



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Alexandra Ackourey	Project Number J1001
Project Title Are Dogs Right or Left Pawed?	
Abstract Objectives/Goals The objective of my project was to find out whether most dogs prefer to use their right or left paw more than the other. Methods/Materials Information was obtained from 217 dogs chosen randomly from a dog park. Before testing I recorded whether the dog was a male or female and what breed it was. I then tested each dog with five tests - shake, lay down, tease, jump, and walk - and then determined if the dog preferred to use their left or right paw more than the other. Results I found that about two thirds of the dogs tested favored their left paw over their right and used the same paw continuously throughout the testing. Conclusions/Discussion The results completely support my hypothesis and I found that even breaking down results by size and male/female, all categories still preferred to use their left paw.	
Summary Statement I wanted to see if most dogs preferred to use their left or right paw over the other.	
Help Received None	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Laura Arnold; Megan Lederhos	Project Number J1002
Project Title Mice-opoly: Which Color is Dominant in Mice: White or Black?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective is to find out which color is dominant between black and white mice.</p> <p>Methods/Materials For our procedure, we gathered the materials. We set up cages with bedding, food, water and exercise wheels. We put the mice in cages (1 male to 2 females). Black male with white female mice; white male with black females; black male with black females; and white male with white females. We checked food and water every day, and cleaned cages once a week. We checked for offspring and observed offspring colors. We recorded and compared the results and made conclusions.</p> <p>The materials included: 4 white female mice, 4 black female mice, 1 white male mouse, 1 black male mouse, three 10 gallon aquarium cages, one 30 gallon aquarium cage(divided in half), 5 food bowls, mouse food, 5 animal water bottles, 2 packages of bedding, and 4 exercise wheels.</p> <p>Results The offspring from all of the black and white litters included: 48.15% white mice, 37.04% brown(or Non-agouti) mice, and 14.8% black mice. From our black and black litters we got 56.5% black mice, 21.7% chocolate mice, 13% white mice, and 8.7% pinto(black/white) mice. From our white with white litters, the results were 100% white mice.</p> <p>Conclusions/Discussion The results showed that the white mice were pure (all of the offspring from their litters were white). Our black mice are not pure. We got four different colors from the black and black litters. Even though our results show that white shows up more often, black would not have shown up at all if white were dominate. The dominant color in mice from black and white is black. The recessive gene in the black mice is in codominant and incomplete dominance with the white allele. However, the black mice have different recessive genes. We believe that these genes are white and brown. Because the black mice have a recessive white gene, we believe black is dominant over white.</p>	
Summary Statement Our science project is about determining what color, black or white, is dominant in mice.	
Help Received Our parents helped with purchasing the mice and materials we used.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Dylan Blossom	Project Number J1003
Project Title Are Dogs Color Blind?	
Objectives/Goals My experiment was to find out if dogs can see color or not.	
Abstract	
Methods/Materials To test if my dog was color-blind, I first trained him to choose blue over yellow. I chose blue and yellow because they appear very different when viewed in a grey scale. After my dog was trained to choose blue, I tested him to see if he could still choose blue over another color. I chose red because it is almost identical to blue when viewed in a grey scale. Materials: 1 dog, 1 table, 2 jars, 3 strips of colored paper (red, blue, and yellow), and lots of dog treats.	
Results My dog chose the blue over the red 72% of the time.	
Conclusions/Discussion Since my dog was able to choose the blue over the red 72% of the time, I concluded that my dog is not completely color-blind.	
Summary Statement This project was to test my dog to see if he was color-blind or not.	
Help Received Mother helped with recording of data during testing, some typing, and some cutting and gluing on project board.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Austin M. Campbell	Project Number J1004
Project Title Do Mice Experience the Same Fight, Flight, or Freeze Response As Humans Do When Faced with Their Fear?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project was to determine if fear has an affect on the behavior of a mouse. I believe that a mouse will reach the end of a maze in a slower time after the rats# scent is added to the maze.</p> <p>Methods/Materials In this project,15 brown mice and 15 white mice held in 15 separate containers, 4 rats, a timer, a cheese and peanut butter treat, a self-constructed wood maze, and a screen lid were all used. All 30 mice were timed as they ran through the maze till the end where the treat was located. After this trial run, rats were released in the maze so they could spread their scent. The mice were timed again to see if they would speed up or slow down after smelling the scent of the rat. The entire experiment was conducted two times for improvements. A paired-sample t-test was used in the second trial for increased accuracy.</p> <p>Results The mice did not show a difference in their times after the introduction of the rat scent in either of the two trials. The significance level, which was far greater than .05, was too high to generalize.</p> <p>Conclusions/Discussion My conclusion is that mice do not have a natural fear of rats as my research stated or that the scent of a rat is not a variable that affects a mouse#s speed. I believe that mice need to see their fear in order to be afraid.</p>	
Summary Statement My project tested the speed of mice before and after the introduction of a rat scent in a maze to see if mice experience the same fight, flight, or freeze response as humans do when faced with their fear.	
