbit Litter Size	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Does the lunar cycle affect the litter size in Polish rabbits? This project looks at the relationship between rabbit litter size and the moon's phase at the time the rabbit was bred. Rabbits do not have an estrus cycle, but are induced ovulates, releasing eggs only after they are bred. Therefore, they can be bred at any time of the month. My goal was to determine if the moon's phase at the time of breeding would affect the size of the litter.</p> <p>Methods/Materials Rabbit litter sizes vary depending on the breed, so I narrowed my study to Polish rabbits. A blind study was used to gather information from Polish rabbit breeders throughout the United States and Canada. My letter to the breeders stated that I was conducting a study to find out if weather at the time of breeding affected the litter size. I asked the breeders to submit: date of breeding, number of kits in the litter, zip code (I told them I would use the zip code to look up the weather on that date for that region). Using the information they submitted about breeding dates, I was able to determine what the moon's phase was at the time the does were bred. The results were divided into categories: full moon, new moon, waxing or waning moon. I then used the information about each individual litter to determine the average litter size for each category.</p> <p>Results My research from over 300 individual litters indicated that rabbits bred during a full moon phase had an average of more kits (3.2 kits), than rabbits bred during a new moon or a waxing/waning moon phase (2.8 and 2.7 kits).</p> <p>Conclusions/Discussion I have raised Polish rabbits for 4 years as a part of my 4H breeding project. The results of this study will help me and other rabbit breeders if we want to get the highest number of kits possible in a litter. As a part of my blind study I also asked the breeders for their zip codes. I would like to do further research to see if weather or length of day might also be a contributing factor to litter size.</p>	
Summary Statement This project is the study of the relationship between the moon's phases at the time of breeding, and the sizes of litters in Polish rabbits	
Help Received Mother helped me cut and laminate the project.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Savannah E. Hammond	Project Number J2406
Project Title Horse Sense: Do Horses Respond to Human Emotion?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I spent my summer working with horses and learned anxiety may interfere with the ability of a horse to learn and respond to commands. This made me wonder how long it might take a horse to calm after a surprising event. I read an article that said a researcher found the heart rate of a nervous rider might influence the heart rate of a horse. I wanted to see if a handler's elevated heart rate might also influence the heart rate of the horse being led or ridden.</p> <p>Methods/Materials I performed 150 tests on over 75 horses of varying breeds, ages and genders. I used a Polar Equine Health Check Monitor to measure the heart rate of the horses. In the first experiment, I let a balloon sail off with a soft whooshing sound to raise the heart rate of the horse. The second experiment was to see if a human rider's heart rate impacts a horse. My method for this experiment was to tell the handler that an umbrella would open on the fourth pass of a set course. An umbrella was never opened. I also performed a control experiment, testing 25 horses. I tested rider/handlers and horses in the same manner without any mention of an umbrella.</p> <p>Results In the first experiment, when the horses were surprised, the majority of the horses tested took at least 20 minutes to return to their resting heart rates. In the second experiment, I found that a difference of 5 beats per minute was the greatest change in the control group, but when handlers were told an umbrella would open, 4 out of 5 horses had significantly increased heart rates. In fact, on average, the horses' heart rates increased 17 beats per minute and human heart rates increased 19 beats per minute.</p> <p>Conclusions/Discussion From the results of the first experiment, 28 of 50 horses took 20 minutes or longer to calm, which is much longer than most handlers would expect. In the second experiment, an astounding 80% of the horses' heart rates increased significantly when the heart rate of the rider/handler increased. This may be invaluable information for riders and trainers to know to help understand their horses. More tests should be performed to confirm the findings.</p>	
Summary Statement The purpose of this project was to see how long it took a horse to calm after a surprising event and to see if rider/handler heart rates could impact horse heart rate.	
Help Received My science teacher is amazing and generous with her support. Thank you to my parents and grandparents for driving me to complete 7 months of testing. Thank you to Judy Duncan for sharing her knowledge. Thank you to Dr. Walker and Dr. Subauste for their advice.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Yosira I. Hernandez	Project Number J2407
Project Title Eriogonum caespitosum Density as a Model Predictor for Lycaena Species Population Models in the White Mountains	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This math project is a continuation of a previous project to determine the use of a model as a predictor in field studies. In phase II of my study I looked at the correlation of the flowering population of one plant species to the population of one family of butterflies. This small study worked well, and was expanded into a larger study, phase III, at multiple sites and multiple species of butterflies within the same family, based upon 5 years of data. As data becomes available after the field counts held on July 4 of this year, I will examine the validity of my predications and apply to algorithms being constructed for multiple sites and multiple species.</p> <p>Methods/Materials Utilizing real field data from the White Mountain Research Station in Bishop, California, I correlated 5 years of data from one of several study sites. I used population data for flowering matted buckwheat <i>Eriogonum caespitosum</i> against the population density for the Copper and Blue Butterfly family <i>Lycaenidae</i>. Data was tabled and graphed for each respective year available, 2005 through 2009. I set a 95% confidence level with a t-Test to establish a predictability parameter. Phase III of the project will look at multiple species at multiple study sites. Predictions for 2010 will be made.</p> <p>Results I found that the Copper and Blue Butterfly <i>Lycaenidae</i> populations did correlate to the population of flowering buckwheat, <i>Eriogonum caespitosum</i>, within a 95% confidence level over a five year period at multiple study sites, regardless of severe population swings from year to year. The relationship appears virtually linear for these species. I am now preparing a phase III study examining multiple sites and multiple species to determine if the same mathematical correlation can be used as a predictor for other butterfly families and dominant plants.</p> <p>Conclusions/Discussion There appeared to be a direct correlation between the density of flowering buckwheat <i>Eriogonum caespitosum</i> and the family of Copper and Blue butterflies <i>Lycaenidae</i>. This was indicated regardless of low or high swings in population density for any given year, within a 95% confidence level in the model. I am now preparing a phase III study examining multiple sites and multiple species to determine if the same mathematical correlation can be used as a predictor for other butterfly families. A simple algorithm should be used for future predictions.</p>	
Summary Statement This applied mathematics project examines the correlations between wild buckwheat populations and butterfly populations as a yearly model predictor.	
