CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Jacqueline M. Ahrens

Project Number
J2201

Project Title
The Effect of the Type of Ground Covering on the Amount of Linepithema humile

Abstract

Objectives/Goals
The objective was to determine the effectiveness of different landscape ground coverings to deter Argentine ants (Linepithema Humile).

Methods/Materials
Standard ground coverings was ranked to determine which was the most effective barrier in preventing Argentine ants. This test was conducted using a food source on plates each containing a different ground covering. The five ground coverings tested were: sand, concrete, pebbles, bark, and dirt. The number of ants was counted every 30 minutes.

Results
On average, 16.25 ants ate from the sand, 10.75 ate from the concrete sample, 10 ants ate from the dirt sample, 3 ants ate from the bark, and .25 of an ant ate from the pebbles.

Conclusions/Discussion
Ants# concentration was greatest with sand and lowest with pebbles. It was found that Argentine ants tend to eat from smooth surfaces because it is easier for them to walk on. After two trials, it was concluded that a ground covering of pebbles would be best to deter ants.

Summary Statement
The project was about how to deter Argentine ants naturally using ground coverings (dirt, sand, pebbles, etc.)

Help Received
Father helped locate large ant colonies

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Stephanie M. Bartel

Project Number

J2202

Project Title

The Ester Project

Abstract

Objectives/Goals

If a young stingray with a birth defect is introduced to her own kind at a late age, will she accept the other Cownose rays?

Methods/Materials

We took a slightly deformed stingray and introduced her to four other cownoses. We did this staggered throughout a period of about 3 monthes for a total of 480 mintues per day. 4 cownose stingays (2 male, 2 female), pH balancer, pH pool, Introduction pool, Ester (slightly deformed stingray), Ester' pool.

Results

Even though there wasn#t a whole lot of schooling between December 11-19, Ester all of the sudden rapidly progressed on the 20th by schooling 150 minutes all together! Ester showed major improvement on December 20thbut then seemed to drop the minutes schooling the next trial. This pattern didn#t happen just once, though. Whenever she rapidly increased her total schooling minutes, she dropped minutes the next trial. If I could do anything differently I would do the experiment when Ester was older because she did not going through the growth spurt most young stingrays have at 6 months of age. Which ultimately means she can#t be move into the main exhibit with the other 15 Cownose rays, because she is too small compared to them.

Conclusions/Discussion

In conclusion, my hypothesis was supported. Although she was still not schooling with the other Cownose rays permanently at a week, there was a clear improvement; as shown in my graph. The deformity didn#t affect her in any way when she was introduced. If a young stingray with a birth defect is introduced to the same species at a later age than most young Cownoses, her age will be a larger factor than the birth defect.

Summary Statement

This Project is about a young, deformed cownose stingray, who is being introduced too 4 other adult stingrays.

Help Received

Fresno chaffee zoo provided the equitment, mom helped organize the board.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Matthew H. Bronars

Project Number

J2203

Project Title

Does Mom's Diet Affect Survival? The Effect of a High Fat Larval Diet on Drosophila. A Model for Human Experimentation

Abstract

Objectives/Goals

This experiment tests the effect of a high fat diet during a fruit fly#s larval stage on its ability to respond to stress as a grown fly.

Methods/Materials

In this experiment two groups of flies were tested, a control group on a regular diet, and a treated group on a high fat diet (containing 20% coconut oil). This experiment used Petco flightless fruit flies, 72 test tubes, 25 plastic containers, bananas, applesauce, vinegar, coconut oil, oatmeal, and cotton balls. Two stress tests were performed on the fruit flies, a starvation test and a cold test. In the cold stress test, flies were placed in empty test tubes and put in the refrigerator for 12 hours. The number of mobile flies was recorded 30 and 60 minutes after being removed from the refrigerator. In the starvation test, flies were left in test tubes with only a damp piece of paper towel for hydration. The number of living flies was recorded approximately every three hours until all the flies were dead.

Results

In the starvation test the first flies to die were two control flies at the 10 hour mark. After 17 hours the first treated fly died. 40 hours into the test, around the middle, the treated group had a 32 percentage point greater survival rate then the control group (39% vs. 61%). The last control fly died 74 hours into the test, at this point 1% of the treated flies were alive. The last treated flies died between 81-86 hours. The average lifespan was 37 hours for the control and 44 hours for the treated (19% longer). In the cold stress test, 30 minutes after being taken out of the refrigerator 33% of the control flies and 36% of the treated flies were mobile. 60 minutes after being removed from the refrigerator 84% of the control flies and 80% of the treated flies were mobile.

Conclusions/Discussion

The results of this experiment showed the treated flies lived substantially longer than the control flies in the starvation stress test. It can be concluded that a high fat diet during a fruit fly#s larval stage is beneficial to its ability to respond to the stress of starvation. In the cold stress test there was little difference between the treated and control groups. It can be concluded that a high fat larval diet does not have on an effect on a fruit fly#s ability to respond to the stress of a cold environment. These results show that a high fat diet during pregnancy may benefit the child.

Summary Statement

This project uses fruit flies as model organisms for humans to predict the effect of a high fat diet during pregnancy on the child's ability to respond to stress.

