



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Bryce R. Alley	Project Number J1201
Project Title Knockout	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The experiment's purpose was to test the scientist's hypothesis: "if one were to apply a kick and a punch separately to an object with the dominant side of the body, then more force will result from the kick vs. the punch using Shaolin Kenpo techniques."</p> <p>Methods/Materials With adult supervision, the scientist created a kicking/punching station between two basketball standards, by securing a wire strung around the standards placed 10 meters apart. After hanging a target bag from the kicking/punching station, the scientist measured the distance (in cm) of how far the bag traveled with each of the twenty kicks and twenty punches. Averages were taken after all the kicks and punches were completed.</p> <p>Results The average of the 20 kicks was 493.5 cm and the average of the 20 punches was 798 cm, clearly showing the punches' average was 304.5 cm farther than the kicks.</p> <p>Conclusions/Discussion The results of the experiment proved the scientist's hypothesis incorrect, because the scientist believed that the bag would travel farther after kicking the bag vs. punching the bag. After analyzing the results, the scientist realized that he was able to aim the punch to the correct spot on the bag allowing the bag to travel smoothly along the wire vs. the kick, which would sometimes be misplaced on the bag causing the bag to travel a shorter distance, and sometimes causing the bag to flip over the wire, and slowing the bag down. Secondly, the scientist realized when he was punching the bag; he used more of his body, allowing him to apply more force to the bag. While he was kicking the bag, he just used the strength in his legs.</p>	
Summary Statement The scientist wanted to test whether a kick to a target bag was stronger than a punch to a target bag.	
Help Received The scientist would like to thank his science teacher for answering questions about his project. The scientist would also like to thank his parents for helping him build the kicking/punching station and for taking pictures while the scientist executed the experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Arya J. Barlinge	Project Number J1202
Project Title The Diversity of Fingerprints	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project is to find out the difference between the fingerprint patterns of India and the USA.</p> <p>Methods/Materials The materials required are a fingerprinting pad, fingerprinting forms, and a pen. First, the test subject would roll their right thumb in ink. Then, the test subject would press their finger down on the fingerprinting form. This process was then repeated with all the other fingers of the test subject. The age and gender of the test subject were then recorded. The same procedure was repeated with all other test subjects. The data was then analyzed and conclusions were made.</p> <p>Results The results were that the population of the USA had 6% more arches than India's population. India had 1% more whorls and 2% more loops than the USA. It was also noted that although double loops are uncommon, they appeared more often than was expected in the test subjects residing in India. The test subjects in the USA rarely had double loops. India had 93% more double loops than the USA in the same amount of people fingerprinted.</p> <p>Conclusions/Discussion There is only a slight change in the percentages of the fingerprint patterns between the two countries. The differences between India and the USA's fingerprint pattern were so minor, that there is practically no contrast. If the entire population of both countries were fingerprinted, then there would probably be no change at all. Therefore, the results show that there is no relationship between the country and its fingerprint patterns. These results are useful in showing that it is not possible to which country a person originated from, based on solely their fingerprints. Although the hypothesis was incorrect, a lot of knowledge was gained from the project.</p>	
Summary Statement My project is about comparing the fingerprints between Indian and America population.	
Help Received Parents & Aunts helped get test subjects; Advisor helped with research.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Mira L. Berenbaum	Project Number J1203
Project Title Jet Lag for Athletes: Myth or Real?	
Abstract Objectives/Goals The objective of this experiment was to test the effect of travel on sport team#s performance. Methods/Materials This experiment was performed using an online data search. Data was collected from April, May, and part of June from the 2013 Major League Baseball Season. The number of runs scored by each team was compared for the first game of each series. Three hundred and two games were used in this study. Results Results: When a team traveled within their time zone, 200 games were won and 181 were lost, averaging 4.21 runs/game. When traveling ahead one time zone, 25 games were won, and 39 were lost, averaging 4.22 runs/game. When a team traveled back one time zone, 33 games were won and 30 were lost, averaging 4.68 runs/game. When a team traveled ahead two time zones, 17 games were won and 16 were lost, averaging 4.12 runs/game. When a team traveled back two time zones, 16 games were won and 17 were lost, averaging 3.58 runs/game. When a team traveled ahead three time zones, 7 games were won and 8 were lost, averaging 4.2 runs/game. When a team went back three time zones, 6 games were won and 9 were lost, averaging 3.73 runs/game. Conclusions/Discussion Jet lag has minor influence on sports players performance. This factor is minimized as most games are played within the same time zone.	
Summary Statement This project tested the affect of jet lag on current athletes of the Major League Baseball.	
Help Received My mother helped me cut and glue for my display board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Cameron G. Brown	Project Number J1204
Project Title The Stimulation Effect of Music on Equines	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to learn if different types of music stimulate horses in different ways.</p> <p>Methods/Materials Each of the five horses was fit with a bridle and walked freely on a long line in a measured circle, tracking left, in a covered arena. Heart rate was taken with a stethoscope before and after each lap, and each lap was timed and recorded. The first lap was with no music, followed by laps when playing music of six different types, ending with another lap without music. Two minutes of quiet time between music changes was given and then 30 seconds of the specific music type was played prior to beginning the timer. Each horse completed this cycle three times on different days.</p> <p>Results My data shows that a horse's speed and heart rate decrease with prolonged exposure to music, independent of music type. The data (both heart rate and lap time) was averaged for each horse over three trials and the overall average of all of the horses' data was calculated. In general, the change in heart rate was minimal for all horses but the lap time was more variable. Of the six types of music tested, no one type had a predictable impact on either lap time or heart rate, however, the trend to slow down toward the end of each trial was clear. The results within a single trial show this trend more clearly than the averages.</p> <p>Conclusions/Discussion My results only partially support my hypothesis, which was "I think that music with a higher tempo will stimulate the horses to move quicker and increase their heart rate. I think more calm music will relax them." It turns out that all of the types of music I played eventually had a calming effect on the horses and that the length of time that they listened to music was more important than the type of music played. This information may help trainers calm down horses who are hyperactive or nervous, help competitors choose music for vaulting competitions that put the horse in the most relaxed mood, or encourage riders to play music while trail riding to decrease the risk of the horse spooking.</p>	
Summary Statement My project evaluates the way music effects horses.	