Help Received Dr. Morse helped obtain data for me.	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Katherine A. Houk	Project Number J2408
Project Title Correlation of Owl Limpet Size to Population Density and Intertidal Disribution	
Objectives/Goals I have always been fascinated by tide pools and aquatic environments. I recently heard about a threatened species of limpet, the owl limpet, that inhabits our coastline. I learned that owl limpets can be territorial. Females are known to drive out any neighbors too close to them in order to grow a "farm" or area of algae. I believed the owl limpet population would be more dispersed for the older and larger female owl limpets. I was also curious to know if the females were randomly distributed in regions along with smaller male owl limpets. I hypothesized that female owl limpets might need to be in deeper tidal zones in order to grow algae more abundantly and also to acquire enough food, since owl limpets cannot graze unless they are fully submerged.	
Abstract Methods/Materials For my project, I used eight 100 cm square quadrats which I laid down in vertical transects with each quadrat was 5 meters apart. I recorded the temperature of the ocean water, the air, and the sand. I documented all of the owl limpets and other organisms and took photographs of each quadrat. I measured the owl limpets in mm and took detailed notes of the surroundings within the quadrat and grid boxes. I repeated my procedures on three different days. I documented 24 quadrats in three transects and found ninety-eight owl limpets of varied size and age.	
Results The 98 owl limpets were mainly dwelling in the high-tide and mid-tide intertidal zone. I found that the majority of the owl limpets were smaller males in an early stage of life. The median and mode for limpet length was 9mm. The mean or average size was 10.1 mm. The range in size was from 5mm-52mm. I found that owl limpets with a shell length greater than 30 mm, were dwelling in the three deepest of the quadrats. These quadrats were quadrat 6,7 and 8.	
Conclusions/Discussion I found that some large owl limpets had an area they claimed as their own. I did find a few female owl limpets living within the same grid square as other inhabitants like black turban snails or common limpets. This may have meant that an owl limpet was in the process of removing its close neighbors. According to my results, the larger the limpet, the deeper the intertidal region in which it resided. I also found, the larger the limpet, the more dispersed the population became. I would recommend more tests to confirm the findings.	
Summary Statement I wanted to discover if female owl limpets are concentrated in a specific intertidal region and if the population is more dispersed as the size of the limpets get larger.	
Help Received thankyou to my father for driving me to the tide pools. I would also like to thank my science teacher for helping me with my research.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Gabriel S. Hulbert	Project Number J2409
Project Title Dialoguing with Dolphins	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to figure out if dolphins become more social when the crowd size around them increases.</p> <p>Methods/Materials Dolphins at Sea World San Diego were identified by their distinct markings and names. Trainers helped to learn some certain marks on each dolphin. Then the dolphins were observed around large crowds and around small crowds in order to look for social behaviors such as clicking, splashing, and whistling. Every thirty seconds the behaviors of a dolphin were tallied on an ethogram created for the project. The ethogram included a crowd estimation on a ranking system of ten with ten being a very large crowd and one being a very small crowd. The ethogram also included a slot for dolphin interaction and human interaction as well as a ranking system of how social the dolphin was over that time interval based on a scale of ten.</p> <p>Results Observations and tallies indicated that as the crowd size at the Rocky Point Preserve at Sea World increased, the number of unsocial behaviors, such as swimming around the pool, decreased while the number of social behaviors, such as clicking, whistling and splashing, increased. It was observed that certain dolphins had particular social behaviors, and it was determined that certain dolphins had more social behaviors as the crowd size increased. The correlation of dolphin behaviors and crowd size was sorted with a computer program called MATLAB.</p> <p>Conclusions/Discussion The observations as well as the raw data and data correlation between social behaviors and crowd size sorted by MATLAB demonstrated that the dolphins' social behaviors such as clicking increased as crowd size increased, and anti social behaviors, such as swimming around the tank, decreased as crowd size increased.</p>	
Summary Statement This project was done to determine if dolphins exhibit more social behaviors as crowd size increases.	