Help Received

My mother, father, sister, and teacher helped edit my work. Dr. Heinrichsen mentored me and helped me decide what stress tests to use and how much coconut oil there should be in the diet.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Ryan M. Fay

Project Number
J2204

Project Title
How Thick Is Your Shell?

Abstract

Objectives/Goals
My objective during my project was to see if feeding chickens different calcium enhanced foods would effect their eggshell thickness.

Methods/Materials
I took three chickens of the same breed and age and fed them the different calcium rich foods for eight to twelve days at a time. The calcium enhanced foods were oyster shells, eggshells, and 17% Lay Crumble(control). I then collected all of the eggs and cracked them. Next i measured the edge of each cracked egg with a micrometer.

Results
The results to my project were that the eggshells and oyster shells both increased the eggshell thickness by about 20% making the shell stronger.

Conclusions/Discussion
The results of the testing show that the chicken eggshell mix and the oyster shell mix did affect the thickness of the eggshells laid when added to the 17% Lay Crumble. The thickness of the eggshells was increased about the same with both of the manipulated variables. These results validate my hypothesis. Because the baked eggshells and the oyster shells yielded about the same results, I would recommend to use the product that is the most accessable. Despite Lay Crumble producing a thinner eggshell containing less calcium than the chicken eggshells and oyster shells, it is a substantial food to give to chickens to provide adequate eggshell thickness.

Summary Statement
The central focus about my project was to see what calcium enhanced food would increase my chicken's eggshell thickness the most.

Help Received
Mom glued a couple papers on board.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Makenzie G. Flach

Project Number

J2205

Project Title

What Is the Effect of MLG-50 Plus in Chickens at the Onset of Lay, Egg Weight, and Weight Gain?

Abstract

Objectives/Goals

My project objective was to determine if feeding chickens natural organic minerals combined with beneficial probiotics would promote a healthy intenstinal environment that would make for healthier chickens and increased feed efficiency.

Methods/Materials

Sixteen Rhode Island Red hens were divided into two coops. Chickens in one coop were given MLG-50 Plus feed supplement over an eight week period mixed with feed and water. The measurements of the added supplement were done as recommended. Chickens in the other coop were fed normal feed and water with no added supplement. This process was performed over 8 consecutive weeks and data was recorded. Daily, chickens in both coops were checked for food and water consumption and eggs were collected and weighed. All sixteen chickens were weighed on the onset of the experiment and then once weekly and data was recorded.

Results

The group of chickens that received the feed supplement started laying eggs on the forth day of the second week of the experiment which was about two weeks earlier than the chickens that were fed the regular feed and plain water so overall, the onset of egg lay was improved.

The average weight, in grams, of the eggs from the chickens that received the feed supplement was more than the other group of chickens so overall, the eggs produced by the chickens who received the feed supplement weighed more.

The average chicken weight, in pounds, of the group of chickens that received the feed supplement was slightly more than the other group of chickens. This indicates that the feed supplement did effect weight gain of the chickens.

Conclusions/Discussion

I think the results are good news for farmers since it is better to feed animals natural or organic food insted of using antibiotics and other additives.

There are also potential cost saving benefits that poultry growers and perhaps other livestock farmers may see by using this feed supplement product. Using organic feed can produce healthier chickens and eggs, and provide efficient growth with less feed to perhaps allow chickens to consume a lower quality feed that costs less so farmer can save money.

Summary Statement

To determine if feeding chickens a mineral supplement combined with beneficial probiotics promotes a healthy intestinal environment, resulting in healthier chickens and increased feed efficiency.

Help Received

Mother helped wth typing and MLG-50 Plus product obtained from Professer at California State University, Fresno

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Ryan J. Golden

Project Number
J2206

Project Title
Can Tree Frog Behavior Predict Earthquake Activity?

Abstract

Objectives/Goals
The objective was to see if Tree Frog behavior could help predict Earthquake activity. My hypothesis was that the frogs would climb and be active before a seismic event.

Methods/Materials
I re-designed my experiment from last year to get a lot more data and to add controls. Two species of Tree Frogs were observed in two terrariums and their behavior logged on a video system for 24 hours over 10 days. The experiment was conducted at a site on the Maacaama fault centered at 39.17N, 123.15W (in our family room). Seismic activity was downloaded from the USGS for the same period, limited to earthquakes greater than 1.0 on the Richter scale and with epicenters between 38.8 N and 39.5N. The frog behavior and the seismic data was then recorded on a spreadsheet and then graphed to show the correlations between the two.

Results
88 seismic events occurred over the 10 days during the experiment after adjusting for aftershocks. The video-log showed that the frogs were more active prior to seismic events than during the periods in-between: The California Tree Frogs averaged a 40.6% active and climbing rate while the Australian Tree Frogs averaged 33.6%. They averaged 19.3% and 17.8% respectively in the periods between seismic events.

Conclusions/Discussion
The results prove my hypothesis that the frog#s activity would increase and that they would actively climb near a seismic event. I could not see a relationship between magnitude and activity. My conclusion is that Tree Frogs are more active and climb before earthquakes.

Summary Statement
An experiment was designed to see if Tree Frog behavior could help predict earthquake activity.