Help Received Mother explained t-test; Step-father helped build maze; Mother and brother helped take mice in & out of the maze; Father gave input into design of experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Isaiah E. Cooper	Project Number J1005
Project Title The Power of Rat Senses	
Abstract Objectives/Goals My project was to determine the role of rats' memory and senses in navigating a maze environment. I believe that their sense of smell will be better than their sense of sight, and that they can learn the layout of a maze quickly. Methods/Materials To construct the maze I used two pieces of 20"x30" thin sturdy board for walls and one piece 20"x30" thick sturdy board for the base (sturdy board is styrofoam in between two pieces of construction paper). I used poster putty in order to keep the walls down while retaining an ability to change the layout of the maze. For their memory tests I put them through the same maze repeatedly every day for a month. For their sight I put different colored paper on the floor and recorded what percentage of the path they followed, and later repeated the same process but put the paper on the walls. For their sense of smell I applied different food scents to the floor of the maze and recorded what percentage of the path they followed. Results The rats' memorized the maze layout fairly well in the amount of time they had, their times went from above four minutes to thirty seconds. They did very good at the sight tests, following the whole path on the wall and floor maze. They didn't do so well on scent tests, barely following some of the paths of smell but doing really well on following some of the other scents. Conclusions/Discussion I found that rats have a good memory, which they must have to memorize their environment. I learned they have better sight than I had anticipated they did. Their sense of smell is fairly good, but not as good as I thought it may be.	
Summary Statement Testing rats' senses and memory in a maze environment.	
Help Received Mom, County Fair Advisers helped with back board and presentation	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Johnnie B. Elliott	Project Number J1006
Project Title Diabetes and Exercise	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project is to determine the effect of exercise on the blood glucose levels of people with Type 1 diabetes. When people eat carbohydrates, they are turned into glucose, or sugar, and enter the bloodstream using a hormone called insulin that converts it into energy. When the pancreas stops making insulin, it results in the illness known as Type 1 diabetes. Overall, I plan to help people with diabetes have better control of their blood glucose to avoid serious health complications.</p> <p>Methods/Materials The blood glucose levels of a person with Type 1 diabetes and a person without diabetes were recorded four times a day during two separate weeks. Two major influences on blood glucose levels were controlled in this setting -- the amount/type of food and the physical activity. The testing tools included blood glucose monitors that measure glucose levels in milligrams per deciliter (mg/dL); calibrated test strips that are placed into the monitor; and lancets, spring-loaded needles used to draw a sample of blood.</p> <p>Results Even during sustained exercise and insulin therapy, it was difficult to control the blood glucose levels of the person with Type 1 diabetes (normal blood glucose levels range from 70 to 120 mg/dL). During the initial eight-day period, blood glucose levels were rarely within the normal range.</p> <p>Conclusions/Discussion People with Type 1 diabetes must balance their insulin intake with constantly changing factors # food, physical activity, stress, hormonal changes, growth, illness, and fatigue. In everyone, blood-glucose levels are influenced by factors including estrogen, testosterone, thyroid hormone, and emotional and physical stress hormones. Research indicated that growth hormones were influencing this experiment. Without diabetes, the endocrine system releases insulin as needed. With diabetes, a blood glucose test is the only way to determine if other factors are influencing blood glucose levels, so treatment is merely reactive.</p>	
Summary Statement This project is to determine the effect of exercise on blood glucose levels of a person with Type 1 diabetes.	
Help Received I received assistance from my sister, who bravely volunteered to be the control in this experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Bridget P. Fox	Project Number J1007
Project Title What Color Can Dogs See Best?	
Objectives/Goals My objective is to see what color dogs are most attracted to.	
Abstract	
Methods/Materials 1st Place a blue, green, yellow, red, and purple 21.3x27.8cm paper in a line. Each 7.3cm apart. 2nd Measure out 4.58meters away from the paper. 3rd Have the dogs owner hold dog 4.58 meters away from the paper. 4th Break three small bone shaped dog biscutes in half. 5th Place half of a dog biscute on the middle of each paper.(Do not use last half.) 6th Tell owner to let dog go. 7th Record what paper the dog went to first 8th Have 5 trials for each dog. 9th Change the order of the paper after each trial	
Results The dogs went to the purple 10%, the blue 15%, the yellow 5%, the red 30%, and the green 40%.	
Conclusions/Discussion My hypothesis is correct and incorrect. I think that my hypothesis is incorrect because the dogs did not go to the yellow the most they went to it the least. I think my hypothesis is correct because in my research I found out that the colors green, yellow and orange all look the same to dogs. The dogs went to the green the most. I conclude that dogs can see green the best.	
Summary Statement It is to see what color dogs can see best.	
Help Received Mother bought supplies, Friends let me use their dogs, Father helped turn feet into meters.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Alex J. Freeman	Project Number J1008
Project Title Can You Hear Me Now? Assessing Canine Hearing Loss	
Abstract Objectives/Goals Until now there has been no reliable method available to specifically determine the frequency range at which hearing-impaired dogs can hear. The goal of this experiment was to design a test that could be used to determine a dog's exact frequency hearing range. A Portable Wide-range Audio Frequency Generator (PWAFFG), invented for this experiment by a gadget specialist, was used to test how large and small breed, along with young and aged dogs, differ in their degree of hearing loss. Methods/Materials Forty dogs were tested to see if aged small breed dogs had a lower degree of hearing loss than aged large breed dogs. Eighteen of the dogs tested were small; 22 were large; 11 were young; 29 were old. Each dog was tested using a Portable Wide-range Audio Frequency Generator (PWAFFG). The PWAFFG was placed 300 cm away from the dog. Eight frequencies were played to observe the dogs' reaction. To distinguish which exact frequency the dog was unable to hear, sounds just above and below the frequency to which the dog reacted were played. Results The large breed dogs heard 3.513 kHz higher than the small breed dogs. The young small dogs heard 14.695 kHz higher than the old small dogs. (Large dogs were classified as "old" if they were six years or older; Small, if they were eight years or older.) The young large dogs heard 6.861 kHz higher than the old large dogs. The young dogs heard 10.205 kHz higher than the old dogs. The young small dogs heard 0.036 kHz higher than the young large dogs. The old large dogs heard 7.798 kHz higher than the old small dogs. The average of all 40 dogs was 25.738 kHz. Four dogs were BAER (Brainstem Auditory Evoked Response) tested to confirm that the PWAFFG was accurate. The BAER test results confirmed that the PWAFFG was an accurate test to determine canine hearing loss. Conclusions/Discussion The results of the experiment did not support the hypothesis, as the aged large dogs had a lower degree of hearing loss than the aged small dogs. The questionnaires filled out by the owners showed that many owners thought their dog had significant hearing loss. It was surprising to owners that their dog could hear high frequency sounds. This is significant because owners of hearing-impaired dogs now have a way to communicate with their dogs through high frequency whistles or other devices that their dog can hear.	