Help Received Barn Manager allowed use of horses, equipment and facilities; Mother helped with timing and music	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Tarun S. Chiruvolu	Project Number J1205
Project Title Healing Bruises with Wearable Devices: The Effect of Ultrasound Treatment on Various Bruises, Aches, and Pains	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I play soccer, so sometimes I get hurt and get a bruise. Bruises and other aches take quite a while to heal, so I researched on how to speed up this process while still making it easy and comfortable without a hospital visit. I hypothesized that using a wearable device that administered ultrasound would help cell growth and have positive thermal effects, therefore healing the injury more efficiently.</p> <p>Methods/Materials I used an Arduino microcontroller board to generate a pulsed oscillating voltage to drive a 25mm 1 MHz ultrasonic disc. All electronic components were assembled into a compact wearable pouch. I modified an Arduino program available online and added buttons to it to select treatment frequency (20kHz, 40kHz and 1MHz). Another button would start treatment to run 3 times: 2 minutes on/15 seconds off (to prevent overheating of treatment area) to a 6 minutes total. With a multimeter, I verified frequency, and measured current, voltage to ensure output power was much less than 180mW/cm², a recommended safe limit. 5 different wounds were tested: 2 bruises, 1 pulled leg muscle, 1 cut and 1 cold sore. Before and after each treatment, I recorded pain levels using a 0-10 scale (0- no/low pain, 10- most pain). I took photographs to record visual changes after each treatment. For controls (projected time), I used ranges of healing times found in published data for similar wounds.</p> <p>Results In all of the 5 wounds tested, the wounds treated with ultrasound showed that they healed faster (by about 25% to about 50%) compared to the controls. Results also showed that the most severe of the injuries healed the fastest compared to projected time.</p> <p>Conclusions/Discussion My hypothesis was supported because the injuries healed faster than reported projected times without ultrasound. A reliability issue is 1) the wounds tested are assumed to be similar to cases described in published data for projected healing time 2) not enough test subjects due to short time window and difficulty in obtaining support from research physicians/institutions. Therefore, to draw clear conclusions additional work is needed. The independent variables (duty cycle, frequency, treatment time, intensity) and impact on dependent variables (pain scale, visual appearance, and healing times) can be studied more thoroughly with support from a medical device company as future study.</p>	
Summary Statement My project explores the possibility of using a wearable ultrasound device to heal bruises and aches efficiently.	
Help Received I received help from my parents in coding and building the device.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Karen H. Cho	Project Number J1206
Project Title Fingers on the String	
Abstract Objectives/Goals My project was to determine if string players do have longer left hand fingers. Wolff's law states that human bones will adapt to the pressure it receives. Supported by that theory, I predicted that string players will have longer left hand fingers compared to their right because they are constantly receiving pressure on their left fingers from pressing down on the strings. I surveyed students who have played 0-2 yrs, 2-4 yrs, 4-6 yrs, and 6-8 yrs. I predicted that students who have played 6-8 yrs would probably have the biggest difference between their left and right hand finger lengths, and those who have played 0-2 yrs would have the least difference between their fingers. Methods/Materials I surveyed 20 string instrument students (age group 6th-9th grade) who have played 0-2 years, 2-4 years, 4-6 years, and 6-8 years. Each student correctly positioned his/her hands on the Hand Diagrams and measured the difference between his/her right and left hand finger lengths. Results String players do have longer left hand fingers. Especially, the students who have played for 6-8 years had the biggest difference in finger length, and those who played for 0-2 had very minimal difference. Some of the biggest differences occurred in the fourth finger, so I will give an example set of data with the fourth finger. 6-8 yrs: 0.36 cm difference, 4-6 yrs: 0.22 cm, 2-4 yrs: 0.26 cm, 0-2 yrs, 0.12 cm. The negative results that appeared on my data table was when the students had longer right hand fingers than their left Conclusions/Discussion My hypothesis was correct: string players did have longer left hand fingers. Also, those who have played 6-8 yrs had the greatest difference between their left and right finger lengths, and those who played 0-2 years had almost no difference. My project shows that bones will react to the stress or mechanical load that it is put under. It cautions us against putting unnecessary pressure on our bones, such as cracking our knuckles or sitting at a crooked position for a long time. It also helps us develop methods to intentionally make our bones react to stress, such as jumping or doing sports to grow taller.	
Summary Statement String players have longer left hand fingers because they are constantly receiving pressure when pressing down on the string.	
Help Received Surveyed students at my orchestra-Santiago Strings (6th-9th grade).	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Kelly Conrad; Kayla Miles	Project Number J1207
Project Title Let's Wii-Hab: The Comparison of the Nintendo Wii Fit Balance Program to Traditional Balance Training	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this study was to examine the effectiveness of the Wii Fit Balance program, as compared to traditional physical therapy balance training. Our hypothesis was that subjects who train on the Wii Fit program will demonstrate greater improvement in balance scores, as compared to the subjects who have a traditional balance training program. We predicted this outcome because, the Wii Fit balance program provides the biofeedback necessary to make the adjustments in order to maintain balance.</p> <p>Methods/Materials In this study we used the following materials: Wii Fit Program, Wii Fit board, Nintendo gaming system, Thera Band, Goniometer, Trampoline, Timer.</p> <p>Results When Wii subjects were tested on the floor with eyes closed, the average increased standing time was 20 seconds. For the Non-Wii subjects, the average increased standing time was 11 seconds. When tested on the trampoline with eyes closed, the Wii Fit subjects had an average increased standing time of 7 seconds. The Non-Wii subjects had an increased time of 0.7 seconds. The majority of the Wii and non-Wii subjects were able to maintain their balance, when standing on one leg with eyes open. The majority of subjects in both groups had increased range of motion in both ankles.</p> <p>Conclusions/Discussion The results of this study clearly indicate that the technology utilized in the Nintendo Wii Fit program, benefited our subjects. The fact that the Wii subjects had greater improvement on both surfaces with eyes closed, demonstrates that subjects were actually able to increase their awareness of their body in space, without the sense of vision. This can be attributed to the biofeedback component of the games that train subjects to move in and out of their base of support, while maintaining balance in order to complete the task. If the rehabilitative industry utilizes the technology of video gaming systems, this could be a revolutionary change in the way medical professionals treat their patients. If training on a program like the Wii Fit decreases likelihood of an individual experiencing a fall or fracture, it should be considered by medical professionals to be a viable option to include as part of a rehabilitative plan of care.</p>	
Summary Statement The effectiveness of the Wii Fit Balance Program when compared to traditional balance training.	
Help Received My mom is a physical therapist and she helped with ankle range of motion measurements. My neighbor is a physical therapist and he gave us good research and background information.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Mariah G. Cox	Project Number J1208
Project Title Ear Candling: Fire in the Hole	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project is to see if ear candling actually sucks up ear wax. I believe that ear candling works because my ears get full of ear wax and my mom candles my ears and they feel normal again. I think ear candling works because it causes a heat vortex inside the cylinder of the candle, so it should work like a vacuum.</p> <p>Methods/Materials My mom, for safety reasons, candled the ears of two volunteers. I used a lighter to light the candles. I used a towel to cover their heads so they wouldn't get warm or hot. I used a bowl of water to put the candles out. I cut the candles open with scissors and found visible orange residue in them. I used a microscope to look at the slides I made with the orange residue and ear wax that I had pulled out of my ear with my finger. Then I compared them and recorded the results. To see if the candles would suck up anything I put powdered Kool-Aid in two vials. I put candles in each vial and lit them. I watched the vortex form. I also saw ash from the candles fall into the Kool-Aid powder. (That could have been my ear!) I put the candles out and cut them open. There was orange residue in them but no Kool-Aid powder.</p> <p>Results I found that the stuff in the candles was gray and bubbly under the microscope. The ear wax I pulled out of my ear was orange and jello-like under the microscope. I think the stuff that is orange in the candles is most likely candle wax, not ear wax. The candles from the Kool-Aid trial did not suck up any Kool-Aid powder but there was still orange residue in the candles. These candles had not been anywhere near an ear. The orange residue looked the same under the microscope as the others.</p> <p>Conclusions/Discussion The orange residue from the candles did not in any way resemble the actual ear wax. I found no ear wax in the candles. I have come to the conclusion that candling does not work. I will not have my ears candled again. It's not worth the risk even though it makes your ear feel better.</p>	
Summary Statement I wanted to prove that ear candling removes ear wax from the ear, but instead I proved that it does not work.	