Help Received
My mother helped me glue the printouts onto the board. My brother helped me set-up the cameras. My father helped me catch the California frogs, buy the Australian frogs and he helped me enter the data into a spreadsheet.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Joseph P. Harmon

Project Number
J2207

Project Title
Drowning in Acid: The Effect of CO(2) on Coral

Abstract

Objectives/Goals
My objective was to see if the presence of CO(2) in a trumpet coral polyp's environment would cause the water to become more acidic and break down the polyp's outer shell.

Methods/Materials
I used two trumpet coral polyps, roughly the same size and weight, and introduced them to separate saltwater tanks. The tanks were equipped with filters, heaters, thermometers, protein skimmers, blue lights, and hydrometers. I monitored the salinity, pH, KH hardness, and measured the shell thickness of each polyp in each tank daily. I also monitored the calcium, nitrate, and phosphate levels weekly. One tank was exposed to CO(2) using a Turbo CO(2) Bio System, a machine that uses sugar and yeast to generate CO(2). The other tank was not exposed to any CO(2).

Results
After four weeks of exposure, the coral polyp's shell thickness decreased quickly in the tank exposed to CO(2) and the pH levels in its environment decreased from 8.2 to 7.9. Its KH hardness levels fell from 10 dKH to 7 dKH. The control polyp's shell kept growing, and the pH and KH hardness levels in the control tank remained stable. My hypothesis was correct.

Conclusions/Discussion
Ocean acidification is the process of carbon dioxide seeping into the world's oceans, which reacts with the water to create carbonic acid. This acid lowers the pH of the water, which is extremely harmful to many varieties of marine life. My experiment tested the effect of this process on trumpet coral. Coral are a huge part of the marine ecosystem, and are also very receptive to changes in pH. We need to protect our planet's oceans and marine life from ocean acidification. Damage to sensitive species like coral can have a ripple effect on the greater ecosystem, potentially affecting future life on our planet as we currently know it.

Summary Statement
My project tested the effect of carbon dioxide on the outer shell thickness/growth of trumpet coral.

Help Received
Mother helped to acquire materials, Advisor provided school time for me to test calcium, nitrate, and phosphate levels.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Connor J. Hartigan

Project Number
J2208

Project Title
No Falcon Know Seagulls, Know Falcon No Seagulls: A Novel Approach to Bird Abatement

Abstract

Objectives/Goals

My objective was to assess whether or not seagull behavior would be modified as a result of the presence of a falcon.

My goal was to determine if the presence of a 'bird of prey' would alter the number of seagulls at a landfill. Further, my objective was to establish a protocol for cost effective and safe bird abatement programs that could be utilized by landfills, vineyards, amusement parks, resorts, airports, and ultimately beaches. At beaches, my goal is to impact improved water quality.

Methods/Materials

Method: 1) Arrive at landfill and follow safety procedures. 2) At sunrise begin taking photos of seagulls to determine a count. 3) Note location of seagulls -- usually hovering low to ground. 4) Falconer prepares birds by removing hood, attaching transfitter, remve leash. 5) Falconer releases falcon to fly towards seagull mass. 6) Falconer shoots flair gun to redirect seagulls and then moves to opposite side of the landfill. 7) Step 5 and 6 are repeated times.

Materials: 2 falcons, quail meat for falcon training/conditioning, falcon perch, tansmitter, hoods, cages, flair gun with 30 flairs, coaching whistle, vehicle to travel around bottom of landfill, camera.

Results

The results of my experiment were both interesting and impressive. After 30 minutes of stooping the falcon, half of the seagulls had left the landfill. Within an hour, zero seagulls remained at the landfill. Utilizing the falcon to scare away the seagulls had resulted in complete elimination of the entire seagull population within 60 minutes.

Conclusions/Discussion

In this experiment, I tested whether or not the use of the falcon would change the amount of seagulls at the landfill. The data supports my hypothesis. When I arrived at sunrise, I observed over a thousand seagulls. Within an hour, the falcon had scared away every seagull. My direct observation proves that having a falcon on site does directly impact seagull behavior and the number of seagulls present.

Summary Statement

A safe, cost-effective bird abatement program with an emphasis on the modification of animal behavior.

Help Received

My science instructors (Ms. Jenkin and Mrs. Rivero) for coaching, Mr. Herrera, the licensed falconer, my mom for help with editing and board assembly and Waste Management for allowing us to utilize their facility.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Atticus J. Humphrey

Project Number

J2209

Project Title

Does Particle Size of Calcium Ingested by Chickens Affect How Calcium Is Metabolized in Increasing Egg Shell Strength?

Abstract

Objectives/Goals

The purpose of my project is to determine if the particle size of calcium ingested by chickens affect how calcium is metabolized in increasing egg shell strength.Humans have teeth and chew their food however chickens do not have teeth but have a gizzard.The gizzard is like a food crusher, it uses strong muscles, grit, and small rocks that the chicken has ingested for grinding hard feed stuffs.My previous investigation on effects of inherited vs. non-inherited calcium indicated that calcium supplemented feed produces stronger egg shells. I questioned if the particle size of calcium affected shell strength.My independent variables were different particle sizes of calcium supplemented feed. No calcium as a control, greater than 5mm, less than 5mm, and crushed powder calcium.The calcium form I used was non-inherited egg shell calcium (chicken egg shells from nonrelated chickens to my six tests subject chickens).