Help Received Mrs. Carolyn Melka at SPAWARSYSCEN for introducing me to dolphin behaviors; Sea World trainers for help in identifying dolphins; Mrs. Schumacher for help refining results and improving the paper; Ms. Gillum for suggesting the topic; my parents and sister and brother for their help and support	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Rachel L. Jolly	Project Number J2410
Project Title Picky Hummingbirds? Analyzing the Effects of Colored Nectar on Hummingbird Eating Habits	
Abstract Objectives/Goals The objective is to determine whether or not colored hummingbird nectar is preferred by hummingbirds, and if so, which color would be preferred. Methods/Materials Before I started my experiment I purchased four hummingbird feeders with identical size and shape, that will be filled with various colors of hummingbird nectar. The first feeder was filled with clear nectar, and was used at the control for my experiment. The remaining feeders had food coloring added to the nectar. One was filled with blue nectar, the next with green, and finally with yellow. Five drops of food coloring were used to color the nectar in each of the feeders. Results The yellow feeder had the highest total amount of nectar lost, but it was not consistently the highest amount of nectar lost weekly. The clear feeder had the lowest total amount of nectar lost, and the lowest average amount of nectar lost. Conclusions/Discussion My conclusion states that colored hummingbird nectar, especially bright colored nectar, is most preferred by hummingbirds.	
Summary Statement My project determines if colored nectar is preferred by hummingbirds, and if it is, which color is preferred.	
Help Received Mom helped me with my display; Dad helped hang the feeders; My school provided a triple-beam balance scale; Teachers helped me with editing.	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Gwendolyn S. Jones	Project Number J2411
Project Title Musca domestica: Carnivore or Sweet Tooth?	
Abstract Objectives/Goals My project is on the species <i>Musca domestica</i> , (more commonly known as the housefly), and I am testing to see which product will attract the most houseflies: meat, sugar water, or plain water. My hypothesis was that the houseflies would be attracted to the meat more than the plain water or sugar water. Methods/Materials Approximately 100 <i>Musca domestica</i> (housefly) pupae were placed in a large clear plastic container. This was connected via tubes to three other plastic containers. The containers had either hamburger meat, sugar water solution, or plain water in them. At regular intervals the number of flies in each container was counted. Results My hypothesis was that the houseflies would be attracted to the meat more than the plain water or sugar water. My result was meat: 49%, plain water: 8%, and sugar water; 43%. Conclusions/Discussion I proved my hypothesis because more houseflies visited the meat container than the sugar water or plain water containers. If houseflies only entered containers at random, I would expect them to go in evenly (33 percent), but this did not happen. If only boy houseflies liked sugar water, and only girl houseflies liked meat, I would expect that they would go into the containers equally, but more houseflies went into the meat container.	
Summary Statement My project is on the species <i>Musca domestica</i> (the housefly), and I am testing to see which product will attract the most houseflies: meat, sugar water, or plain water.	
Help Received My parents - purchasing supplies; My dad - cutting the plastic and helping with Excel; My mom - helping with the stove (making sugar syrup); My brother - helping me catch escaping houseflies; Mrs. Fricke, my science teacher - answering my project questions and for project guidance.	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Alice S. Lau	Project Number J2412
Project Title How Sweet It Is: Ants and Sugar Experiment	
Objectives/Goals The project, How Sweet It Is: Ants and Sugar Experiment, is a scientific experiment that determines if ants, in their natural habitat, can tell the difference between real and artificial sugars when different types of sugars are presented to them at the same time, place and condition. This project was designed to test my hypothesis that ants can tell the difference between real sugars and artificial sugars and that the ants will consume the natural sugars before going to artificial sugars. Seven different types of sugars were placed on different plates and observations were performed over a fourteen-day period to observe what ants prefer. Two natural sugars, Pure Cane Sugar and Brown Sugar were used. Five artificial sugars were used, Dextrose (Glucose), Equal (Aspartame), NutraSweet (Neotame), Splenda (Sucralose) and Sweet N Low (Saccharin). Water was used as the control. The experimental data obtained proved my hypothesis to be correct. Most ants preferred the Pure Cane Sugar and a small amount going to the Brown Sugar. After the depletion of the Pure Cane Sugar, the ants started to go to the Brown Sugar and small amounts of ants going to Dextrose. No ants went to the other artificial sugars.	
Abstract	
Summary Statement This project is about whether ants prefer natural sugars or artificial sugars in their natural habitat.	
Help Received Parents bought materials; Science teacher (Ms. Guy) gave me encouragement.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Hannah C. Lee	Project Number J2413
Project Title Tasty or Deadly	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my experiment to determine if different amounts of Monosodium Glutamate to effects the heart rate of daphnia. My hypothesis is that the daphnia's heart rate will increase as the Monosodium Glutamate increases because MSG causes the taurine, what helps regulates the heart rate, to not function properly.</p> <p>Methods/Materials To begin the experiment, I placed one of the daphnia under the microscope and counted its heart rate for twenty seconds. After recording my data I placed two drops of a solution containing five grams of Monosodium Glutamate and 300 mL of bottled water with a pipette, and let that set for thirty seconds. Then I counted the heartbeats of the same daphnia after the thirty seconds for twenty more seconds. After writing down the data, I tested fifteen more daphnia the same way. Then I took fifteen more daphnia and tested them the same way but with a solution containing ten grams of Monosodium Glutamate and 300 mL water. Following that I tested fifteen more daphnia in that way but with a solution of fifteen grams of Monosodium Glutamate and 300 mL water.</p> <p>Results In the end, the average difference of heart rates before and after the solution with five grams of Monosodium Glutamate was -19.8 beats per minute. For the solution containing ten grams of Monosodium Glutamate the daphnia's heart rate got faster by 25 heart beats per minute. And finally for the solution containing fifteen grams of Monosodium Glutamate the heart rate got faster by 132 heartbeats per minute.</p> <p>Conclusions/Discussion My hypothesis stated that the daphnia's heart rate would increase with the more Monosodium Glutamate that was added was supported in this experiment. Slowly as the Monosodium Glutamate was increased the daphnia's heart rate started beating faster and faster, which concludes that there might be some serious side effects to having Monosodium Glutamate in commonly eaten foods.</p>	
Summary Statement The objective of my experiment to determine if different amounts of Monosodium Glutamate to effects the heart rate of daphnia.	