Summary Statement In this experiment, 40 dogs were tested using a Portable Wide-range Audio Frequency Generator specially invented for this study to see how small breed and large breed dogs differ in their degree of hearing loss.	
Help Received Dr. Benita Keiss, D.V.M, recruited the many dogs needed for this experiment and supervised the testing; Mike Palazzola designed and built the Portable Wide-range Audio Frequency Generator used in this experiment; Dr. David Lipsitz, veterinary neurologist, gave up his time to conduct the BAER tests.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Ryan M. Goldstein	Project Number J1009
Project Title Does Gender, Age, or Smoking Habits Affect a Person's Sense of Smell?	
Abstract Objectives/Goals The objective of this project is to investigate whether gender, age or smoking habits affect a person's sense of smell. Methods/Materials Twelve distinct scented oils and one empty control were placed in numbered jars. Test subjects were asked to identify what the scent was. 460 test subject evaluation forms were then graded and scored. The data was stratified and 95% confidence intervals were calculated. Results The average number of correct responses for all males was 5.88 with a sample size of 142 (The confidence interval was 5.50 - 6.26.). For females the average was 6.32 with a sample size of 319 (The confidence interval was 6.06 - 6.58.). The average for all participants from the older group(40 years old and over) was 5.96 and the sample size was 215 (The confidence interval was 5.64 - 6.28). The average for the younger group (less than 40 years old) was 6.38 with a sample size of 245 (The confidence interval was 6.08 - 6.68.). The average of all smokers was 6.95 with a sample size of 79 (The confidence interval was 6.44 - 7.47.). The average of all ex-smokers was 5.50 with a sample size of 104 (The confidence interval was 5.16 - 5.96.). The average of all non-smokers was 6.22 and the sample size was 277 (The confidence interval was 5.95 - 6.49.). Conclusions/Discussion This project did show a higher rate of correct responses for females over males and for younger over older subjects, but these differences did not achieve statistical significance. No clear trend was seen for the influence of smoking. Non-smokers scored higher than ex-smokers and this difference was very close to achieving statistical significance. The group of smokers, however, scored the highest, but this was the smallest subgroup and the confidence interval was the broadest. These results tend to support the hypothesis, but a larger sample size would be needed to achieve statistically significant results.	
Summary Statement Does gender, age or smoking habits affect a person's sense of smell?	
Help Received Father helped calculate confidence intervals. Parents provided transportation to shopping areas.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kellen M. Levy	Project Number J1010
Project Title How Dietary Sugar Affects the Weight Gain of Baby Mice	
Abstract Objectives/Goals My project was to determine if feeding baby mice supplemental sugar coated cereals would lead to obesity. I believe that the mice that are given sugar coated cereals will gain more weight at a faster rate than mice that are fed fruits and vegetables Methods/Materials Four mice that were 4 weeks old were placed in two separate cages. A base weight was obtained for all four mice. All four mice were given commercially prepared mouse food according to package directions. The mice in Cage A were given supplemental fruits and vegetables twice a day. The mice in Cage B were given supplemental sugar coated cereal twice a day. The mice were weighed in grams once a week. Results The mice all gained weight at about the same rate. The two mice that were given supplemental fruits and vegetables gained 7g. and 6g. The two mice that were given supplemental dietary sugar gained 7g. and 4g. Conclusions/Discussion There was not a significant difference in the amount of weight gained by the two different groups of mice. On further research, I learned that the fruits and vegetables that the mice received (carrots and bananas) had about the same amount of calories and carbs as the sugar coated cereals. I would like to continue this experiment using more mice and different supplements such as fatty foods. I would also like to use an exercise wheel to see if exercise had any effect on the amount of weight gained. It is also important to know that although the mice all gained about the same amount of weight, the mice receiving the fruits and vegetables were getting more nutritious food than the mice receiving the sugar coated cereal.	
Summary Statement My project was about how sugary snacks affect the amount of weight gained in baby mice.	
Help Received Mother helped type the report. The lady at the pet store helped me to design my project so that the mice would all receive nutritious food.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Gina M. Little	Project Number J1011
Project Title Maximize your Peak!	