Methods/Materials

Greater than 5mm particles sized calcium feed was lightly crushed egg shells that stayed on top of a 5mm wire net sifter.Less than 5mm particles sized calcium feed was lightly crushed egg shell that passed through the holes of a 5mm wire net sifter.Crushed calcium feed was egg shells crushed.To insure that the previously tested calcium cleared the chickens systems, I waited 3 days between the different particle sizes to collect test eggs.I fed my chickens twice a day with a mixture of pellets and the calcium feed for trials.To test egg shell strength I constructed a mechanism to crush eggs.This mechanism included PVC pipe, with a cap, a sleeve for the pipe, and sand.I placed the test egg in a shallow pan bottom up with the test egg placed under the crushing mechanism.I filled the pipe of the mechanism with sand until the egg broke.This pipe had a silicone ring on the capped bottom to stabilize the egg.I weighed the sand on a gram scale and recorded each egg by chicken and feed type onto my data log.I used 6 chickens, 10 eggs per chicken/independant variable in my study.This totaled 240 eggs.

Results

No calcium =5246.40g
Greater than 5mm calcium =5444.08g
Less than 5mm calcium =5938.10g
Crushed calcium =5326.02g

Conclusions/Discussion

The weakest egg shell strength was the control eggs, at an average of 5246.40g to crush the eggs.The strongest egg shell was produced by the less than 5mm particle sized calcium feed, at an average of 5938.10g to crush the eggs.

Summary Statement

Does particle size of calcium ingested affect egg shell strength?

Help Received

Interview, Dr. Gregg Cutler, Doctor of Veterinary Medicine,/ Interview, Michelle Ganci, California State University Fresno, Poultry Professor

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Anhyo Jeong

Project Number
J2210

Project Title
Does the Mendelian Ratio Really Work?

Abstract

Objectives/Goals
I wanted to see if The Mendelian ratio really worked.

Methods/Materials
I used C. elegans as my test subject. First I get male and hermaphrodite C. elegans that have been mutated. I mated them and picked four hermaphrodite offsprings and made them self fertilize. After that I took the self fertilized eggs and looked for the mutated genes that the very first generation had.

Results
I was able to conclude that the Mendelian ratio really worked.

Conclusions/Discussion
I proved that the Mendelian ratio worked and that I can tell if a mutation was a dominant one or a recessive one by doing this experiment.

Summary Statement
My project is about the Mendelian ratio.

Help Received
Used lab equpment at University of California, Santa Barbara under the supervision of Dr. Rothman and Dr. Jeong.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Aleeque Lori Marselian

Project Number
J2211

Project Title
Fruit Flies In Hot, Cold, and Room Temperature

Abstract

Objectives/Goals
The objective of my project is to find the effect of temperature on the development time of a Drosophila melanogaster. My hypothesis is that as the temperature increases the development time of the drosophila melanogaster decreases.

Methods/Materials
First I set the food for the fruit fly on the bottom of each container. Then, I separated the male and female fruit flies. I put five female and five male flies in each container. I let the flies mate. Once they reproduced I took out the adult flies, leaving only the eggs. Lastly, I observed them for their development from egg to adult in their experimental temperatures.

Results
It was found that development times decrease at higher temperatures. It took the fruit flies in the cold temperature condition 22 days to develop, while it took the hot temperature fruit flies 11 days to develop. The flies in room temperature took about 12 days to develop.

Summary Statement
to find the effect of temperature on the development time of a Drosophila melanogaster.

Help Received
Mrs. Gevorkian, my science teacher.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Jack P. Ramsey

Project Number
J2212

Project Title
Effect of Light and Heat on the Silk Production of Silkworms

Abstract

Objectives/Goals
My project was to see if the bodily process of producing silk from silkworms can be affected by the heat and light in a specific habitat and temperature.

Methods/Materials
Four terrariums were places in two separate rooms, for the two trials ran in this experiment. The experiment groups both had heat, regardless of which trial and the control groups had no heat lamp, also regardless of its trial. The first experiment group had both light and heat, and the first control group just had light. In all cages, six silkworms were placed in each, to ensure a consistent sample size. In the second trial, the experiment group just had heat, but no light, and the control group was entirely bare, no light or heat. The silkworms would be fed twice a day and each cage was monitored for 15-20 minutes each.

Results
Silkworms produce more silk under cooler and darker habitats. In the first trial the control group, with only light, produced 226 grams of silk, in comparison to the experiment group's 151 grams of silk. This is a 75 gram difference between the experiment and control groups, which is quite substantial. In trial two, the control group, with no light or heat produced 251 grams of silk, compared to the 136 produced by the experiment group. These two numbers show a 115 gram difference, exceeding the first trial's numbers. This shows that silkworms prefer a cooler and darker habitat to produce silk in larger quantities.

Conclusions/Discussion
Through both of the trials, one thing is clear: silkworms produce more silk in cooler, darker, and less hot and humid habitats. The silkworms in the control cage were often more active, as well as mobile than the experiment group. I believe this is because the heat had a great effect on how the silkworms acted, moved, and ultimately, how much silk they produced in the end. Silkworms obviously prefer cooler habitats not only to produce more silk, but also faster. All of the control group's worms spun into their cocoons at a normal and somewhat fast paced time. However, the experiment group's worms always seemed to be slower in everything they did, and the amount of silk was substantially less.