Help Received My mom did the candling on the volunteers for safety reasons.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Emma R. Curia	Project Number J1209
Project Title Color Genetics of the Netherland Dwarf Rabbit	
Abstract Objectives/Goals The purpose of this experiment was to test the accuracy of "The Rabbit Register" computer program's calculation of offspring produced from a chestnut to black otter breeding. The hypothesis tested was based on The Rabbit Register's prediction that there would be an average of 43% chestnut (agouti pattern gene) and 8% black otter (tan pattern gene) offspring produced in the litters. Methods/Materials There were 6 senior (older than 6 months) bucks and 9 senior does bred in this experiment resulting in 9 litters. There were 15 large cages to house each rabbit, and each doe bred was supplied with a large nest box so they could each make a nest for their young. The total number of offspring, the number of chestnut offspring, and the number of black otter offspring produced were put into a chart, and averaged together to find the average percentage of chestnuts and black otter offspring produced. Results The average percentage of chestnut variety offspring produced was 61%, and the percentage of black otter offspring was 39%. The experiment showed that the ladder of dominance and the laws of inheritance came into play, however, not in the ratios predicted by The Rabbit Register. These results show that through individual litters, the computer prediction won't always be correct, but if you look at all the litters combined, you can see a more accurate representation of the dominance of the agouti pattern gene over the tan pattern gene. Conclusions/Discussion The results did not completely agree with the hypothesis, since 43% chestnut and 8% black otter offspring was predicted to be produced, while the results were 61% chestnut and 39% black otter offspring produced. I learned that the more rabbits bred and litters produced, the more accurate the computer program's calculation will be. Information provided through this project shows how important sample size is in the science of studying genetics and the prediction of certain outcomes of controlled breedings.	
Summary Statement I studied the color genetics of the Netherland Dwarf rabbit by testing the computer program "The Rabbit Register"'s accuracy in its prediction of offspring being produced from breeding a chestnut to a black otter.	
Help Received I did not receive any assistance except for the pie chart, which I needed my dad to show me how to create the pie chart and enter the data into the chart.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Katherine E. Dang	Project Number J1210
Project Title The Effect of Various Ailments on the Vibration of the Tympanic Membrane	
Abstract Objectives/Goals The Objective of this project is to determine which of the three selected ailments (Acoustic Neuroma, Acute Otits Media, and cerumen) will prevent the Tympanic Membrane from vibrating the most. Methods/Materials Three representations of Ailments are placed in/on a small plastic bowl, with a latex balloon covering the opening of the bowl. One representation is a balloon filled with air taped to the bottom of the bowl (Acoustic Neuroma), the other is peices of paper placed on the rim of the latex surface (cerumen), and the last is vegetable oil that fills the entire bowl (Acute Otits Media). A grain of rice is placed in the center of latex surface, above a reference point (a dot). Then a speaker is placed one inch above the latex surface, play a song through the speaker for one minute. Measure the distance between the grain of rice and the reference point. Record the data and perform 4 more trials for each ailment (when finished, there should be 5 trials for each ailment). Results The data averages collected from the "Acoustic Neuroma" experiment showed that the grain of rice moved the farthest from the reference point (the greater the distance traveled means there was more vibration, therefore the Acoustic Neuroma affected the membrane the least). Also the data from each individual trial in the "Acute Otitis Media" experiment showed the grain of rice moved the least distance in comparison to the other Ailments. Conclusions/Discussion To conclude, according to my experiment, the amount the Tympanic Membrane vibrates generally depends on the distance of an ailment in relation to the Tympanic Membrane.	
Summary Statement My Project is about how different Ailments/obstructions affect the vibration of the Tympanic Membrane.	
Help Received Aunt Purchased Supplies, Mother helped select colored paper used on the board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Aiden G. Darius	Project Number J1211
Project Title Surfing the Blood Glucose Wave: The Impact of Different Types of Sugar on Blood Glucose	
Abstract Objectives/Goals The goal of this study is to understand the impact of different sugars on blood glucose. After eating, some foods process more quickly and cause the blood sugar to temporarily spike. If the spike stays high, it can cause long-term health complications. Faster digesting sugars such as dextrose, will cause more of a spike, than slower digesting sugars. Adding fat to carbohydrates slows the digestion process. Hypothesis: Different types of sugars have different effects on blood glucose in participants without diabetes, adding fat to the sugar slows down the effect. Methods/Materials Materials included different sugars, peanut butter, measuring spoons, blood glucose meters, directions, and data sheets. Participants were 6 adults without diabetes. The first variable, sugar, had three levels (dextrose, fructose, and agave). My second variable was fat (peanut butter). My third variable was blood glucose. My participants ate the sugars on separate mornings , then repeated this process eating the sugars with peanut butter. They were asked to get a blood sugar reading before and after eating the sugar to calculate the change in their blood glucose level. Results Average values for change in blood glucose were calculated, and compared across sugars. The results are consistent with my hypothesis. Gel had an average of 36, juice 32.5, and agave 4. Results for the second part regarding fat only partially supported my hypothesis. Juice alone averaged 32.5, and 3.2 with peanut butter. The agave alone averaged 4, and 13.6 with peanut butter. This was inconsistent with my expectations. If one outlier is eliminated from the analysis the average for gel is 26.8, and the average for gel with peanut butter is 20, providing partial support. Conclusions/Discussion Results from this project support the first part of the hypothesis. The dextrose gel changed blood glucose the most, followed by juice, then agave. Different forms of sugar do impact blood glucose differently. The second part of the hypothesis was only partially supported for juice. The dextrose gel was not changed by the fat until an outlier was removed. These findings are important because everyone needs to maintain healthy blood glucose levels to avoid many health complications. Doctors and health educators could use this information to help their patients learn how to make healthy choices.	
Summary Statement This project is about the impact of different types of sugar on blood glucose in non-diabetic participants.	