Abstract Objectives/Goals The objective of this project is to determine the effects of exercise on peak flow readings on non-asthmatic human beings. Methods/Materials Using 4 human subjects, peak flow readings, using a peak flow meter, were measured and recorded every AM and PM for 4 weeks, at least 5 days per week. During weeks 2 through 4, 3 of the 4 subjects also recorded their peak flow readings just prior to aerobic exercise, immediately following aerobic exercise, and after recovery from this exercise. Subject #2 exercised the same amount during the 3 weeks, while subjects #3 and #4 increased the aerobic exercise by 5 minutes each week, starting at 10 minutes and progressing to 20 minutes. Subject #1 did not exercise but continued to record AM and PM peak flow readings. Exercise was walking quickly and/or running uphill to maintain an aerobic state. Recovery time was when subject returned to bottom of hill walking. Results Peak flow readings did not improve significantly on the subjects who exercised regularly prior to the experiment. Peak flow readings were markedly improved in subject who did not exercise regularly prior to experiment. Conclusions/Discussion My conclusion is that exercise will improve peak flow readings on non-asthmatics until their maximum peak is reached.	
Summary Statement My project is about exercise and the effect it has on peak flow rates on non-asthmatic human beings.	
Help Received My mother obtained the peak flow meters used in the project.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Katerina D. Marcoulides	Project Number J1012
Project Title Tick Tock, Let's Change the Mouse's Internal Clock	
Abstract Objectives/Goals The objective is to determine if having a partner will speed up the time it takes mice to change their internal clocks. Methods/Materials Six mice of identical ages and gender were placed in four containers. Two small containers had one mouse each and two large containers had two mice each. They were placed in two rooms. One room had artificial light and the other room had natural light. Both a large and small container were placed in each room. The temperature, feeding time and amount was the same for all mice. Mice were observed in both light and dark times for 10 minutes each for one week during which their activity level was recorded. The following week the light and dark periods were reversed with the use of artificial light. The mice were again observed during both light and dark times for 10 minutes each. Results The activity levels of the mice in the artificially lit room was the same as those in the room with natural light(active 8-9 minutes when dark and 2-3 minutes when light). This allowed me to change the light/dark cycle using artificial light. After the light/dark cycle was changed, mice with partners did not adjust to the time change. Those that were on their own appeared to adjust by reaching the goal activity level of 2-3 minutes when it was light, although they only reached an activity level of 7 minutes in the dark (goal was 8-9 minutes). Conclusions/Discussion My conclusion is that mice adjust to time changes faster if they are on their own rather than in an environment with a partnered mouse. This result can help people set up an environment for pet mice in the house so they will not disturb their owners. It may also help those studying the human sleep/wake cycle form hypotheses about how people might adjust to work shift changes or jet lag while travelling.	
Summary Statement To change the light/dark cycle and see if the internal clocks of mice with partners change faster than those on their own.	
Help Received Mother bought mice.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Deborah H. Martin	Project Number J1013
Project Title What Makes the Giddyup?	
Objectives/Goals My objective was to find what commom equine feed will produce the most energy for the horse judged by the horses blood sugar (glucose) level.	
Abstract	
Methods/Materials <ul style="list-style-type: none">-seven healthy horses-one diabetes testing kit-nine bales of good quality alfalfa hay-eight bales of good quality grass hay-three acres of lush equine pasture mix grass-one large pen- bare of food-one electric razor-one container of rubbing alchol-cotton swabs	
Results <p>The results turned out that the alfalfa hay produced the most energy in all three trials. The pasture mix produced the second best results in trial one and trial three, for trial two the grass hay produced .14 percent better then the pasture mix, but had the lowest in trial one and three.</p> <p>For trial one with the alfalfa the results were: 72, 73, 71, 72, 74, 70, and 69 making a average measure of blood glucose 71.57. For trial two the results were 73, 69, 68, 70, 71, 73, 74, average was 71.14. For trial three the results were 74, 71, 70, 71, 72, 69, 72, average was 71.29.</p> <p>The equine pasture mix grass had results of 67, 68, 71, 66, 67, 69, 70, average was 68.28 for trial one. Trial two had results of 71, 67, 70, 69, 68, 70, 67, average was 68.86. Trial three was 71, 66, 70, 67, 69, 70, 69, with average of 68.86.</p> <p>Grass hay produced 67, 68, 71, 66, 67, 69, 70, average was 68.28 for trial One. Trial two had 68, 70, 69, 71, 66, 69, 70, average being 69.</p> <p>Trial three results were 67, 70, 71, 68, 66, 68, 69, average was 68.43.</p>	
Conclusions/Discussion <p>My hypothesis was correct, the alfalfa hay did produce the most energy for the horse judged by the horses blood sugar level.</p>	
Summary Statement <p>I fed seven diffrent horses three types of common feed and then tested their blood sugar to see which feed produced the most energy for the horse.</p>	
Help Received <p>My two friends Heather and Shayla Dabney helped me handle the horses, and allowed me to use four of their horses for the experiment.</p>	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Thomas C. McGrath, Jr.	Project Number J1014
Project Title Identification by Dental Structures	
Objectives/Goals The purpose for doing this project is to prove that forensic odontology is a reliable science and that people can be positively identified by teeth or other dental features.	
Abstract	
Methods/Materials 1. 216 Styrofoam cards(specimen cards) 2. Ruler # in centimeters 3. Labels 4. 72 interviewees	
Results In phase 1, the 7th graders were able to positively match their dental imprints approximately 96% of the time. In phase 2, 6th graders successfully identified their imprints 82% of the time. While in phase 3, which consisted of a blend of 6th and 7th graders, these individuals matched their imprints 95.6% of the time	
Conclusions/Discussion The results of all three phases demonstrated that forensic odontology is a reliable science which can be used to identify an individual by their teeth and dental structures.	