Summary Statement
I am testing whether light and heat have a substantial effect on how much silk is produced by a silkworm.

Help Received
Father's colleague provided terrariums, my teacher Mrs. Gillum and her advice towards my project, and my parents for taking me to get supplies I needed.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Mounir J. Saunders-Newton

Project Number

J2213

Project Title

How Camouflage Affects the Predatory Behavior of Praying Mantids

Abstract

Objectives/Goals

Praying mantids use camouflage to avoid predation and to ambush their prey. Research shows that mantids pay attention to structural cues, by demonstrating a preference for a camouflage environment as opposed to an un-camouflaged environment. My project explored the effects of camouflage on hunting behavior. My hypothesis was that apprehension time of prey would increase in an un-camouflaged environment for praying mantids as compared to the camouflaged habitat.

Methods/Materials

I placed nine mantids into separate habitats; 3 Creobroter Pictipennis, 3 Stagmomantis Limbata, and 3 Phyllocrania Paradoxa. The mantids were fed wingless fruit flies every other day. I constructed two habitat environments for each species of mantids. The first habitat corresponded with, and matched each speciesâ## camouflage. The second habitat was absent of camouflage. After two weeks, I started testing by placing one mantis into the camouflaged matched habitat. After waiting 5 minutes to allow the mantis to find a comfortable position, I placed a fruit fly into the habitat, in front of the mantis, in the center of the habitat. Once the fruit fly was inside the habitat, I started the stop watch. After the first attempt to apprehend the fruit fly, I stopped the watch,recorded the time and position of the mantis. I conducted the same procedure with the other eight (8) mantids. I waited two days to conduct the second part of the experiment. Using the un-camouflaged habitats, I performed the same procedure. As before, after timing the first attempt to apprehend the prey, I recorded the data and repeated with the remaining mantids.

Results

Four findings emerged. First, there were differences in apprehension time averages across species. Next, differences in hunting behavior across species were observed. As hypothesized, apprehension times were less in the camouflaged habitat as compared to the un-camouflaged habitat. And finally, there was significant overlap in the range of apprehension times, across species, in the camouflaged habitat.

Conclusions/Discussion

While I predicted that apprehension times would be less in the camouflaged habitat, I did not anticipate that individual differences in performance would be greater in the camouflaged habitat as compared to the un-camouflaged habitat. By comparison, the lack of apprehension time ranges overlap between species in the un-camouflaged condition highlights differences between species.

Summary Statement

The purpose of this project was to demonstrate the effect of camouflage on the predatory behavior of praying mantids.

Help Received

My mother purchased the praying mantids.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Emma R. Schaefer-Whittall

Project Number
J2214

Project Title
What's on the Menu?

Abstract

Objectives/Goals
My objective was to test whether ladybugs prefer to eat aphids, pollen, powdery mildew, or scale insects. Some gardening resources suggest that ladybugs eat pollen which would decrease plant reproduction.

Methods/Materials
To test what the ladybugs preferred to eat, I compared aphids to three other food choices (pollen, scale insects, and powdery mildew). For each experiment I put 10-20 aphids on one side of a tupperware in a corner. In the closest corner to the aphids, I placed one of the three different food choices. After I sealed the tupperware with saran wrap and a rubber band, I recorded every time a ladybug ate an aphid or the other food item for ten minutes. I released the ladybugs in my garden and repeated each experiment 2 more times.

Results
In the three aphids vs. sour grass pollen experiments, the ladybugs chose pollen an average of 18.8% of the time, but preferred aphids 81.3% of the time. In the three aphids vs. scale insects trials, the ladybugs chose scale insects 44.4% of the time, but preferred aphids 55.6% of the time. In the three aphids vs. powdery mildew tests, the ladybugs chose the powdery mildew 31% of the time, but preferred aphids 59% of the time.

Conclusions/Discussion
My question was, what do ladybugs prefer to eat: aphids, pollen, powdery mildew, or scale insects? I predicted that ladybugs would prefer aphids and my hypothesis was supported by my experiments. The second most preferred food was the scale insects and the least preferred was the pollen.

The results of these experiments suggest that if you have aphids in your yard, ladybugs will take care of your problem. I was surprised to discover that ladybugs also eat scale insects at about the same rate as aphids. All in all, ladybugs are an excellent insect pest controller, but they will not help remove powdery mildew. Contrary to some reports, ladybugs rarely eat pollen and thus are flower friendly.

Summary Statement
My project is about whether ladybugs prefer pollen or pests.

Help Received
My dad helped proofread my report and supervised the ladybugs.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Kristen R. Schiavon

Project Number
J2215

Project Title
What Type of Meat Attracts Meat Bees the Most?

Abstract

Objectives/Goals
The objective is to determine what type of meat will attract meat bees the most.

Methods/Materials
To do this procedure you must find a large bottle and cut a large hole and two small holes in the bottle. Then take a stick and meat and put the stick through the meat. Then put the stick with the meat in the bottle. Then put the trap out over a period of time and repeat and record what meat caught the most meat bees.

Results
In the end, my results were fish will catch 108 to 54 more meat bees than any other meat.

Conclusions/Discussion
The reason the piece of fish attracted more meat bees is because meat bees are attracted to smell and meat (protein).

Summary Statement
My project is determining what meat will attract meat bees the best.