Help Received My mother helped type the submission and buy the supplies.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Megan Dolan	Project Number J1212
Project Title Which Swimming Stroke Raises the Adult Heart Rate the Most?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project was to determine the swimming stroke that raises the adult human heart rate the most.</p> <p>Methods/Materials Ten adult masters swimmers were asked to participate in 50-yard sprints of each of four main swim strokes, on four separate occasions. They counted their pulse for 15 seconds on their carotid arteries using a swimmer pace clock. Their pulses were recorded each day after they warmed up, and after each sprint. A recovery 50-yard easy swim followed each sprint. The order of the strokes rotated in each trial.</p> <p>Results Butterfly raised the adult human heart the most. It changed the heart rate by an average of 14.06 beats per 15 seconds. Backstroke raised the heart rate by 13.4. Breaststroke changed it by 11.91. And freestyle was 11.41.</p> <p>Conclusions/Discussion My hypothesis that butterfly would raise the heart rate more than the other strokes was proven correct. Freestyle raised the raised the heart rate the least which is most likely due to the fact that when master swimmers are given a choice of which stroke to swim, they seem to always choose freestyle. Therefore, they are more efficient swimming that stroke. Because of my results, I believe that masters swimmers should vary the strokes in their workouts more in order to maximize their fitness levels.</p> <p>Last year, I performed a similar test on competitive swimmers ages 12-14. Interestingly, freestyle increased their heart rates the most. The heart rate changes in the adult masters swimmers were overall much greater than the youth competitive swimmers.</p>	
Summary Statement My project was to determine which swimming stroke increases the adult heart rate the most in order to improve fitness levels in masters swimmers.	
Help Received Mother helped with project board and transportation to pool for trials.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Marie Garcia; Lauren Little	Project Number J1213
Project Title The Beat of Your Heart: Does Music Affect Heart Rate?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective was to investigate the effect of listening to various genres of music on heart rate(HR). Based on the literature, we expected that listening to fast tempo music would tend to speed up HR, and listening to slow tempo music would tend to decrease HR. We further hypothesized that music's effect on HR might be a factor of gender or age.</p> <p>Methods/Materials Informed consent was obtained from 12 adults, ages 32 to 63, and for 14 students, ages 9 to 12,(N=26). Parental consent was obtained for all students. Each subject was tested in a booth set up in our school library. The booth was lined with white paper to minimize visual distractions. Testing was conducted only while the library was closed to further control for extraneous variables. At the start, each subject was asked to take 20 deep breaths, and their baseline HR was measured (starting after the first 10 breaths) with a ReliOn cuff monitor. Each subject then listened to 6 different types of music (reggae, rap, heavy metal, gospel, jazz, and soundscapes) for 2 minutes each, while wearing ear buds. All subjects listened to the same music in the same order. HR was measured during minute two of each music piece. Between musical pieces, each subject was asked to take 20 deep breaths and HR was measured, as above, to establish a baseline before listening to the next type of music. The total test took about 20 minutes per subject.</p> <p>Results For each type of music, we calculated the HR change as the HR while listening to a music piece minus the baseline HR. To help interpret results, we calculated summary statistics for the entire group of subjects, and for the tested group divided by gender (13 females and 13 males) and by age (14 students and 12 adults). Data was sorted and plotted on histogram charts.</p> <p>Conclusions/Discussion As hypothesized, HR for the typical subject decreased while listening to soundscapes. The typical subject did experience an increase in HR while listening to the five genres of faster tempo music. For the group as a whole, HR increased the most while listening to heavy metal. Interestingly, while listening to soundscapes, the average student and average male experienced a decrease in HR, while the average adult and average female experienced an increase in HR. We think this type of study has numerous potential uses, especially in the fields of medicine, education, and sports performance.</p>	
Summary Statement We studied the effect of music on heart rate (HR); in particular, we examined the effect of listening to six different genres of music on HR for 26 subjects, and whether gender or age played a role in the observed HR differences.	
Help Received Dr. Spongberg helped with interpretation of statistics; Mother helped to type part of report.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Lindsey K. Gillette	Project Number J1214
Project Title Allergies et Pulsus Rate in Effectu: A Study of Food Allergies and Their Effect on Pulse Rate	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Many Americans suffer from food allergies, including my mom, my sister, and myself. Allergy testing usually means needles and pain and is very difficult for children. We found out through our nutritionist that if we took our pulse after we ate, we may be able to determine if we are allergic to a certain food. The purpose of my project was to determine if an allergic response to a food increases your heart rate.</p> <p>Methods/Materials The pulse rate of five individuals, three with known food allergies and two without, was taken throughout the day for a period of ten days. Each person measured their pulse for one full minute in the morning before sitting up in bed and after they sat up in bed. Then, they measured their pulse before eating, right after eating, then again 30 minutes and 60 minutes after eating. A food journal was kept by each person, recording the foods they ate. I then calculated the change in pulse rate to determine if there was an increase of 12 beats per minute, as determined to be a significant increase by Arthur F. Coca, MD.</p> <p>Results During this experiment, there were 13 times pulse rates increased by 12 or more beats per minute. Of these 13 times, nine were after breakfast, one after lunch, and three after dinner. This was inconsistent and not proof that allergies cause an increase in heart rate.</p> <p>Conclusions/Discussion According to my data, my hypothesis was incorrect. The results were too inconsistent to prove the Coca Pulse Test an effective way to test for allergies to food on its own. However, we did take the data to our Doctor/Nutritionist who ran a blood test for my sister to check for food allergies. This test showed she was allergic to dairy, corn, and eggs, which made up a large portion of her diet. This pulse test was a benefit to my sister because the nutritionist could use one specific lab test and not stick her with multiple needles for multiple tests.</p>	
Summary Statement My project is to determine if a person's pulse rate increases after eating a food he or she is allergic to.	
Help Received Mother helped format graphs; Rick Peterson, DC helped with information about the elimination diet and personal allergies.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Lorenzo A. Granados	Project Number J1215
Project Title Hand Sensitivity: Which Hand Is More Sensitive?	
Objectives/Goals The goal of this project was to determine if a person's Dominant Hand was more sensitive to touch than their Non-Dominant Hand.	
Abstract Methods/Materials Methods: 1. Gather 50 subjects between the ages of 11 and 14. 2. Ask them if they are left-handed or right-handed. Depending on their answer determines how I begin their tests. 3. Place the 5 different grades of sandpaper in front of them and ask them to arrange the sandpaper with their Dominant Hand from smoothest to roughest. 4. Check the back of sandpaper to determine if they placed all 5 in the correct places. 5. Move sandpaper and ask subject to close their eyes and look the other way. 6. I then touch their hand in 5 different areas using thin fishing line. 7. I then ask the subject to truthfully say how many times they felt the fishing line. 8. I record the data and determine how many correct answers my subject got out of 10. 9. Do the same tests with subject's Non-Dominant Hand. 10. Record data and thank subject. 11. Do methods 2-10 with rest of subjects. Materials: Five different grades of sand paper. (400, 220, 150, 100, and 60) Thin fishing line, Pen or Pencil, Comp. Book, and 50 subjects	
Results The results of this project show that the Dominant Hand was indeed more sensitive with a mean of 7.34 correct answers and the Non-Dominant Hand with a mean of 6.88 correct answers. The means were obtained by adding all of the correct answers for the Dominant Hand and the Non-Dominant Hand and dividing each by 50. Possible errors for this project are that the sandpaper were each a different shade of purple possibly making it easier for the subject to answer correct. Another source of error may have been that the subject may have lied when asked how many time they felt the fishing line.	