Summary Statement My objective was to test the accuracy of the science of forensic odontology.	
Help Received Used lab equipment at Bay View Dental Lab under supervision of lab owner, Gloria Salvio,	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Morgan A. McLeod	Project Number J1015
Project Title Chew On This: A Study of Rats' Gnawing Behaviors on Electrical Wires	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Rats and other rodents do a considerable amount of damage worldwide by gnawing on electrical lines. The purpose of this project was to determine if rats showed a preference to gnaw on certain types of wires commonly found in the home.</p> <p>Methods/Materials An experiment was designed in two phases. Phase 1 trials were done to determine if a preference for a wire type could be demonstrated. Six wire types were run through the bottom of a domestic pet rat cage. The wires included a gray telephone wire, a red category 5 wire, a gray category 5 wire, a black coaxial wire, a white romex 110-volt wire, and a copper speaker wire. Gnawed wires were changed daily for 30 days and results were recorded. Phase 2 trials were designed to determine if the presence of electrical current in the wires influenced the gnawing behavior. Telephone wires and Category 5 wires were connected to appropriate electrical sources and another 6 days of trials were run.</p> <p>Results Phase 1 showed a preference for the gray telephone wire and the red category 5 wire. Phase 2 results revealed a strong preference to gnaw on telephone wires that were connected to a working phone but failed to show any preference for Category 5 wire connected to an active computer network.</p> <p>Conclusions/Discussion This limited study supports the hypothesis that there are certain characteristics to electrical lines that may encourage gnawing by rats. Further experiments could be designed to determine which properties attract gnawing behavior by controlling the variables of size, shape and stiffness of the wire; color, composition and texture of coatings; and the properties of electrical currents running through them.</p>	
Summary Statement This project was a study of rats' gnawing behaviors as related to electrical wires with certain characteristics.	
Help Received Mother helped change wires, Father helped type report and choose wires to test	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Shawn H. McLeod	Project Number J1016
Project Title A Spoonful of Sugar Helps the Medicine Go Down: Reliable Dosing of Oral Medication to Pet Rats	
Objectives/Goals This project was to determine a convenient and accurate way to orally administer an anti-parasitic drug, Ivermectin, to pet rats in order to treat them for Fur Mites.	
Abstract Methods/Materials Three pet rats needed to be treated. Six "treats" (apple, marshmallow, peanut butter, cheese, popcorn, and raisins) that the rats were known to like were placed on paper plates arranged in a circular pattern on a tabletop. The rats were positioned, one at a time, in the middle of the circle of treats. Their preferences (which treat they ate first) were recorded. Twelve trials were run for each of the three rats. The proper dose of Ivermectin was determined, from several sources on the Internet, to be 0.2 mg/kg. The rats were weighed and the proper dose to be administered was determined. A one-percent solution of Ivermectin was diluted with sterile water at a 1:30 ratio to prepare a mixture that was 0.33 mg/ml. This resulted in a volume of 0.2ml to properly dose the 330 gram rats. The "preferred treats" were then injected with this dose and fed to the rats.	
Results Of the six treats tested, the rats showed a strong preference for marshmallows and popcorn. Additionally, the rats always consumed these two treats completely, whereas they only nibbled at the others. Popcorn was easily injected with the drug whereas the marshmallows would not hold any injected fluid without leaking. The rats eagerly consumed the injected popcorn and the Fur Mites were successfully treated by this method.	
Conclusions/Discussion The rats had contracted Fur Mites (<i>Radfordia ensifera</i>), a common rat parasite that causes intense itching. The Veterinary drug Ivermectin, at a dose of 0.2mg/kg, has been used successfully to treat fur mites but is not commercially available in a dosing format that lends itself to conveniently treating small pets. In order to avoid the need to inject the rats to deliver the medication, the problem of accurately dosing rats orally was solved by determining a "treat" that the rats would reliably consume completely when injected with the proper dose of Ivermectin.	
Summary Statement The objective of this project was to find a way to orally administer Ivermectin , an anti-parasitic drug, to my pet rats to treat fur mites.	
Help Received Father (an Oral surgeon) helped determine proper drug dosage/ helped me type	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Erin S. Miller	Project Number J1017
Project Title Are You or Your Pet Overly Acidic?	
Abstract Objectives/Goals My goal is to see if there is any relationship between a cat's pH and a human's pH at different times of the day. I will measure the saliva pH of 3 human's and three cat's three times a day. Methods/Materials The materials I will need for this project are, 3 cats, 3 humans and saliva pH test strips. Test pH by opening the cat's mouth, and touch the strip on its tongue. Open your mouth and touch the strip on your tongue. Results My results were that after three days I found that the cat's pH was always higher. Conclusions/Discussion My conclusion was that my hypothesis was in correct. The human's pH was lower throught the three days of testing.	
Summary Statement The relationship between a human's pH and a cat's pH at different times of the day.	
Help Received My mother purchased my board and pH strips.	



