CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Aaron D. Barnhart

Project Number
J1401

Project Title
Can Cats Be Right or Left Pawed?

Abstract

Objectives/Goals
I think that cats are right of left pawed. My objective was to determine if cats have a dominant paw.

Methods/Materials
The materials I used included a small box with a hole cut in the top, a cat toy with a string attached and cat treats. I made up three tests to observe whether or not the cat used a dominant paw. I also designed a data sheet on my computer to log all testing information.

The procedures I used included putting a small treat in a box that had a small hole in it; I moved a toy on a string around in front of each cat to bat at. I observed and recorded each test. I also picked up each cat and gently placed it back down on the ground to see which paw was used as the cat stepped away. I tested my own cats as well as most of the cats living at the Tuolumne County Humane Society.

Results
More cats showed the use of a dominant paw than not. Six of the cats tested used their left paw more dominantly than their right paw. Four of the cats tested used their right paw more dominantly than their left. Two of the cats tested were too shy to react at all to the tests. One cat tested was undefined whether it had a dominant paw or not.

Conclusions/Discussion
The test results conclude that cats can be left or right pawed. My hypothesis was proven correct. Like humans prefer left or right hands, cats prefer to use one paw more than the other.

Summary Statement
My project is about determining whether or not cats prefer to use a dominant paw.

Help Received
Discussed project and asked questions of Marvin Orway DVN, asked questions of Eva Jaeger Licensed Vet. Technician, tested all of the resident cats at the Tuolumne County Humane Society, My Mom helped type project.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Eli Hoff; SarahRose Jarvis

Project Number
J1402

Project Title
Can Bricky and Indy Coexist?

Abstract

Objectives/Goals
Our Science Fair Project involves our dogs, Bricky and Indy. Our question is Can Bricky and Indy coexist? Prior to this project, our dogs could not interact together, and acted somewhat aggressively, especially Indy. Our goal is to expose our dogs to each other repeatedly to see whether they can coexist without being aggressive.

Methods/Materials
Procedure:
From the first interaction to the fifth interaction, it will be approximately three weeks. We hope to expose our dogs to each other at three times a week and as much as five times a week.
Step One: Dogs (both but separate) training refresher
Step Two: A series of Interactions, exposing the dogs to each other.
First Set of Interaction(s): Dogs walk at distance but beside each other on neutral ground
Second Set of Interaction(s): Dogs walk beside each other
Third Set of Interaction(s): Dogs face each other
Fourth Set of Interaction(s): Dogs interact up close with leash
Fifth Set of Interaction(s): Dogs interact without leash
Our dependent variable is the way the dogs act when together. Our independent variable is the way we treat the dogs. This includes training, number of interactions, and the way we interact with our dogs.

Results
The dogs were able to interact without acting aggressively much faster than we anticipated.

Conclusions/Discussion
In conclusion, our hypothesis was partially incorrect and partially correct. We were correct in that Indy and Bricky were able to interact off leash successfully. Our hypothesis was not correct in that it only took seven interactions versus the 12 to 20 interactions we predicted. Our experiment went even better than we planned. Because of this, the dogs no longer act aggressively towards each other and can interact together on a daily basis.

Summary Statement
Our project focus is to have our dogs interact together repeatedly to see whether they can coexist together without being aggressive.

Help Received
Parents helped handle the dogs.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Alexandra S. Kokka

Project Number
J1403

Project Title
Studying the Effects of Stress and Nutrition on the Growth Rate of Mice

Abstract

Objectives/Goals
My goal was to determine if placing mice in varied environments and different diets would affect the weight gained or lost.

Methods/Materials
Twenty-four mice were placed in four cages with six mice per group. Groups One and Two were in a night/day environment. Groups Three and Four were placed in a twenty-four hour light environment. One group from each environment was given high carbohydrate food (Frosted Flakes), while the others were given regular mouse food. I weighed each mouse individually on a triple beam balance scale every 3 days for 15 days. The results were recorded and graphed.

Results
Group Four (regular mouse food with twenty-four hour light) gained the most weight, while group One(Frosted Flakes with night/day environment) lost the most weight. Group Three (Frosted Flakes with twenty-four hour light) lost the second most amount of weight, while group Two (regular mouse food with night/day environment) gained the second most amount of weight.