Help Received Science teacher helped with grading papers, staying after school while I'm doing the project, ordering daphnia, Mother bought supplies for board, Language Arts teacher graded research report	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Arielle Meininger; James Welsh	Project Number J2414
Project Title Snap, Crackle, Rockfish	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our project is about fish recompression and the corneal crackling, exophthalmia and ventilation rate that occurs in rockfish species after they are decompressed. Fish recompression is when we recompress a rockfish in a compression chamber after it has been brought up from 180 or more feet. Our question is: How do rockfish recover from barotraumas when they are compressed? We went fishing for Rosie, Vermillion and Green Stripe rockfish. We are trying to find how long the crackling lasts and how much psi it takes for the exophthalmia to go away. We also looked at how much the fish ventilates per minute when it is in the chamber.</p> <p>Methods/Materials We rated the severity of both from one to ten. We also filmed the fish when he was in the chamber.</p> <p>Results We found that it took up to four and a half hours for the crackling to go away. It also took up to 70 psi or 150 simulated ft. for the exophthalmia to go away.</p>	
Summary Statement Our project is about how rockfish recover from barotraumas when they are brought up from deep depths.	
Help Received Father helped with gathering reaserch	



**CALIFORNIA STATE SCIENCE FAIR
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Name(s) Bailee S. Nelson	Project Number J2415
Project Title Bug Appetite	
Abstract Objectives/Goals In my project I am going to be putting a hog head in with Dermestid Beetles and another hog head in a container to decay naturally. I believe if the beetles are kept in the correct conditions then the hog head in with the beetles will be consumed before the hog head decaying naturally. I believe this because the Dermestid Beetles are able to consume a small animal head in less than 24 hours.	
Methods/Materials Materials 1. Colony of Dermestid Beetles 2. Two stripped hog heads 3. One spray bottle filled with water 4. Two large ventilated containers with lids 5. One large piece of Styrofoam 6. Heat lamp and reptile heating pad 7. Thermometer to make sure temperature is in the 60-70 degree mark. 8. Bedding such as shavings Methods 1. Order the beetles (order at least 4 weeks in advance) 2. Collect two hog heads, then cut away eyes, hair, tongue, brains and major fatty meat. 3. After the head are prepared, place one with the colony of beetles and the other in the second ventilated box. 4. Every two days spray a light mist of water over the beetles (put your hand and spray bottle in the container to accurately water the beetles). 5. Every day document the progress of both heads by taking notes and also taking pictures. 6. At the end of the two weeks document final results and when first head finished.	
Results After only 7 days the beetles had completely consumed the hog head leaving behind only the bone was left. On the other side with the natural head, nothing happened except the head dried out and was infested with maggots. This project was one of my favorite projects, out of many that I have done, because it was the most informational and it involved the outdoors, which is one of my favorite places. It shows me that even if something is small it doesn't mean that it isn't powerful.	
Conclusions/Discussion After finishing my results, I found that my hypothesis was correct. The beetles finished the head 7 days earlier than the natural decaying head. I gave the second head another week after the beetle head was finished hoping the decaying head would finish. It found out that natural head takes a really long time. I learned that my research helped me greatly in taking care of the beetles and keeping the beetles in the right conditions.	
Summary Statement My project is about how fast a colony of Dermestid beetles can consume a hog head before another hog head can decay naturally.	
Help Received Friend help clean the hog heads.	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Alexandra R. Nordyke	Project Number J2416
Project Title The Effect of Music Tempo on Spider Webs	
Abstract Objectives/Goals This study examined whether or not the tempo of music would affect spiders and the way that they would spin webs. Methods/Materials Four spiders were placed into two terrariums for 24 hours and allowed to spin webs while prerecorded music was played at varying tempos. Including the baseline measurement without music, the experiment was repeated 7 times using tempos of 40, 80, 160, and 240 beats per minute. Results The average baseline was 93 degrees while the average angles with the music playing varied from 93-117 degrees. The variations in the angles were very high, which might have made it hard to determine if there is a relationship between the angles of the webs and the tempos. Conclusions/Discussion Based on photographs of each web (4 webs in each repetition) a random selection of angles were measured for each web. The results suggested that the spiders were more affected by music at 80 beats per minute. However, the overall results showed that there was very little significant impact to the webs.	
Summary Statement This experiment was to see how spiders were affected by different speeds of tempo.	