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Amanda L. Mundell	Project Number J1018
Project Title The Effect of Athlete's Heart Syndrome on Pulse Pressure	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Pulse pressure (the difference between systolic and diastolic blood pressures) is recognized as a leading predictor of stroke and heart attack risk. For every ten point increase in pulse pressure, there is a twelve percent increase in mortality. I hypothesized that, for middle-aged or elderly individuals, pulse pressure would tend to increase with the development of athlete's heart syndrome (enlargement of the left ventricular cavity, dramatically slowed heart rate, and increased cardiac efficiency resulting from sustained aerobic conditioning).</p> <p>Methods/Materials The diastolic and systolic blood pressures of a number of middle-aged and elderly athletes were recorded and compared to their resting heart rates. The subjects were screened to ensure they were not taking blood pressure medication. A history was obtained to rule out sinus bradycardia and ensure that true athlete's heart syndrome was present. Several youthful athletes were also tested as a control group. One middle-aged former athlete with hypertension was followed for several months, during which he engaged in strenuous aerobic conditioning to reduce his heart rate, and then became sedentary, allowing his heart rate to return to normal. The subject's resting heart rate, diastolic pressure and systolic pressure were measured at intervals during this time and averaged.</p> <p>Results Those middle-aged and elderly athletes who had clear athlete's heart syndrome (a resting heart rate of 45 beats per minute or below) had an average pulse pressure of 54.7 mm Hg. Those with "normal" resting heart rates (60 beats per minute or above) had an average pulse pressure of 38.5 mm Hg.</p> <p>Conclusions/Discussion The results confirmed the hypothesis. Middle-aged and elderly subjects with athlete's heart syndrome exhibited increased pulse pressure compared to subjects with "normal" hearts. Because increased pulse pressure is recognized as a leading contributor to heart attack and stroke, the results of this experiment suggest that middle-aged or elderly persons, particularly those with pre-existing hypertension, should be careful not to "overdo" it when embarking on an exercise program. If they exercise too vigorously for an extended period of time, they could develop athlete's heart syndrome, or something close to it, which could lead to a dangerously widened pulse pressure.</p>	
Summary Statement My project looked for a link between the development of athlete's heart syndrome and widened pulse pressure, in order to determine whether sustained, vigorous aerobic exercise might be dangerous for middle-aged or elderly people.	
Help Received My parents drove me to running and cycling venues to test athletes and to the library. I interviewed Robert Millhouse, M.D. regarding the heart. I interviewed engineer Douglas DeVries regarding fluid mechanics. Dad bought me a sphygmomanometer.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Henry J. Perazzelli	Project Number J1019
Project Title The Arboreal Acrobatics of the Western Gray Squirrel	
Abstract Objectives/Goals I chose to test the jumping ability of squirrels because I have enjoyed watching them in my backyard, running, leaping and chasing each other. My objective for this experiment was to find the extent of the squirrel's jumping capability on a horizontal scale. From my previous research, I hypothesized that all the squirrels being tested would be willing to jump at least two meters. Methods/Materials For this experiment, I used a 30" round board, a 1/2" I.D. steel pipe, and several pieces of plywood. I placed food on a red and white target. Three wild squirrels participated in the experiment. The process was to move the ramp back a 1/4 of a meter every time the squirrels successfully jumped the distance. Results In general, all the squirrels were able to jump one meter. The medium squirrel was able to jump 1.75 meters horizontally. The small sized squirrel was able to jump 1.5 meters and the large squirrel was able to jump 1.0 meter. In all there were 30 observed successful attempts by the squirrels. Conclusions/Discussion I conclude squirrels are territorial and have strong survival skills. I expected to attract numerous squirrels through networking and that did not happen. Also, once the jump was beyond them, they stopped without any further attempts. They will not take risks beyond their capabilities.	
Summary Statement My project is about the arboreal acrobatics of the Western Gray Squirrel.	
Help Received My father help me to build and photograph this project. My mother helped me collect the supplies.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Jessica E. Prescott	Project Number J1020
Project Title Got Intestinal Problems? Try Parasite Control!	
Abstract Objectives/Goals My objective while doing this project was to determine whether horses that were kept in a pasture had more or less parasites than horses that were kept in stalls. I predicted that the horses kept in a pasture would have more parasites than the horses kept in stalls. Methods/Materials Eight horses were dewormed on the same day with the same dewormer. Four of these horses were kept in a pasture and four were kept in stalls. Forty-nine days later, fecal samples were collected from the eight horses, prepared and examined under a microscope. Strongyle and ascarid eggs were counted in each sample and the number found was totaled within the two groups of horses. The totals were then compared to determine which group had more parasite eggs. Samples were taken again twenty-four days later and this process was repeated. Results The first collection resulted in the stall horses having a total of 6 parasites with an average of 1.5 parasites per horse. The pasture horses had a total of 37 parasites with an average of 9.25 parasites per horse. One of the stalled horses was turned out on pasture before the second collection which resulted in his having almost double the amount of parasites from the first collection. After the second collection, the three stalled horses had a total of 1 parasite for an average of .33 parasite per horse, and the five pasture horses had a total of 163 parasites for an average of 32.6 parasites per horse. Conclusions/Discussion I concluded from my results that horses kept in a pasture are more likely to obtain parasites than horses kept in stalls. This may be due to all fecal material being removed from the stall daily and the feeding arrangement in which stalled horses eat from a bunk while pasture horses eat on the ground where parasites can crawl up on the grass. Therefore, horses kept in a pasture may need to be dewormed more often than horses kept in stalls.	
Summary Statement My project was to determine whether horses kept in a pasture had more or less parasites than horses kept in a stall.	