Conclusions/Discussion The results of this experiment show that my hypothesis was correct with the Dominant Hand having a mean of 7.34 correct answers and the Non-Dominant Hand with a mean of 6.88 correct answers. If I were able to redo this project all over again I would try to gather more left-handed subjects to see if there is a difference between sensitivity in the right-handers Dominant Hand and the left-handers Dominant Hand.	
Summary Statement My project is about determining if a person's Dominant Hand is more sensitive to touch than their Non-Dominant Hand.	
Help Received Mother helped with display board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Stacy Halperin; Michael Kerrigan	Project Number J1216
Project Title Doggy MP3	
Abstract Objectives/Goals For this project we hope we can find out what type of music dog's will prefer. We would also like to find out a way to stop separation anxiety in dogs by using one of the more popular pastimes in America and the world, listening music. Methods/Materials Materials: -webcam; -cage; -test subject (dog); -computers; -journals; -portable speakers; -treats for dogs; -dog owner's signature of acceptance; -writing utensils. Methods: 1) Set up web cam, cage, and speakers in one room; 2) Set up computers in another room; 3) Place the dog in the cage; 4)Ask everyone to leave the room; 5) Wait until the dog has calmed down; 6) Start playing the music and recording the dog on the web cam; 7) Wait one minute between the 5 songs; 8) Repeat last 2 steps until all music has been played. Results Our results suggested that the dogs preferred the heavy metal choice of music, but when looking at our data something odd caught our eye. Only two of the dogs preferred the pop music. This was strange so we went back to the owners and found out that they listen to a lot of pop music. We also went back to talk to the owners of the only dogs who preferred classical music. Turns out the owners listened to a lot of classical music. So it looks like dogs may prefer the most familiar music to them. Conclusions/Discussion In conclusion, this project was a very difficult project but it was very rewarding. Even though our hypothesis was wrong we got to solved one thing that has real promise for abused and neglected dogs. We know now that dogs do have a preference in music. So know whenever our dogs are too hyper or at home alone we can calm them down by just playing music.	
Summary Statement We want to find out what type of music dogs will prefer.	
Help Received John Demand helped us with our research. Scott Halperin helped type report.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Nicole M. Hanson	Project Number J1217
Project Title Side Effect: An Experiment to Determine Side Dominance	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine side dominance for subjects and better understand how the body and brain work together.</p> <p>Methods/Materials 1. Set up a quiet room with materials. 2. Conduct Tests: Hand Dominance: a) Give subject paper and pencil. Ask them to write their name and age. b) The subject will throw a ball. Foot Dominance: a) Ask subject to kick a ball. b) Ask subject to hop on one foot. Eye Dominance: a) Cut a 1cm hole in the middle of a piece of paper. Place a penny on the ground. The subject holds the paper and finds the penny while looking with both eyes open through the hole in the paper. Close one eye and ask if they can still see the penny. b) Ask subject to look through a paper towel tube. Ear Dominance: a) Ask subject to pick up and listen to a cell phone. b) The subject will stand facing a wall and be asked to listen through it. 3. Note which hand, foot, eye or ear is used in each test and record the results for each subject. 4. Repeat this procedure for 20 subjects- 10 male/10 female. Materials: Paper, pencil, ball, scissors, penny, paper towel tube, cell phone, table and chairs.</p> <p>Results When 20 subjects were tested for side dominance, the subjects were mostly right side dominant, but they did not all have the same side dominance for all the areas tested. Overall, 60% were right sided dominant, 18.75% were left side dominant, and 21.25% were ambidextrous in at least one area tested.</p> <p>Conclusions/Discussion When evaluating 20 subjects for side dominance for their hands, feet, eyes, and ears by testing each area in two different ways, it was found that the majority was right side dominant. The results were different in the subjects tested. Overall, 60% of the subjects were found to be right side dominant. Discussion: The results were not totally consistent with my hypothesis. Although I was correct in predicting that the majority would be right side dominant, I thought most would have the same side dominance for all the areas tested. However, only four subjects had the same side dominance for all the areas tested. In the future, I would use a more accurate test for eye dominance that is not affected by which hand is dominant, do more trials, and possibly test just athletes or compare family members. In real life, testing for side dominance can help us understand how the brain and body work together.</p>	
Summary Statement This science project is about determining side dominance for subjects by testing their hands, feet, eyes and ears and better understanding how the body and brain work together.	
Help Received My mom cut paper for me and helped proofed my work, and my dad helped with computer problems.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Mikhaella Anne Napiza; Trenton Sinclair	Project Number J1219
Project Title We Have Lost Our Ears from NIHL (Noise Induced Hearing Loss)	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We want to know if we need to protect our ears from NIHL, to become aware on how we could prevent acquiring hearing loss and to stop or avoid wearing hearing aids. To prove if communication break can occur at 80 decibels or higher.</p> <p>Methods/Materials Screen school aged and adults with and without background noise. Ask participants to repeat the word if they hear the tester, or say " No idea! " If the participants can not hear the word.</p> <p>Results The first screening without noise background showed 100% correct response. The other three screening tests with background music presented at 80 decibels or higher showed communication break at varying levels.</p> <p>Conclusions/Discussion Our hypothesis was correct it proved that a communication break can occur when a background noise is added while someone is speaking. A noise level can also harm the ears when exposed beyond its natural capacity.</p>	
Summary Statement Noise Induced Hearing Loss can create communication deficit effecting a wide spectrum of all ages.	
Help Received Mothers helped type this report.	



CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

Name(s) Isabella J. Negrete	Project Number J1220
Project Title Fingerprint Inheritance	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective of my project is if the type and pattern of fingerprints are passed down from parent to offspring and if they show resemblance between family members. My hypothesis stated that fingerprint patterns are inherited and passed down through family generations.</p> <p>Methods/Materials The materials used in this experiment were a black ink pad, paper towels, drawing paper and two groups of related and unrelated people. For the experiment, I gathered up the two groups and had everyone wash their hands. Then, I had everyone print down their fingerprints on drawing paper using the black ink pad and then clean their hands with a paper towel after the printing. The fingers used were the 1st, 2nd, and 3rd fingers of the right hand. I then paired up the people and calculated an overall percent of resemblance for each group.</p> <p>Results After all the tests, the results showed that the Unrelated Group had a 42% of resemblance and the Related Group had a 58% of resemblance. From this, it showed that related people have a higher rate of resemblance than unrelated people, showing that fingerprints are inherited through family members and generations.</p> <p>Conclusions/Discussion My hypothesis said that fingerprint patterns are inherited and are passed down through family generations, and my experiment proves that this is so. With the results of this experiment in mind, another interesting study would be to see if close friends or people from the same area have the same type of prints. Also, to see if people who have the same astrological sign have the same type of fingerprints would also be an interesting study as well. Overall, this experiment can extend our knowledge about inherited traits and adds to our research of fingerprint patterns.</p>	
Summary Statement My investigation focused on fingerprint inheritance and figuring out if fingerprint patterns are passed down from parent to offspring.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Dana M. O'Brien	Project Number J1221
Project Title Is Sensitivity Heightened on the Dominant Side?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine if a person's dominant side was more sensitive than their non-dominant side. I believed that the dominant side would be more sensitive than the non-dominant side.</p> <p>Methods/Materials The experiment involved testing fifty middle-school students to determine whether the back of their dominant hand was more sensitive than the back of their non-dominant hand using the Semmes Weinstein touch sensitivity test. Subjects were tested using standardized nylon monofilaments of different diameters. Each test subject sat down in front of a cardboard screen and laid their hands out of sight behind it. The test subject was told to respond when they felt something on their hand and indicate which hand they felt the touch. The smallest monofilament was pressed perpendicular to the back of the test subject's hand for 1.5 seconds, three times. If the test subject didn't feel the first monofilament, then the next size larger monofilament was used to repeat the procedure. This continued until the test subject had felt a monofilament on the first hand, and then the procedure was repeated on the other hand. The testing began on alternate hands for each test subject.</p> <p>Results The results showed that neither hand was consistently more sensitive and that there was not a correlation between hand dominance and hand sensitivity.</p> <p>Conclusions/Discussion The results did not support my hypothesis, but rather indicated that there was not a correlation between hand dominance and hand sensitivity. The information gained from this experiment could be used by hand therapists looking for a way to evaluate their patient's recovery. If the patient had a nerve damaged hand and therapist knew that the hand sensitivity on both sides of a healthy body was similar, the therapist could better assess the normal sensitivity of the patient and determine if the patient had fully recovered.</p>	
Summary Statement The purpose of my project was to determine if touch sensitivity is heightened on the dominant side.	
Help Received Borrowed Semmes Weinstein monofilament kit from hospital hand therapy clinic; Father helped determine which statistical test to use in data analysis	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Andrew E. O'Rourke	Project Number J1222
Project Title Do You See What I See? Testing the Peripheral Vision of People with and without Dyslexia	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My initial investigative question was to ask "Do people with dyslexia have better peripheral vision than people without this learning difference?" I wanted to test the peripheral vision of people to determine if there is a difference between the peripheral vision of those with or without dyslexia. I hypothesized that people with dyslexia have better peripheral vision than those without this learning difference.</p> <p>Methods/Materials The first part of my research was to find out how to set up my test with subjects. It's important to do an accurate peripheral vision test to assure proper results. After a couple of different ideas, I found out the proper method to do this test was to use a visual protractor. The materials I used were a piece of foam core, Popsicle# sticks, glue, a push pin, a cup, pen, paper to record your data, scissors, protractor, and construction paper. These are the items needed to create my visual protractor and everything that I used in performing my experiment.</p> <p>The second part of my research was to see if professionals in the scientific fields have studied dyslexics and peripheral vision. I determined two cognitive scientists, Gadi Geiger and Jerome Lettvin, had done research and found that dyslexic readers could read on the far edges of their visual field more so then those of typical readers. This helped frame my thoughts on peripheral vision</p> <p>Results My data shows that most dyslexics have better peripheral vision than non-dyslexics. I did however, find cases where a non-dyslexic individual had better peripheral vision than a dyslexic. Overall dyslexics had better peripheral vision.</p> <p>Conclusions/Discussion In conclusion my hypothesis was correct. Testing showed that dyslexics tended to have better peripheral vision than non-dyslexic individuals. Just like in most aspects of life and science, there are exceptions; not all of the dyslexics tested had better peripheral vision. It was difficult to find dyslexic participants. Some of them feel bad as there is a negative perception associated with the word "dyslexic".</p>	
Summary Statement Testing to see if people with dyslexia have better peripheral vision than people who don't.	
Help Received My tutor, Linda Diamantopoulos, helped arrange some of the testing subjects. Family Friend Chris Donohoe helped make my graphs. Teacher Paul Brown provided encouragement and organizational help. Dad & Mom helped make the testing equipment	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Bailee A. Poole	Project Number J1223
Project Title Investigating Which Post Exercise Therapy Lowers an Equine's Heart Rate and Temperature the Fastest	
Abstract Objectives/Goals The objective of my scientific investigation on which post exercise therapy lowers and equine's heart rate and temperature the fastest was to determine which post exercise therapy would lower a horse's heart rate and temperature the fastest. I wanted to do this investigation to see which therapy is best for a horse after exercising the horse. Methods/Materials For my materials, I used the following: arena, calculator, barrels, bridle, grooming materials, paper, pencil, protective boots for horses, seven horses, saddle, saddle blanket, stethoscope, stopwatch, thermometer, and water hose. Procedure: First I took all 7 horse's heart rates and temperatures. Then I saddled each horse and exercised them for 5 minutes, including a barrel pattern. I then unsaddled the horse and took the heart rate and temperature of the horse. Next I used the chosen therapy for that trial and competed it on the horse. Finally I took the horse's heart rate and temperature after completing the therapy and recorded my data. The therapies I used were walking, bathing, grooming, and no therapy on the control day. i tested one therapy per day, and I did two trials of each on each horse, for a total of 14 trials for each therapy, including my control. Results My results stated that grooming lowered the equine's heart rate and temperature the fastest, followed by bathing working second best on heart rate and third best on temperature, and walking working third best for heart rate and second best for temperature. Conclusions/Discussion After completing my scientific investigation on investigating which post exercise therapy lowers an equine's heart rate and temperature the fastest, I found the grooming the horse after exercise helped to lower the horse's heart rate and temperature the fastest. I found that grooming lowered heart rate and temperature the most, followed by bathing lowering temperature the second best and heart rate the third best, with walking lowering heart rate the second best and temperature the third best.	
Summary Statement The purpose of my investigation was to determine which therapy performed on a horse after exercise would lower the horse's heart rate and temperature the fastest.	