Help Received Father helped to collect spiders.	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Matthew P. Perez	Project Number J2417
Project Title How Does Electromagnetic Radiation Affect A Colony of Harvester Ants?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Hypothesis Based on my research and experiment "How Does Electromagnetic Radiation (EMR) Affect a Colony of Harvester Ants?" I theorize that the exposure to low level EMR will have detrimental effects on the two ant farms that are exposed to them.</p> <p>Methods/Materials Procedures: I will set up three individual ant farms with around sixty harvester ants each. There will be a Control Group, which will receive no EMRs, a TV Group that will be exposed to EMRs from a TV for eight hours a day, and a Phone Group that will receive EMRs from a wireless phone and basestation 24/7. I will monitor the ants for three weeks. On the last day of the experiment I will take the ant farms apart and count the dead. Lastly I will compare the data that I collect between each of the three ant farms.</p> <p>Results Results: About the same amount of ants died in all of the three ant farms. I found out that the EMR#s could have evoked the ants to become cannibalistic because there were very few body parts found in the TV and Phone Group. The EMR#s emitted from the TV and wireless phone did seem to negatively affect the ants. The wireless phone seemed to evoke confusion in the Phone Group and they tried to stay away from them. The TV Group seemed to initially thrive on the EMR#s but as the experiment continued they lacked energy. The Control Group seemed natural, and worked well together during the entire experiment.</p> <p>Conclusions/Discussion Conclusion: The EMR#s did seem to have negative affects on the ants in my experiment. With our growing exposure to manmade EMR#s in our society today, we might want to take a closer look at these negative effects and decide if we should limit our exposure to them.</p>	
Summary Statement How does electromagnetic radiation affect a colony of harvester?	
Help Received Mother helped type information; Friend helped with Excel document; Parents helped with display boards; Mom helped take photos of art farms..	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Allison J. Piper	Project Number J2418
Project Title Roses Are Red, Violets Are Blue: Hummingbirds and Flower Preference	
Abstract Objectives/Goals My project was to determine how the color of flower affects how much sugar water has been consumed by hummingbirds. Methods/Materials 1.Red, Pink, and Yellow Surveyor's tape 2.Dowel (thin wood cylinder) 3.Centrifuge tubes 4.Sugar 5.Water Results In the first experiment, the red flowers had more sugar water consumed than the yellow flowers. In the second experiment, the red flowers did the same as the pink flowers. The results from the pink flowers suggested part of my hypothesis was incorrect. The surprising part of the results came from comparing the two graphs, red vs. yellow flowers (experiment 1) and red vs. pink flowers (experiment 2). When both graphs had the same scale, I realized the yellow flower had more consumed than the pink flower or red flower in the competition between the pink and the red flowers. So, the yellow flower was not completely avoided, but just not popular versus the red. Conclusions/Discussion I predicted that the red flowers would do better than the yellow flowers, and that part of my hypothesis was correct, according to this experiment. The red flowers tied with the pink flowers which suggests my hypothesis was incorrect. The pink flower brought the red flowers down on the popularity scale. I don't know why the hummingbirds liked the yellow vs. red competition better than red vs. pink. In future research, I will surely study how hummingbirds react to pink flowers.	
Summary Statement My project is about which colors of flowers hummingbirds pick to feed from because of coevolution.	
Help Received Dad introduced me to the idea of this project; Mom encouraged me; Mr. Nelson taught me what made up a good report.	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Gwendolyn M.C. Ramirez	Project Number J2419
Project Title Do Rose Additives in Water Make Drinking More Appealing to Your Dog?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals *Statement of Purpose* My dog only drinks outside water when I put rose petals in it. This makes me wonder if dogs will be better hydrated if the water is more attractive to them. If dogs are better hydrated they will be healthier, they will heal faster after injury, and most likely live longer lives. *Investigative Question* Do rose additives in water make drinking more appealing to your dog? *Hypothesis* Dogs prefer regular water with rose petals floating in it.</p> <p>Methods/Materials *Materials* 4 medium sized dog bowls, labeled: water, water with petals, rose, rose with petals; 3, 2.5 gal water containers filled with regular hose water; 2 dozen organic roses; Measuring cups; 50 field data forms; A dog park nearby; A poster advertising the experiment; A small sign telling dog owners what to do; A table; Pens. *Method* Make field data forms; 24 hours in advance of testing, put rose petals from 8 roses into one of the 2.5 gal water containers; Gather supplies; Drive to dog park and set up experiment; Put 1 cup of water into two of the bowls; Put ½ cup of water and ½ cup of rose soaked water into the other two bowls; Put 3 rose petals into the bowls labeled water with petals and rose with petals; Set out bowls in exact order (every time) and wait for volunteers; When people volunteer, ask them what their dog is named, how old it is, if it is a male or female, and what breed; Observe what bowls the dog drinks out of or sniffs; Record information on field data form; Repeat until out of water.</p> <p>Results Water- over 1/2 of the dogs drank the plain water instead of ignoring it or sniffing it; Water w/ petals- almost 1/2 of the dogs sniffed the water w/petals but did not drink it; Rose water- almost 3/4 of the dogs did not drink the rose water at all; Rose water w/ petals- the results for the rose water w/petals were very similar to the results of the rose water; The regular water was the most preferred among the dogs tested.</p> <p>Conclusions/Discussion I set out to test which of the four water types (regular, regular w/petals, rose, and rose w/ petals) was the most preferred among dogs. My hypothesis was that the regular water w/ rose petals would be the most popular, but the data showed that the regular water was. The order of preference was: regular water, regular water with rose petals, rose water, and then the rose water with rose petals.</p>	
Summary Statement I studied whether rose additives in water make drinking more appealing to dogs.	