Conclusions/Discussion
In conclusion, I believe that group Four gained the most weight because their diet was adequate and the 24 hour the light exposure may have stressed the mice. From my previous year project, I found that stress causes weight gain in mice. I also believe that group One lost the most weight because Frosted Flakes doesn't have the proper amount of fat, nutrients, and vitamins needed to produce a balanced diet for mice. Due to their high metabolism, the effect was dramatic.

Summary Statement
My project studied the importance of proper nutrition to mammalian growth and how stress can also affect growth.

Help Received
Father helped assemble the board. Teacher helped with graphs.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Eugene Laksana

Project Number
J1404

Project Title
Impact of Osteophase and Herbal Extracts on BMD Levels

Abstract

Objectives/Goals
After researching a medication based on herbal components called osteophase, I have decided to conduct an experiment concerning the impact of osteophase and its herbal components (including astragalus, anbgelica sinensis, and coix seed) on a bone's BMD level and density structure using an x-ray. Then, operating a texture analyzer, I also wanted to calculate the strengths of the treated bones versus the bones that were untreated. Through this experiment, I hope to determine if osteophase may be an ideal prevention or cure to osteoporosis.

Methods/Materials
Fill fifteen cups with 175 milliliters and mix cups 1-3 with water, 4-6 with 13 grams of astragalus, 7-9 with 13 grams of angelica sinensis, 10-12 with 13 grams of coix seed, and 13-15 with 2 capsules of osteophase. Place one bone in each cup, and record observations for one month. After one month, use the x-ray to take images of each of the bone's density structure. Repeat these same procedures, but this time, extend the observation period to two months. Once the total submersion period has reached three months, take another x-ray of each of the bone to base on for your results. Finally, use a texture analyzer to test the strengths of the bones. This step will terminate the experiment.

Results
The bone treated with the osteophase solution developed bones that were the densest. However, the bones treated only with water were determined the most durable once it was tested on the texture analyzer. All the other bones that were treated with the other herbal extracts fall below these two.

Conclusions/Discussion
Osteophase is a medication that works by redirecting calcium into the bones. Due to the lack of calcium external prior to the bones, this medication was unable to serve its full potential, although it did develop the densest bones. However, the osteophase solution maintained the density by shifting minerals from the outer layer, into the marrow, thus weakening the bones further than the water solution.

Summary Statement
In an attempt to find the cure for osteoporosis, this project is designed to test the effectiveness of osteophase and its herbal extracts in the promotion of calcification of bones by redirecting BMD compositions into the skeletal system.

Help Received
Dr. Haidekker contributed information for my research; Dr. Judo assisted me in using the x-ray; Dr. Omary assisted me in using the texture analyzer; Mrs. Taylor checked and approved of my papers; Mom helped with the design; Dad helped supervised through procedures.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Ryan A. McCormick

Project Number
J1405

Project Title
A-Maze-Ing Rat Senses

Abstract

Objectives/Goals
The objective of my project is to determine whether the absence of light will effect the time it takes a trained rat to navigate its way through a maze.

Methods/Materials
Materials used: 1. 3 male rats # common house rat # Rattus Norvegicus; 2. 1 Maze # 4# x 4# x 6#; 3. 1 quart of flat black paint; 4. paint brush; 5. 1 4# x 4# sheet of plywood; 6. 40 board feet of 1# x 6# wood; 7. 1 rat cage with bottle and mini igloo;8. nails Method and Procedure used: 1.Train rats to run maze in the light; a. Guide them along with your hand; b.Reward them by giving them cheese and putting them in their cage; c.Repeat until they can do it alone # 4 to 6 times daily; 2.Train rats to run maze in the dark; a.Use same procedures as in step one; 3.Run them while recording time in the light # 5 times each; 4.Run them while recording time in the dark # 5 times each; 5.Compare running times

Results
Average times for each rat in the dark and in the light: Rat #1 Light: :34.57 Dark: :27.45 Rat #2 Light: :47.56 Dark: :33.53 Rat #3 Light: :45.70 Dark: :24.14 Raw Data for all three rats: Rat #1 Light: 1:10.69; :37.97; :29.12; :05.68; :29.40 Dark: :09.41; :28.97; :19.19; :26.82; :52.88 Rat #2 Light: :59.79; 1:00.03; :29.12; :57.13; :31.71; Dark: :35.84; :35.25; :47.63; :20.22; :28.69 Rat #3 Light: :32.19; 1:11.75; :43.09; :37.31; :44.16; Dark: :19.32; :19.75; :24.37; :25.37; :31.91