Help Received Mother helped take photographs of the experiment and arrange the science board.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Raleigh E. Pot	Project Number J1224
Project Title The Relative Tensile Strength of Equine Hair as Relates to Coat Color Genetics	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine which color of hair, from the tail of a horse, is the strongest, and whether or not that relates to coat color genetics. Because of my research, last year, on human hair, I believed that the darker hair would be stronger. In addition, because the coat color genetics play such a strong role in the varieties of horses, I believed the tensile strength would be related to the coat color.</p> <p>Methods/Materials I did this by collecting hair samples from 14 horses and testing the tensile strength of 8 strands of tail hair from each horse. I then averaged the tensile strength of each horse's samples and compared them to the other horses.</p> <p>Results What I found was that the strength of the tail hair depends on the coat color type, not the color of the tail hair itself, which was not what I expected.</p> <p>Conclusions/Discussion I expected that the coat color genetics would cause all darker hair to be stronger because of the density and particle make-up of the shaft, which causes the refraction of light and creates the color. Instead, I found that the coat color genetics cause the color and strength to vary throughout coat color types. In other words, dark hair in one coat color type may be stronger than the dark hair in another coat color type just as light hair in one coat color type may be stronger than dark hair in another coat color type.</p>	
Summary Statement My project is to test if color effects the tensile strength of equine tail hair and whether or not that relates to coat color genetics.	
Help Received Supervised by Brie Wilson during the collection of the tail hair from the horses.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Omer A. Raheem	Project Number J1225
Project Title Stresstigation: Correlating Body Temperature and Stress	
Abstract Objectives/Goals Stress is the body's reaction to a change that requires a physical, mental, or emotional behavior. Stress is a normal reaction that happens in our daily lives. Physiologically, stress occurs because of the release of hormones which causes a higher body temperature. It's a feeling that's created when we react to particular events such as taking a test. I want to find out if students from ages 12-13 do better when they have a higher stress level or a lower stress level. I also want to find out if there are any changes in their body temperatures due to the change in stress level. Methods/Materials I had the students take a mini survey asking which subject test they find difficult. Based on the surveys' results, I created a Standardized Math Test. I had each student fill out a fill-in form asking them questions about their age, gender, etc. Then, I had each student take the Standardized Math Test in three minutes. I covered a thermometer with a Probe Cover and checked the body temperature of each student before and after taking the test. Results Due to stress, the students' body temperatures did change. The students who had a higher stress level before and after taking the test had a higher increase in their body temperatures. The students who had a lower stress level before and after taking the test had a lower increase in their body temperatures. Conclusions/Discussion In conclusion, the students from ages 12-13 do better in their tests when they have a higher stress level. Due to stress, their body temperatures change. The students who had a lower body temperature and lower stress level did poorly on their tests. The students who had higher body temperature and higher stress level did well on their tests. Lots of people think stress is bad and unhealthy for you. Some people don't even know if stress is good or bad for them. However, stress isn't always bad. Some amount of stress is healthy, but excessive stress can lead you to health problems. When you come upon stress, it helps you keep your mind alert and makes you do things faster. Also, you are more awake, aware, and focused.	
Summary Statement My project is about correlating Body Temperature and Stress in Students from ages 12-13.	
Help Received Mother and sister helped me grade the tests; Mrs. Maryam Abbasi, Mrs. Muna Moinuddin, and Mrs. Nabila Patel guided me throughout the project	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Bavan P. Rajan	Project Number J1226
Project Title It's a Sweet Tongue, Not a Sweet Tooth: A Correlation between BMI and Papillae	
Abstract Objectives/Goals I investigated the relationship between body mass index (BMI) and sweet fungiform papillae. Fungiform papillae are the bumps on your tongue that give it texture, and this specific kind of papillae have taste buds in them. My hypothesis was that if a person had more sweet fungiform papillae, they would have a higher BMI. This is because the person would get more signals to brain from the sweet area of the tongue that indicate that they like this taste. Methods/Materials I performed my experiment on twenty subjects, ten from each gender. The weight and height was kept confidential. I then applied blue food coloring to the participant's tongue to illuminate the fungiform papilla in the sweet area of the tongue. I placed a paper tab with a 1.5 cm diameter opening on the front part of the tongue, where the dye was applied. I photographed the participant's tongue and was easily able to see the papillae in the photograph after it was magnified on the computer. I then measured the participant's height and weight and used a BMI calculator to find their BMI. I then input the data I collected into a graph. Results The results for my experiment did not show any clear relationship between BMI and papillae. The average male BMI was 20.57 and the average for females was 20.7. The average papillae density for males was 40.7 and the average for females was 46.6. Conclusions/Discussion My project gave us some important knowledge. From my project, we can conclude that papillae does not have any direct effect on the BMI of a person, as their BMI may be affected by several other factors such as genetics. Participants could have been supertasters as well, which could have given them higher amounts of total papillae in every area of the tongue. I think that papillae is more directly related to food preference instead of body mass.	
Summary Statement My project is about finding a correlation between body mass index and sweet fungiform papillae.	
Help Received My parents supplied me with some equipment for the project.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Catherine M. Snook	Project Number J1227
Project Title Got Brush? Need Goats?	
Abstract Objectives/Goals The goal for this project is to discover which browsing plant goats like the best and their least favorite plants. The hypothesis for this project is if two goats are offered the following browsing plants: pine, madrone, manzanita, tan oak, black oak, grass, cedar, and blackberry, then the goats will go to the madrone first every time. The hypothesis was incorrect because one of the goats didn't go to madrone first every time, only one goat went to madrone first every time. Methods/Materials The materials used in this project included 2 pygmy goats, 2 fenced pens, pine needles, madrone leaves, manzanita leaves, blackberry, cedar, grass, black oak, tanoak, paper, pencil, clipboard, and halters. The method of this project was that the goats were put into a different enclosure, away from the plants. The plants were separated into piles in a line in the other enclosure, so the goats could see all the plants. Then catch one goat with the halter and brought it into the pen with the plants. Then let the goat sniff each plant but did not let it eat any plants. Then let the goat go and write down what the goat went to 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th and repeat the steps with the other goat. Results The result of this project was that the highest plant chosen was madrone and the lowest plant that was chosen was grass. Each goat had different preferences. One of the goats chose tanoak almost every time and the other goat chose madrone first almost every time. Both goats chose grass last every trial. Conclusions/Discussion The results did not support the hypothesis because only one of the goats chose madrone first and the other did not. The benefit of this project is to discover what plants goats like and what they prefer to eat. People could use use this project to find goats that will clear away the brush they want cleared. For example some people might want pine needles cleared and they could use this project to find goats that clear pine needles.	
Summary Statement My project is about the type of browsing plants that goats prefer.	
Help Received My science teacher helped me choose my topic for this project.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Ashlynn F. Stupar	Project Number J1228
Project Title Think Fast! Does Exercise Have an Immediate Effect on Reaction Time?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine if a small amount of exercise can decrease one's reaction time.</p> <p>Methods/Materials I tested about thirty seventh grade students using a reaction testing machine. Simply, the machine tests the amount of time it takes an individual to push a button after seeing a light or hearing a buzzer. I tested the individuals initially, then asked them to run half a mile, then tested them again.</p> <p>Results Reaction time appears to be decreased immediately by exercise.</p> <p>Conclusions/Discussion It seems that reactions are faster after one has exercised. However, my results were not as conclusive as I would have liked. Only sixty percent of my test subjects showed improvement. Because of the ease of testing in a PE setting, the exercise used was a half mile run. In the future, I'd like to determine if a quicker exercise (such as jumping jacks) might yield more favorable results.</p>	
Summary Statement My project was to determine if exercise can immediately reduce reaction times in humans.	