Help Received Mother helped type report; father helped with wording in written information; father taught me how to focus microscope.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Nicole M. Rothschild	Project Number J1021
Project Title Whew, I Am Winded! The Lung Capacity Test	
Abstract Objectives/Goals To determine why some musicians can hold their notes longer than others. Lung capacity is affected by activity. Methods/Materials To measure lung capacity a meter was designed and built specifically for this experiment. The "Air Ball" measures the amount of air that one can exhale by pushing a ping-pong ball up a tube. The tube is marked in liters. Each subject had three attempts and the highest score was used. Results After repeated trials and analyzing data it was found that Oboe players had the greatest lung capacity, followed by Baritone Sax. However, the data is not completely reliable because height, size, age, and other activities were not controlled when doing the experiment. Clearly, height is most important. As it turns out there are several variables in this data that can affect the results. Age, height, weight, activity and size are all factors of this project. To arrive at a conclusion the data was narrowed to find subjects that were most similar, which reduced the variables. What else can affect lung capacity? Health, fitness and physical development should also be considered for further research. A better conclusion may be drawn if the subjects were full grown, in good health and all had similar lifestyles and fitness levels. Therefore the hypothesis could not be proved. Conclusions/Discussion After breaking down all the data it was recognized that the Oboe's have the largest lung capacity among the musicians. Nevertheless, height, or size and development is clearly the most important and significant factor in determining lung capacity. To determine if in fact activity does affect lung capacity a new study would be needed where the variables of height and development are the same. Given the vast difference between people, this would be a great challenge.	
Summary Statement This project measures the lung capacity of different wind and brass musicians to determine if activity affects lung capacity.	
Help Received My mother helped me type some of my report and drove me to the store to purchase materials. She also drove me to Westlake High School to test additional musicians.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kyle J. Scaffidi	Project Number J1022
Project Title Lung Capacity: Is There a Difference in Athletes and Non-Athletes?	
Abstract Objectives/Goals The objective of my experiment was to determine if athletes have a larger lung capacity than non-athletes. I hypothesized athletes, because of their consistent aerobic activity, would exhibit a significantly greater lung capacity. Methods/Materials I tested eighty sixth-grade students: 20 male athletes, 20 male non-athletes, 20 female athletes, and 20 female non-athletes. Each subject inhaled as much as they could and then exhaled into a balloon as much as they could. The experimenter then measured the diameter of the balloon to quantify the lung capacity of the subject. Each subject completed three trials, with adequate rest in between each trial. Results Both the male and female athletes blew the balloon up on the average over one inch larger than the non-athletes to validate my hypothesis. There was a seven percent increase in lung capacity for female athletes when compared to female non-athletes and a four percent increase for male athletes when compared to male non-athletes of the same age. Constant aerobic activity also affected the consistency of lung capacity as male and female athletes' measurements ranged 6.3 inches and 4.8 inches respectively while male and female non-athletes' scores ranged 9.5 inches and 16.0 inches respectively. Conclusions/Discussion My experiment proved a significant advantage to exercise for both genders. My averages show consistent aerobic activity leads to a larger lung capacity for both males and females, eleven to twelve years of age. A greater lung capacity leads to a more efficient respiratory system to distribute oxygen throughout the body, especially important while exercising.	
Summary Statement My experiment taught me that constant and consistent exercise will improve the efficiency of a vital organ, our lungs, and that all people, even young subjects, need to work this organ along with the rest of their body for a healthier life	
Help Received Parents bought the balloons used in the experiment. The sixth grade teachers allowed me to test during P.E. times. My teacher taught me how to use Excel to analyze the data collected.	



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Camille M. Shanahan	Project Number J1023
Project Title Seeing Double in Focus	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals How are identical twins different and similar? I think that I will discover that my sisters will not have the same blood samples and dental X-rays. I think they will have a few similar dreams, and will have some of the same likes and dislikes. I also think they might have similar hair strands and fingerprints</p> <p>Methods/Materials Materials: Cell samples; Hair; Fingerprints; Dental X-rays. Methods: Create a survey; Make a graph of the survey results; Analyze data and form a conclusion. Results: I found out that their hair was almost alike? Dental X-rays showed that their jaws were very similar, but their bites and structure were slightly different. We found they both had the same blood type, O positive. I found out that identical twins fingerprints are different. Fingerprints come from the growth of the twin in the mother's womb. Finger indentations are not all about genetic characteristics or DNA. The differences of the fingerprint comes from the mother's nutrition, blood pressure, position of the baby in the womb and the growth rate of the baby's first three months. But, you will also find similar patterns and whorls in the fingerprints of the twins. I wanted to see what these differences and similarities would look like so I did a fingerprint sample of my sisters and found out that they were not completely alike. I did the test on both of them and then looked at the prints under a magnifying glass.</p> <p>Results They were practically exactly the same except some of the whorls were placed differently. After getting my surveys back from the 14 sets of identical twins, I tallied up the answers. Their sex was boys - 2 to girls - 12. Most everything was half and half but some of the results were a lot different than the others. The surveys were gathered from Rio Del Mar, Aptos Jr. High, Aptos High, North Monterey County High School, and Anzar High School. My graph on the surveys shows most of the important questions.</p> <p>Conclusions/Discussion To me the results meant that twins do have different thoughts in most things, but in some they do think the same. For example, my sisters survey showed that on the distinct features question Lauren answered that they did have distinct features, but Paige circled that they didn't. I found out that twins do have some similarities, but also have their own unique differences. If I were to investigate further, I would get DNA samples and check bone structure.</p>	
Summary Statement How are identical twins different and similar?	