Conclusions/Discussion
In my hypothesis I predicted that the three rats would run faster through the maze in the dark because I thought since rats have poor eyesight they would not use their eyesight to navigate, that it is distracting to them. Therefore, instead of using their eyesight, the rats would use their touch and smell. My data showed that when all three of the rats ran through the maze in the dark they did so faster than in the light. The average time combined for all three rats to run through the maze in the light was :42.61 seconds, and the average time in the dark was :28.37. I was not surprised that the results supported my hypothesis because my background research indicated that rats don#t rely on their vision to navigate, rats would possibly navigate better without their vision. My results show that rat #3 went :21.56 seconds faster in the dark trials than he did in the light trials. This is a significant result supporting my hypothesis. All of the averages showed that they ran faster in the dark than in the light.

Summary Statement
The goal of my project is to determine whether the absence of light effects the time it takes a trained rat to navigate its way through a maze.

Help Received
Mother and Father helped care and initially train the rats. Father and Grandfather helped build the maze. Mother helped type report.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Mary M. Raymund

Project Number
J1406

Project Title
Saddle Sense: Which Saddle Pad Material Keeps the Horse at the Coolest Core Temperature After a Twenty Minute Workout

Abstract

Objectives/Goals
The experiment is to examine different materials of saddle pads by measuring a horse#s core temperature, after a twenty-minute work out. The comparison is between three different saddle pad materials: cotton, wool and neoprene. The pads are tested by exercising a single horse, for a specific amount of time, in a speed controlled setting. For twenty minutes the horse will be attached to a machine that will control the horses speed by leading it in a circle, at the end of fifteen trials, over fifteen different days.

Methods/Materials
A Healthy Quarter Horse; Halter with lead rope; Stud Chain; Large Animal; Rectal Digital Thermometer; Temperature Sensor by PASCO model PS-2000; Soapy water; Petroleum Jelly; Western Saddle weighing 15.9 Kilograms; Wool Pad; Cotton Pad; Neoprene Pad; Brush; Hoof Pick; Hot walker: Dayton DC; speed control with speeds 0-100; Lunge Whip; An instrument that measures weather temperature.

Results
The wool pad kept the horse at a cooler core temperature of 40°C after a 20 min workout, five times for each saddle pad. The controls were using the same horse, for the same amount of time in a speed controlled environment. The results demonstrates the neoprene pad does not perform well because the fabric does not breathe well. The cotton and wool saddle pads were closer in results, because they are both natural material and breathe more.

Conclusions/Discussion
The wool saddle pad performs the best of all three pads at keeping the horse at the coolest core temperature after a twenty-minute workout. This finding was determined by measuring the pad with the smallest change in core and surface pad temperature. If it was feasible, a test could be done verifying the independent variables on fifty horses to see if that would support my results. In conclusion, the wool saddle pad is the best one to use to maintain the horse#s coolest core temperature and keep the horse from overheating and collapsing from exhaustion.

Summary Statement
Three different saddle pads, wool, cotton and neoprene, were tested to determine which material keeps the horse at the coolest core temperature after a 20 minute workout.

Help Received
Supervision of Mentor when taking rectal temperature; My Mom assisted with the timer for the trials; Science teacher let me borrow the Pasco Sensor Probe and reviewed lab report: Used hot walker at Ortega Equestrian Center.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Mackenzie Lynn Riney

Project Number
J1407

Project Title
Is a Horse's Stride Length Affected by Its Own Shoulder Angle or Height?

Abstract

Objectives/Goals
The objective of the project is to determine if a horse's stride length is affected by its shoulder angle or height.

Methods/Materials
This experiment included measurements from 28 horses. Each horse was measured for shoulder angle, height, and stride length. The data was collected, stride lengths compared to both height and shoulder angles and put into graphs to determine results.

Results
The results showed that on average, the horses with the longest strides had the smallest shoulder angles. The horses with the shortest strides had the largest shoulder angles. Smaller shoulder angles give longer strides because if the shoulder angle is smaller, then the bone is more parallel to the ground, allowing the leg to reach farther and making the stride longer. The results show that the height of the horse has nothing to do with the stride length.