Help Received My parents: Chrissy Cain-Ramirez and Tony Ramirez (materials, supervision, transportation); Schmidt V.M.D., Joana (e-mail advice and confirmation of safety of project); Hauser V.M.D., Wendy (e-mail advice and confirmation of safety of project) ; Clara Chilton (helped taking notes)	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Brett W. Richey	Project Number J2420
Project Title Red Clawed Crabs: Can They Learn to Consistently Decrease Times in a Maze?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To effectively determine whether Red-Clawed Crabs have the brain capability to learn and retain information. Also, I would like to find out whether their times will decrease significantly each day, or have a lower margin of decrease as time passes.</p> <p>Methods/Materials Using common household objects, I created a simple maze in which to test the three crabs. I used tuna and salt along the maze to keep the crabs motivated. Next, I filled the maze with 8 rocks and 3 hurdles to serve as obstacles. Each afternoon, I had each crab complete the maze, and I took detailed notes on their times and behaviors in my notebook. When the 5 day period ended, I used the crabs times and behaviors to create detailed conclusions and colorful graphs. The results of the experiment were astonishing and amazing!</p> <p>Results Not only had the crabs gotten faster with time, they had gotten faster with each and every consecutive day. I plotted the crabs' times on a line graph, so I could visually see the steady decrease in time. I was then able to draw conclusions in my experiment. I figured out that the crab times had decreased by minutes each day at first, but after the first few days they had reached their personal best running speed, and could only improve their times by knowing what lay ahead in the maze. Over all, each crab decreased their times by minutes, which proves that crabs do have the brain capability to learn and apply information.</p> <p>Conclusions/Discussion My hypothesis was proven correct: Red Clawed Crabs can learn and remember from day to day and apply this knowledge to consistently improve their times in a maze. This proves that Red Clawed crabs could be tested and used for lab experiments, in the place of small rodents. Also, this experiment proves that small invertebrates have a complex brain, complete with learning and memory ability. Knowing the capabilities of small invertebrates can help scientists find new animals to test and study.</p>	
Summary Statement I tested Red Clawed Crabs in a simple maze each day to determine if they had the brain ability to learn and apply knowledge to steadily decrease their maze times.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Jessica I. Rutten	Project Number J2421
Project Title Picky Pollinators: A Study of the Effect of Flower Variants on a Plant's Ability to Attract Butterflies	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I recorded butterfly behavior when butterflies were exposed to variants of flowers. I wanted to find what causes butterflies to prefer one breed of flower over another.</p> <p>Methods/Materials I used 90 flowers, and 24 painted lady butterflies all together in my experiment. I placed 4 butterflies at a time, for 30 min. in a terrarium with 3 flowers of each variant in the category of color, petal size, and stem height. I recorded the number of landings and feedings on the flower.</p> <p>Results Color variants: yellow flowers had an avg. of 4.3 landings, white flowers had a avg. of 4, red had 3 and blue had 1.6. Height variants: 4cm flowers had 5.3 avg. 2cm had 4.3, 6cm had 4 and 8cm flowers with no visible petals had 3.3 landings on avg.</p> <p>Conclusions/Discussion Both the blossom color and plant height made significant differences in the flowers ability to attract butterflies. Yellow flowers and flowers with short to medium size stems had the most amount of landings</p>	
Summary Statement Do variants of flower characteristics affect the plants ability to attract pollinators.	
Help Received none	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Sydney R. Shaw	Project Number J2422
Project Title How Does Hydra littoralis Regenerate?	
Abstract Objectives/Goals The objective was to pinpoint the gene for hydra regeneration by dissecting Hydra littoralis in four different orientations, then observing regrowth. It was hypothesized that a certain part of the hydra would show more rapid growth than the others, indicating that it housed this gene. The locating of this gene has potential for application to human limb or organ regeneration. Methods/Materials Hydrae were dissected horizontally in four different orientations; in half, in thirds, with base removed, and with head removed. Trials were repeated three times. Hydrae were kept separately in petri dishes and fed brine shrimp, cultivated separately. Hydrae were observed daily under a microscope for 15 days to monitor progress of regeneration. Results All hydrae were able to regrow at the end of the 15 day period, the bases taking an average of three days longer than the heads. In the hydrae cut into thirds, the center pieces grew at about the same rate as the bases. Size proved to be a factor; larger pieces were able to regrow more quickly. These results would indicate that the gene is spread throughout the hydra, though it is perhaps more abundant in the heads. Conclusions/Discussion It makes sense that size should influence regrowth; the process of morphallaxis, which hydrae use, does not involve the regrowth of new cells, but instead relies on existing cells to take the place of those which were lost. As for the specific gene which controls morphallaxis, it is likely distributed evenly throughout the hydra. The identity of this exact gene is unknown; it may be Msx, or cnox-2. If this gene is identified, it could be applied to humans and used to regrow organs and cure many diseases.	
Summary Statement The purpose is to locate the gene for hydra regeneration in order for potential human application.	