Help Received My uncle built the reaction testing machine, my mother helped me type my report, my PE teachers allowed me to test during class.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sameer Sundrani	Project Number J1229
Project Title An Echocardiographic Assessment of an Athlete's and Non-Athlete's Heart	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project was to determine the comparison between an athletes heart and non-athletes heart using echocardiographic and electrocardiographic readings. I hypothesized that average increase in each subjects cardiac output would be 150-300% and that the athletes heart would be more efficient based on cardiac output.</p> <p>Methods/Materials The testing was done at a medical clinic supervised by a cardiologist and an echo-tech using an electrocardiogram and an echocardiogram. I recruited a minimum of 10 subjects in each category (athletes and non-athletes), and each subject submitted an informed consent. I recorded baseline vitals (blood pressure, height, and weight) for each subject. The baseline echocardiogram and electrocardiogram of the heart was performed. After each subject ran 9 minutes on the treadmill at Bruce protocol, the post exercise ECG and EKG was done.</p> <p>Results I recorded the baseline and post exercise blood pressure, heart rate, stroke volume, and cardiac output. To provide a more advanced and accurate analysis, I used standard deviation of the mean, and also a t-test (significance and p value). Overall, the athletes heart rate was lower at rest and at post exercise and the athletes stroke volume was larger at rest and at post exercise. The baseline cardiac output for athletes and non-athletes was 4096.9 ± 1345.9 milliliters per minute and 3976.1 ± 1610.5 milliliters per minute. The post exercise cardiac output for the athletes and non-athletes was 7953.9 ± 2060 milliliters per minute and 7502.3 ± 1805.6 ml per minute. The athletes cardiac output was higher at rest and with exercise and the average increase was 191.45%.</p> <p>Conclusions/Discussion I hypothesized that the athletes heart would be more efficient based on cardiac output, and that the average increase of cardiac output would be 150-300%. Heart rate was determined using the electrocardiogram and stroke volume using the echocardiogram. Using these calculations, I found the cardiac output with the formula $HR * SV = CO$. Finally, my project proves that if you are well conditioned and have a healthy life style, you have a more efficient heart than a less fit person. This can benefit the community by stating that if you get healthy, you also have a better heart function. It also encourages the community and students to get more active and have a better live style.</p>	
Summary Statement I compared the cardiac heart function of athletes and non-athletes using echocardiographic views.	
Help Received I used Dr. Sundrani's medical clinic for testing. Echo-techs and Dr. Sundrani were supervising while running the echo's.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Edward A. Trimble	Project Number J1230
Project Title EEG Usage to Indicate Mental Imagery and Transition to Physical Activity	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project was to determine if left-brain and right-brain hemisphere activity could be recorded on an EEG to indicate (left brain) mental imagery/preparation and transition to (right-brain) physical execution of a shot with clay target shooters. My hypothesis was that the EEG would indicate transition from left-brain type imagery to right-brain type physical execution of a shot. This has application as a sports medicine training tool in many types of sports where the athlete may be using a mental preparation tool immediately prior to the execution of whatever it is they may be performing.</p> <p>Methods/Materials To start this project, an Olympic shooter was #wired# by a technician with a simple 8 lead setup that would record activity on the left-brain and right-brain hemispheres only. The Olympic clay target shooter was then told to run through a performance enhancing mental imagery program with the EEG started. The shooter would execute shots and then return to the mental program in a sequence of 25 shots. Finally, the EEG data was captured and downloaded onto a notebook computer and later printed onto a left-right brain hemisphere tape showing the two areas only.</p> <p>Results When the tape was printed, the transition from left-brain to right-brain was very apparent in most areas. As the shooter began the mental program, there were Beta waves on the left-brain. The second the shooters performed the physical execution of the shot, the Alpha waves on the right-brain abruptly turned into Beta waves and activity on the left-brain stopped or subsided for a brief moment.</p> <p>Conclusions/Discussion In the end, my hypothesis was supported and I discovered that an EEG could be used to record a transition from left to right brain hemispheric activity. This would suggest that it may be a diagnostic tool used to help athletes employing a mental imagery program and physical performance. Future studies should employ higher quality EEG instrumentation and athletes of varying disciplines to examine these phenomena.</p>	
Summary Statement The purpose of this project was to determine if left-brain and right-brain hemisphere activity could be recorded on an EEG to indicate (left brain) mental imagery/preparation and transition to (right-brain) physical execution of a shot with	
Help Received Daniel Morse, Ph.D. (and Olympic shooter) and Steve McKinley, M.D. provided materials and study site.	



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Luke A. Virsik	Project Number J1231
Project Title How Is Taste Affected by Age?	
Objectives/Goals My objective was to find out how age affects the ability to taste. Specifically, do the different tastes (saltiness, sourness, sweetness, and bitterness) decrease or increase with age.	
Abstract Methods/Materials Eleven senior subjects (60+ years old), eight middle-aged subjects (25-59 years old), and nine young subjects (9-24 years old) were recruited for my experiment. Salt, citric acid, sugar and tonic water were used to make three solutions for each taste. The solution order was randomized to make sure the subjects could not guess the taste. Randomization was achieved by putting numbers 1-12 on slips of paper (representing the solutions) in a bag. Ten sequences were pulled out. The test subjects were assigned a sequence. The test was done by following the randomized sequence for each person. The subjects were given a tablespoon of each solution and their responses were recorded.	
Results The overall taste accuracy average for the young, medium and senior groups was 69%, 67%, and 62%, respectively. The salt taste accuracy average for the young, medium and senior groups was 85%, 88%, and 85%, respectively. The sour taste accuracy average for the young, medium and senior groups was 59%, 58%, and 55%, respectively. The sweet taste accuracy average for the young, medium and senior groups was 78%, 75%, and 64%, respectively. The bitter taste accuracy average for the young, medium and senior groups was 52%, 46%, and 45%, respectively.	
Conclusions/Discussion I investigated how age affects taste sensibility because I noticed that young kids do not like spicy foods while adults like spicy foods. My data showed me that taste does decrease as age increases, though it is a very mild change. My hypothesis was that sweetness and saltiness would be the most affected tastes. I also learned that people generally could not tell the difference between bitter and sour. All in all, I learned a lot about taste sensibility. My hypothesis was generally correct. As a person aged, their ability to taste started to fade a little.	
Summary Statement The ability to taste (saltiness, sourness, sweetness, bitterness) decreases as a person ages.	
Help Received Mom bought poster board, Dad taught me how to graph in Excel, parents and siblings handed me the test solutions, Dad helped me find the bitter taste (tonic water) and he proofread my paper.	