Conclusions/Discussion
The outcome of this project is important to horse trainers, enthusiasts, judges, and riders. Equestrians need to know their horse's body type and style in order to have the best performance and speed. Horse riders hope for the best presentation from their horses when it comes to jumps, agility, or shows. If a horse's stride is short when performing in a show, the score will suffer because long strides are preferred over short ones. Most people would think that a larger horse would have a longer stride. My experiment demonstrates that the shoulder angle, and not the height of a horse, determines its stride length.

Summary Statement
This project is to determine if a horse's stride length is affected by its shoulder angle or height.

Help Received
Briarwood Riding Stables and Jeremy's Ranch provided horses for the project.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Marcia Elena Uncangco

Project Number
J1408

Project Title
How Mice Habitats Affect Cognitive Skills

Abstract

Objectives/Goals
My goal for this project was to study how four groups of mice habitats would affect their cognitive skills. I also sought to determine what, and how much they would learn in a short period of time.

Methods/Materials
All the cages consisted of basic materials* and both male and female mice, three in each cage. Cages one and two were made of a transparent plexiglass material with small openings intended for ventilation located on the top and sides of these cages. Cages three and four were made of metal wire bars with small openings between the bars that enclosed the cage, but cage three#s bars were set apart a little wider than cage four. Cages one through four were put in the order of the lowest stimuli to the highest, with cage one containing the least of the stimuli. After six weeks, the mice were put into a maze that I constructed out of a prefabricated maze kit. After I constructed the maze, I mixed the mice food with brown sugar, and then placed it at the end of the maze. The purpose of mixing the brown sugar in with their food was to entice the mice to travel through the maze as quickly as possible.

*Basic Materials=water, food, bedding

Results
My theory was that the mice in cage four, which contained the most stimuli, and with their continued time improvement through the maze, they would become most capable of completing the maze in the shortest period of time. In fact, cage three contained the mice that learned the fastest. I discovered this happened because when I was picking out cages I did not consider that cage three with small wire bars would act as an extra unwanted stimuli. Unbeknownst to me, the mice would eventually want to squeeze through the bars as a way to escape the confinements of the cage. Due to these daily occurrences, the bars were what changed the results, giving them an education in obstacles.

Conclusions/Discussion
Even though my hypothesis was not fully supported by the evidence, if I had planned the actual layout better, I believe the data would have had a more favorable outcome. If I do this project again I would put the mice in cages made from the same enclosure materials, instead of using both wire and plexiglass cages. I would test the mouse#s cognitive skills prior to exposing them to their new environments, to get a definitive answer to my curiosity of how habitats affect their cognitive skills.

Summary Statement
My project was to see if the more stimulus added to an environment would effect how mice comprehend, respond, and how their instinctive skills are affected.

Help Received
Ms. Persky, Mrs. Parrenas, Mr Rodecker, and my mom and step-dad.

CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Christa G. Watkins

Project Number
J1409

Project Title
Equine Magnetic Orientation

Abstract

Objectives/Goals
The object is to determine if horses are magnetically oriented animals.

Methods/Materials
To study to prove the hypothesis, Google Earth satellite images were collected and the horse's direction in them were analyzed. From here the amount standing on the North/South axis was discovered. There were approximately 135 horses tested in 13 fields from BHS (British Horse Society) certified stables in Greater London and Bexley Kent. The overall percentage of horses standing North/South by taking the overall majority of all of the herds and making a percentage of dominance from that.

Results
A rounded 76% (76.92307692) of the spreads studied had a majority of horses standing on a North/South axis. This shows that they have a magnetic orientation, causing them to automatically, and most likely subconsciously, stand North to South when grazing and resting. The other approximate 23% (23.07642307) was made up of East/West majorities and ties between North/South and East/West.

Conclusions/Discussion
In the wake of the discovery that cattle and deer are magnetically oriented, this experiment found the equally important discovery that horses are magnetically oriented as well. There needs to be more discoveries of large magnetically oriented animals so that it will capture the interest of other scientists, that are not specifically working in magnetoreception, so that further research on this topic can made. There is great speculation on what being magnetically oriented is and what effects it may have, which is why a greater knowledge of magnetoreception is needed. The horse discovery, while important, is a small step in fully understanding this newly discovered and mysterious behavior.

Summary Statement
This experiment has found that horses are magnetically oriented animals.

Help Received
Parents edited research project; Mrs. Gillum (teacher) advised throughout project.