Help Received LAUSD science center provided microscope, pipettors dissection tools; Carolina Biological provided hydra and shrimp; father supervised dissection; mother helped type	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Walker E. Spence	Project Number J2423
Project Title On the Snail Trail: Effects of Moisture and Temperature on the Movement of Snails	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My experiment was designed to discover whether or not moisture and temperature affect snail movement. My hypothesis was that snails would move farther on warm, damp nights because snails are cold blooded and therefore have low metabolism on cold nights, and because they use slime to lubricate the path in front of them and therefore a moist surface would lessen the amount of slime needed to move.</p> <p>Methods/Materials During the day, I marked many snails (that had taken refuge in three different buckets) with different colors of paint corresponding to their specific bucket. Three hours after sunset, I returned to the backyard with a flashlight and marked the position of the snails using color-coded Popsicle sticks. I also noted the temperature and moisture conditions. On the following day, I measured the distance the snails traversed as marked by the Popsicle sticks. I re-marked the snails every day, and repeated this process for 18 nights until I had data points for most temperature/moisture combinations.</p> <p>Results My results show that snails move farther on warm and damp nights. On cold nights (<5 degrees C), snails moved an average of 0.7 inches when it was dry. On medium temperature nights (5-10 degrees C), they moved an average of 7.4 inches when it was dry and 33.2 inches when it was damp or rainy. Finally, on warm nights (>10 degrees C) they moved an average of 20.5 inches when it was dry and 29.5 inches when it was damp or rainy.</p> <p>Conclusions/Discussion The results of this experiment support my hypothesis. The observation that snails move farther on warm nights is consistent with the fact that on cold nights they have low metabolism, and they only feed in temperatures from 5-25 degrees C. On damp nights snails move farther, which is likely because the moisture lessens the amount of slime they need to move forward. Generally, moisture had the greatest affect on snails when the temperature was 5-10 degrees C.</p>	
Summary Statement My project examines the movement of snails under different moisture and temperature conditions.	
Help Received Dad helped me collect data; Mom helped edit report; Mr. Steely offered advice and encouragement.	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Hannah N. Sussex	Project Number J2424
Project Title The Buzz about Bees: Are Bees Most Attracted to the Fragrance, Taste, or Color of a Flower?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project was to first determine the bees' most preferred taste, color, and fragrance. Finally with these results, it will be determined whether they are most attracted to the fragrance, taste, or color of a flower.</p> <p>Methods/Materials For this experiment, testing was performed in a habitat that was constructed, containing twenty-one bees. Eight different flowers and colors were used for testing. Next, a test will be conducted to see which of the eight fragrances attracts the greatest amount of bees. This is done by smearing the juices of each flower that has been pulverized individually onto a piece of poster board. Next, a similar test is conducted to see which of the eight tastes attracts the greatest amount of bees, which is done by smearing particles of each flower that has individually been pulverized onto a piece of poster board. The poster board is then placed under a heat lamp for four hours, causing the fragrance to dissipate, still leaving taste. Another test is conducted to see which of the eight colors the bees are most attracted to. This is done by putting eight different colors onto a piece of poster board. Finally, a test is conducted using the bees most preferred taste, fragrance, and color. These results will show whether bees are most attracted to the taste, fragrance, or color of a flower.</p> <p>Results This experiment showed that the bees were most attracted to the fragrance of Queen Anne's Lace, the taste of Leptospermum, and the color pink. When these three most preferred characteristics were tested together, the bees were most attracted to the fragrance. The second most preferred characteristic was the taste of the flower. Lastly, the least amount of bees was attracted to the color of a flower.</p> <p>Conclusions/Discussion The greatest amount of bees were attracted to the fragrance of a flower. Therefore, one could conclude that bees are most attracted to the fragrance of a flower.</p>	
Summary Statement This project was to determine what bees are most attracted to, whether it was the fragrance, taste, or color of a flower.	
Help Received Much help was received during this project. My parents helped me with the experiment and some of the writing. My science teacher, Dr. Dunn, gave me advice for my project and helped me with some of the writing as well. My English teacher, Mrs. Mitchell, helped me with the formatting of some of my writing,	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Catherine K.K. Takata	Project Number J2425
Project Title The Effect of Various Surfaces on the Behavior of Managed Bees	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I predict that more honey bees will land on the yellow disc compared to any other test surface, per ten minute exposure time. Pollination of food crops by "portable" bee colonies managed by beekeepers is what farmers rely on for best crop production. Man-made additions to their habitat such as water tanks, irrigation pipes, and vehicles, now also include solar panel frameworks! Do different surfaces contribute stress to bees?</p> <p>Methods/Materials Pencils, notebook, tape, string, stopwatch, thermometer: Digital Springfield Precise Temp., digital camera - Kodak EasyShare V530, four cardboard discs - diameter 0.914 m, aluminum foil, yellow paper, red paper, solar panel - 0.787 x 0.66 m anti-glare triple layered tempered glass, www.ElectriCare.com, managed bee colony, 84 hives, Fallbrook, CA, protective clothing.</p> <p>Results 34.80 landings occurred on the polished aluminum disc, or, 295% more landings than on the brown control. Bees exhibited agitated buzzing noises and fell out of the sky possibly due to being blinded. Fewest bee landings occurred on the solar panel surface, 2.40 landings, probably because of the triple layered anti-glare surface. Compared to the brown control, the solar panel had 80% fewer landings, a surface the bees ignored. The yellow and brown control averaged the same number of landings, 11.80, so the yellow surface had a 0% percent change compared to the brown control. Bees were attracted to both these surfaces without agitated buzzing or confusion. The red paper disc averaged 7.60 landings also without agitation or confusion. Red had 36% fewer landings than the brown control. Bees are red-blind and few landings were recorded. Bees landed, or really "collapsed" the most on the polished aluminum.</p> <p>Conclusions/Discussion The greatest average of bee landings, 34.80, occurred on the polished aluminum surface. My hypothesis was incorrect. I hypothesized that the bees would land most on the yellow paper disc since UV, violet, blue are known bee attractants, and yellow is next in the spectrum. Rapid light movements disturb bees and the polished aluminum made the bees buzz loudly and have a seizure like attack. Polished aluminum also had bee deaths as opposed to the other four surfaces without deaths or agitated behavior. All other surfaces had significantly fewer landings compared to polished aluminum.</p>	
Summary Statement Managed honey bees were exposed to surfaces, yellow, red, brown (ground) control, polished aluminum, and a solar panel, in an attempt to identify stresses in their habitat affecting behavior; polished aluminum was a significant stressor.	