Help Received
Dad helped glue board, teacher helped fill out state packet, mom helped hang traps

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Jessamyn M. Skutches

Project Number
J2216

Project Title
An Animal Cognition Study for Siamese Fighting Fish (Betta splendens) Regarding Spatial Learning in a Compound T Maze

Abstract

Objectives/Goals
My objective is to discover if Siamese Fighting Fish (Betta splendens) have the spatial cognitive ability to learn a multiple T-maze.

Methods/Materials
A multiple T-maze was made of 3/4 inch plywood that was painted, and then coated with fiber glass resin for waterproofing. There were 2 acclimation periods before each trial began. The first period, lasting 15 minutes, was to get the water in the holding tanks and the water in the maze equalized both chemically and temperature-wise. The second acclimation period occurred in the acclimation chamber located at the beginning of the maze; the fish were given two minutes to relax before the trial began. While the fish acclimated the food reward was placed in the appropriate section of the maze in relation to the trial number. The stopwatch started simultaneously as the gate was lifted, releasing the fish into the maze. The trial ended when the fish reached the food and began feeding. Times for each of the five fish were recorded and then averaged for each trial.

Results
In the first seventeen trials, the fish would sometimes take several minutes to eat, if they ate at all. If the fish did not eat, the trial would be ended at the five-minute mark. Once live tubifex worms were introduced as the food reward the fish always ate. The experiment yielded significant results from this time forward. The last five trials' averages were 29.33 sec., 26.20 sec., 20.68 sec., 19.21 sec., and 17.49 sec.

Conclusions/Discussion
During research it was discovered that Betta fish have been known to be taught tricks when food rewards were used. After twenty trials using live food, the Betta fishes' times were clearly faster. The forty percent decrease in the average trial time for completing the entire maze indicated that the fish were truly learning the maze. As was stated in the hypothesis, Betta fish can learn a multiple T-maze. However, evidence shows that their memory may only be short term. For example, when a day was skipped between trials, the average time was longer than the previous trial. Future work could investigate short and long term learning.

Summary Statement
To determine if Betta fish have the spatial learning ability to learn a multiple T-maze.

Help Received
My father helped build the maze. My mother and father helped time the trials. My science teacher helped with the experiment design.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Ferryn A. Spence

Project Number

J2217

Project Title

How Slow Can You Go? Effects of Snail Size and Sun Exposure on Snail Speeds

Abstract

Objectives/Goals

My experiment was designed to determine how differences in snail size and in sun exposure affect how fast snails travel. My hypothesis was that bigger snails would move faster than smaller snails because they have a larger muscular foot. I also thought that snails would travel faster when exposed to direct sun (as compared to shade) in order to avoid drying out.

Methods/Materials

I set-up the experimental surface by covering a wood board with plastic, and then drawing a small circle (3-inch diameter) surrounded by a larger circle (19-inch diameter). I recorded time, temperature, and whether the board was in sun or shade. I sprayed the board's surface with 5 squirts of water for moisture, and then placed a snail on the board inside the small circle. Using a stopwatch, I measured the travel time, starting when the snail exited the small circle and ending when it reached the larger circle. Next, I determined the actual distance traveled by covering the snail's slime path with a piece of string and measuring the string length. I measured the length of each snail shell by placing a ruler next to the snail and taking a photograph.

Results

Overall, I measured the speeds of 60 snails of various sizes, 30 snails in sun and 30 snails in shade. I found that small snails and large snails moved at similar absolute speeds (mm/minute). Although small and large snails moved at similar speeds, small snails did move faster when speed was expressed in body lengths traveled per minute. My other major finding was that snails exposed to direct sunlight moved faster than snails tested in shade, regardless of their size. Specifically the average speed of snails tested in sun was 125.3 mm/min, more than 1.5 times faster than the average speed of snails tested in shade, which was 76.1 mm/min.

Conclusions/Discussion

I think there are several explanations as to why larger snails did not move faster than smaller snails, as I hypothesized. Two possiblities are (1) that smaller snails have smaller and thinner shells and therefore carry less weight than the larger snails, which may allow them to move faster relative to their body size, and (2) that smaller snails may be more vulnerable to drying out or to predators because of their thin shells and thus may need to find shelter faster. In addition, my data support my hypothesis that snails travel faster in the sun, possibly because they are trying to avoid drying out.

Summary Statement

My science fair project focuses on the common brown garden snail, Helix aspersa, and how snail speed is affected by snail size and by exposure to sun and shade.

Help Received

My dad helped gather snails while I collected data; Mr. Nestlerode offered advice and encouragement.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Montana A. Sprague

Project Number

J2218

Project Title

Can Fish Get Jet-Lagged?

Abstract

Objectives/Goals

In this project, the effects of circadian rhythm changes on training goldfish was investigated. For this project to happen, one had to change the circadian rhythm of a tank of goldfish, and then train them to complete a simple trick. Then, compare the time it took to train both tanks of fish. The purpose of this experiment was to learn more about the effects of circadian rhythm changes. The more we know about circadian rhythm disruptions, the better.