Help Received Bob Schellentrager, my dentist Steve McCarthy, head pathologist at Dominican Hospital David Richlin, hair salon owner	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Chelsea B. Stewart-Fusek	Project Number J1024
Project Title Are Domestic Dogs and Wolves Similar in Their Hierarchical Behaviors?	
Abstract Objectives/Goals The objective was to see if a domestic dog pack's hierarchical behaviors were similar to those of wolves. Methods/Materials I observed seven domestic dogs on two acres of land and recorded hierarchical behaviors among the "pack." At three different intervals throughout my study I introduced eight bones to the pack in order to record the eating order, and observe whether or not it was affected by the social ranking. Upon obtaining a large sample of observations I then researched the hierarchical behaviors that are seen in wolves. To get my results I compared my research of wolves with my observations of the dogs. Results My domestic dog pack did indeed exhibit hierarchical behaviors similar to those of wolves. Different degrees of submissiveness and aggressiveness were displayed by the pack of domestic dogs, and eating orders were affected by social ranking. Conclusions/Discussion My hypothesis was correct, because the dogs displayed similar hierarchical behaviors to those of wolves. According to my study both species live by a highly organized rank system, as was demonstrated by their eating order, social interactions, etc. Although the majority of their behaviors were similar, there were some differences, such as in a wolf pack there are both a female and male Alpha, whereas in my study there was only one Alpha, as all of the dogs were spayed or neutered and a breeding pair was not necessary.	
Summary Statement My project was about comparing hierarchical behaviors of dogs and wolves.	
Help Received Project advisor Victor Aubin assisted me in putting the finishing touches on my project before reaching county.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Yu Hsiang "Simon" Wang	Project Number J1025
Project Title The Fingers of Isaac Stern: Will Constant Stress Affect the Development of Phalanges?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine if violinists have longer phalanges in their left hand than their right hand compared to non-violinist. I believe violinists have longer left hand fingers due to the stress on the bones.</p> <p>Methods/Materials Methods: 6 steps: 1)Design a questionnaire 2)Define samples. 3)Select two groups: violinists and control group,each with twenty four people,divide evenly into four sub-groups: male, female, adult and young adult.(12 & up) 4)Define uncontrolled variables. 5)Conduct a personal interview and measure the index, middle, ring finger & pinky. 6)Analyze data. Materials: A specially made ruler is used. It has a moveable piece of cardboard on the ruler for easy reading and maximum accuracy.</p> <p>Results The violinist group has much longer phalanges in their left hand by as much as 0.6 cm. The non-violinists left hand four fingers are significantly shorter than the right hands' by as much as 0.9 cm. The data show no significant difference between both adults and young adults, male and female group.</p> <p>Conclusions/Discussion Conclusions: My hypothesis is correct. The violinists' left hand fingers are longer than their right hand. This might be due to the stress they put on their bones during years of practice. Next question: I would like to know if my research would help any medical study. Especially for the handicapped with two legs of different length.</p>	
Summary Statement Constant exercise and extra stress will make the finger bones grow faster and thicker.	
Help Received Mother helped type report & print pictures, father helped make the special ruler and wired violin on the board. Parents helped drive to other Southern California cities for searching valid samples from various Youth Symphony.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Allison J. Winger	Project Number J1026
Project Title The Effect of External Stimuli on Primates	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Since primates are known to be curious, the purpose of this project is to determine which types of objects are most interesting to the pygmy marmosets at the San Diego Zoo. It would seem that these primates would be more curious about unfamiliar objects and, therefore, they would show more interest over a longer period of time in them than they would in familiar objects.</p> <p>Methods/Materials A stopwatch was used to time how long it took the pygmy marmosets to take notice of twelve different objects one at a time and how long they looked at each object. In order to test each item, the object was held up to the glass of the enclosure, the timer was started, and the pygmy marmosets were observed to determine when they took notice of the item. The time that the animals first paid attention to the object and the time that they quit looking at the item were recorded along with their apparent level of interest on a scale of one to five. The twelve items tested were as follows: hand mirror, snake light flashlight, teddy bear, camera, CD, sponge, wooden spoon, silver spoon, red flowers, blue flowers, tree branch, palm leaf and stopwatch.</p> <p>Results The results show that primates, pygmy marmosets in particular, are very curious about all objects but are attracted to some objects more than others. The hand mirror was the pygmy marmosets' favorite and it was looked at for a total of 2,777 seconds. The objects which were more interesting, especially the mirror and the teddy bear, are the items which would be most useful to zoos and keepers of captive monkeys in a visual enrichment program.</p> <p>Conclusions/Discussion The results show that the two pygmy marmosets which were tested clearly preferred new, unfamiliar objects to items with which they were already familiar. Furthermore, the non-control, shiny items and the larger, more obvious objects were determined to be preferred by these primates. However, it should be noted that, in general, the pygmy marmosets were fairly interested in all of the items and did, in fact, live up to the reputation that monkeys have of being curious. Like humans, they clearly showed preferences towards certain items, even to the point of extreme excitability. It can be concluded that pygmy marmosets, like humans and probably many other primates, have a very strong curiosity, particularly towards items unfamiliar to them.</p>	
Summary Statement This project tested pygmy marmosets to determine which types of objects were most interesting to them: familiar, unfamiliar, shiny, bright, large, small, etc.	
Help Received The personnel from the San Diego Zoo were very helpful in providing information and guidance. An artist friend helped me design my board. My parents drove me to the zoo, helped me to record data during testing, and proofread my work.	