Help Received Mother counted bee landings; Aunt let me use her managed bee colonies; Eddie Haro loaned his solar panel; Dr. Eric Mussen contributed advice; Dad cared for my bee sting.	



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Kasi P. Zoldoske	Project Number J2426
Project Title Does Calcium Strengthen Eggshells?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine if feeding hens calcium in the form of oyster shell, which is 37.62% calcium, would strengthen their eggshells. Oyster shell can be purchased at most feed stores as a feed supplement for chickens.</p> <p>Methods/Materials The procedure that I used for testing eggshell strength started with nine hens and the eggs they laid. These hens were already being fed a commercial layer mix from the feed store. Layer mix has 3 to 4% calcium already in it. Then I had an egg crusher made. The crusher consisted of a square board with a rod in each corner. The lid was another square board with holes drilled in the corners for the rods which allow the top to slide up or down. I placed one egg at a time in the crusher and slowly added weight using water until the eggshell broke. I then measured how much weight was used to break the eggshell. I repeated this process after adding oyster shell along with the hens' diet of layer mix for 30 days. I then crushed those eggs and graphed the weight where each eggshell failed. I then compared the difference between the eggshell failure before and after adding the calcium.</p> <p>Results The results of my investigation showed that the addition of calcium in the form of oyster shell does increase the shell strength of the hens' eggs. The strength of the eggshells ranged from 0.45 kg up to 4.54 kg of additional weight required to break the eggs.</p> <p>Conclusions/Discussion After completing my science project, I learned that it is very important to add calcium supplements to my hens' diet. In conclusion, even if you feed your chickens a commercial layer mix you should still offer them oyster shell if you want stronger eggshells. It is even more important to give chickens oyster shell if you only feed them scratch because scratch contains no other source of calcium.</p>	
Summary Statement This project was done to see if the addition of calcium to a hen's diet improves the strength of her eggshell.	
Help Received My dad built the egg crusher for me; my sister showed me how to make graphs and how to convert pounds into kilograms; my mom helped type and edit my reports.	



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Avery L. Van Houten	Project Number J2499
Project Title Preserving Coastal Marsh Habitat for the Belding's Savannah Sparrow	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The Belding's Savannah Sparrow (<i>Passerculus sandwichensis beldingi</i>) is an endemic and endangered species that lives year round in the salt marshes of Southern California and northern Baja California. This bird requires continuous stretches of Pickleweed, Salt Grass and Shoregrass habitat for its survival. The goal of my project was to test which watering schedule would best promote the growth of Salt Grass and Shoregrass. Another goal was to document the Belding's Savannah Sparrow's presence and to record other bird species observed at the lagoon.</p> <p>Methods/Materials I planted 90 Salt Grass and Shoregrass plants in a 2:1 ratio in three plots at the San Elijo Lagoon. One plot was to be watered weekly, one biweekly, and the third plot was the control. I recorded over 500 measurements including plant heights, air and soil temperature, wind speed, relative humidity, soil pH, soil moisture and the tide levels.</p> <p>Results The experiment was performed over 5 months. The first 6 weeks, the Shoregrass and Salt grass were watered weekly due to drought conditions and because animals uprooted the plants. I installed chicken wire. Rainfall came. Invasive weeds crowded out my native species. I documented plants heights and observed the Belding's Savannah Sparrows which were always near my plots. I recorded their numbers and noted their behaviors. I also observed more than 50 other bird species, including the Green-Winged Teal, the Blue-Winged Teal, the Northern Pintail, the Sora, the Bank Swallow, the Peregrine Falcon, and the Black-bellied Plover.</p> <p>Conclusions/Discussion Due to rainfall, I was unable to conclude which watering schedules might support replanting efforts. I did make other discoveries. I found that newly planted Salt Grass and Shoregrass would need protection from animals. I would suggest installing chicken wire when planting these species. Invasive weeds, such as dwarf nettle, were so numerous that I plan to test a weeding schedule. Both Shoregrass and Salt Grass were overwhelmed by weeds. Approximately 98% of Salt Grass survived while only 40% of the Shoregrass remained. I would suggest planting a greater ratio of Shoregrass due to its high attrition rate. The success of both plants is critical to the reproduction of the Belding's Savannah Sparrow. These grasses are woven to form the outer layer of the nests. If the population is to increase, nesting resources must be available.</p>	
Summary Statement The goal of my project was to document the presence and activity of Belding's Savannah Sparrows and to monitor the growth of their native nesting materials which I planted.	
Help Received I would like to thank my mother who provided supervision at my test site and my science teacher who provided books and encouragement. Thanks to Doug Gibson who provided the plants I planted.	