Methods/Materials

In this project, there were two tanks with 10 goldfish in each. They were given two weeks to adjust to their new surroundings. Then, one tank was covered with a dark cloth from 7:00 AM to 7:00 PM, and had a light shining on it from 7:00 PM to 7:00 AM. The other tank had the opposite schedule. Both tanks of goldfish were fed at 7:00 AM and 7:00 PM. This was continued for two weeks. After the two weeks was up, the covers and lights were not used anymore, and the R2 fish school training kit was used to train both tanks of fish to swim through the hoop. They were trained every day for 5 minutes each. The training was continued for one week. First, the fish were taught to recognize the wand as a feeder by giving them their food for the day through the feeding wand. Then, they were lured through the hoop, and then rewarded after successfully completing the trick. The number of fish who swam through the hoop every day was recorded in the notebook.

Results

The results clearly show that the fish who were on a normal circadian rhythm before the test learned much more quickly than the fish with the disrupted circadian rhythm. However, the disruption did not affect the fish#s ability to learn, the learning was simply delayed. The graph for how many fish went through the hoop from each tank was almost exactly similar, except that the switched circadian rhythm tank learned three to four days later than the other tank.

Conclusions/Discussion

The results of this experiment clearly supported the hypothesis. The fish in the tank on a normal sleep cycle learned the trick up to three times faster, therefore the amount of time it took for a fish to learn was negatively impacted by the reversing of the circadian rhythm. However, the ability the fish possesed to learn did not change. It was simply delayed for the fish in the tank that#s sleep cycle had been disrupted.

Summary Statement

This project will investigate the effects of circadian rhythm disruptions on the training and memory of common goldfish.

Help Received

My Science teacher reviewed the different phases of the project.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Aidan C. Stenson

Project Number
J2219

Project Title
The Effect of Acid Rain on Regeneration of Planaria

Abstract

Objectives/Goals
The purpose of this experiment is to observe the regeneration of planaria exposed to an acid rain solution.

Methods/Materials
Using vinegar as a household substitute for acid rain, I created six solution strengths for observation: spring water, and 10%, 1%, 0.1%, 0.01%, and 0.001% vinegar. I decapitated five planaria for each of the groups and observed and measured the regeneration of the heads and tails over the course of seven days.

Results
In the first trial with 10%, 1%, and 0.1% vinegar, all of the worms died within 36 hours. In the second trial, both the control worms in spring water and the worms exposed to 0.001% vinegar recorded an average growth of 1.7 mm. The worms in 0.01% vinegar grew 1.1 mm, and the worms in 0.1% vinegar recorded an average growth of 0.6 mm.

Conclusions/Discussion
I conclude that acid rain significantly inhibits the regeneration of planaria. Worms exposed to vinegar suffered compromised strength and growth. This is important because if animals lower on the food chain are eliminated by pollution such as acid rain, animals higher on the food chain will also be affected.

Summary Statement
My project evaluates how exposure to acid rain impacts the regeneration of planarian worms.

Help Received
Parents helped with ordering supplies.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Julia V. Vaughan

Project Number
J2220

Project Title
Do Peanuts Make Eggs Larger?

Abstract

Objectives/Goals
This project was to see if the protein from peanuts would make chickens lay larger eggs. The hypothesis is that the eggs will get larger.

Methods/Materials
Method:
Feed chickens 4 cups of chicken food pellets and collect eggs daily for 5 days.
Measure weight, width, length, and circumference of collected eggs. Record Data.
Feed chickens 2 cups of raw, unsalted peanuts and 2 cups of chicken food pellets for 1 week.
Collect eggs daily for 5 days.
Measure weight, width, length, and circumference of eggs. Record Data.
Review data and conclude what happened to egg size.
Make a conclusion.
Materials:
Chickens
Chicken feed
Raw and unsalted peanuts
A ruler
A tape measure
A scale
A box to help measure width and length

Results
The results were that yes, the protein from the peanuts did make the eggs larger but the changes weren't large and varied. One day the measurements increased, and the next day they decreased.

Conclusions/Discussion
I can conclude that the protein from the peanuts did make the eggs larger in the end, but the changes in size varied, it was inconsistent and went up and down, but at the end of each graph the measurements were higher than when the experiment began. I thought that a person could sell larger eggs for more money so if they fed chickens peanuts they could get bigger eggs, but it turns out that peanuts cost a lot more money. Even if larger eggs make more than smaller eggs, the difference in the price is just a few cents, so it would make more sense to buy normal chicken feed.

Summary Statement
My project was to see if the protein from peanuts will make chicken eggs larger.

Help Received
Grandfather helped feed the chickens the amount of peanuts and chicken feed I requested.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Daniel I. Vitenson

Project Number

J2221

Project Title

Territorial Relationships and Social Interactions of Migratory and Resident Duck Species

Abstract

Objectives/Goals

During winter, migratory ducks come to the San Elijo Lagoon from as far away as Canada and Alaska. The purpose of my project was to observe territorial relationships and social interactions between duck species in the San Elijo Lagoon. With a declining number of some duck species, determining why ducks stay in certain areas is crucial. I hypothesized that certain duck species would stay in specific parts of the lagoon based on many factors, including the food available, other species of ducks with which they may interact, and a sufficient number of the opposite sex.

Methods/Materials

The materials I used were a laser rangefinder, an anemometer, a hygro-thermometer clock, two types of binoculars, and log forms I developed to record my data. I visited the lagoon 20 times and documented the time of day, wind speed, tide, temperature, humidity and weather at every visit. I searched for ducks and recorded the numbers and species. I then analyzed my raw data, classified the ducks into three categories based on my observations, and generated graphs and tables to present my findings.

Results

Based on my observations during my 20 visits to the San Elijo Lagoon, I classified the ducks into three groups I designated as Types "A", "B" and
"C", according to their behaviors. I classified Green-winged Teals and Gadwalls as "Type A" ducks because they stayed very near the shore to feed, and roosted throughout the lagoon. Northern Pintails and American Wigeons were "Type B" ducks because they mainly fed near the shore, but occasionally would feed elsewhere. Buffleheads and diving ducks were "Type C" ducks in the San Elijo Lagoon because they fed in the middle of the waterway and roosted out of sight.

Conclusions/Discussion

According to my findings, specific species of ducks appeared to prefer different areas of the lagoon. Through my field observations, I noticed that migratory ducks seemed to stay in sections of the lagoon that replicate their nesting sites. For example, Northern Pintails nest in prairies in Alaska; in the San Elijo Lagoon, they roosted in grass, much like prairies. Also, some ducks seemed more social with other species and their mates than others. Type "A" ducks were the most social, followed by Type "B" ducks. I would like to visit other lagoons and make observations to confirm my findings. The results of my project can be used when taking a census of duck species in Southern California.

Summary Statement

The purpose of my project was to observe territorial relationships and social interactions between duck species in a lagoon environment.

Help Received

Mother drove me to the San Elijo Lagoon

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Madison H. White

Project Number
J2222

Project Title
Livin' Life Like an Angelfish

Abstract

Objectives/Goals
In doing this project, I am trying to proe to people that owning and caring for fish is not something that should always be taken lightly. My goal is to show people that Angelfish is a breed of fish that need more then more than the normal amount of attention and care compared to your normal easy-to-care-for Wal-Mart fish.

Methods/Materials
Three seperate 20 gallon fish tanks with identical size, shape and contents, but different internal temperatures and pH levels, were constructed. One fish tank, specified as tank #1, had an internal environment set with a pH level of 0 pH and a temperature of 60 degrees Fahrenheit. Another fish tank, specified as tank #2, had an internal environment set with a pH level of 7.0 pH and a temperature of 75 degrees Fahrenheit. The third fish tank, specified as tank #3, had an internal environment set with a pH level of 3.0 pH and a temperature of 85 degrees Fahrenheit. The tanks were tested for constant regularity and observed constantly to record the varied responses to the different levels and temperatures.

Results
Of the three seperate tanks, the tank specified as tank #2 with the pH level 7.0 pH and temperature of 75 degrees Fahrenheit, was the tank that held the best response of pH and temperature from the fish. The other tanks, tank #1 and tank #3, had much more negative responses. The tank that had the best results was the tank that I predicted would be the best; the fish were completely happy and thrived much more than the other two tanks.

Conclusions/Discussion
The bes aquarium environment for angelfish to thrive in is one that is closely related to their natural environment. A tank with a pH level ranging between 6.4 to 6.9 pH, and with a temperature between 74 and 80 degrees Fahrenheit is the best for them. Also, at least one live plant, a low-power filter, and something to be used by the fish as shelter, also improves the aquarium environment drastically. These requirements and recomendations closely resemble tank #2, which is where the fish responded best.

Summary Statement
This project is about the best possible tank-environment, ranging from the plants used all the way to the chemical amounts and temperatures necessary for Angelfish to live and thrive in.

Help Received
Tutor helped type and organize report and project; Mother helped type report and gather information

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Lauren M. Yen

Project Number

J2223

Project Title

Blaberus discoidalis Cockroach Mind Control by Artificial Neurosensory Signals

Abstract

Objectives/Goals

A cockroach senses their environment with their antennae. The purpose of this experiment is to test the feasibility of stimulating the antennae to change cockroach behavior. The hypothesis for this experiment states that the cockroach will turn left or right no matter how quickly the stimuli are given.

Methods/Materials

In this experiment, a remote control transmitter and receiver were used to send an electrical signal to the antennae that tricked the cockroach into turning left or right. The receiver was attached to the back of the cockroach and had wires connected to the antennae. When a transmitter sent out infrared light, the receiver detected the light as a command to send a small current to the cockroach antenna. The cockroach then turned left or right depending on the signal. Opposite signals were given 10 seconds apart, 5 seconds apart, 2 seconds apart, and 1 second apart.

Results

The cockroach responded to signals given 10 seconds, 5 seconds, and 2 seconds apart, but was confused and did not move when signals were given 1 second apart.

Conclusions/Discussion

The hypothesis was proven false because the cockroach did not turn when signals were given 1 second apart. However, the receiver was able to provide sensory data to the brain that the cockroach responded to. This study can be a model for combining robotics with neurobiology to send sensory signals to the brain. For example, this technology could help restore a patient#s touch sensation in a human who lost a hand or arm.

Summary Statement

Cockroaches were stimulated by a remote control to turn left or right at different time intervals.

Help Received

My father purchased a RoboRoach kit from Backyard Brains. He helped me understand the instructions from the RoboRoach kit.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
William A. Sanchez

Project Number
J2297

Project Title
The Mind of a Reptile

Abstract

Objectives/Goals
My objective was to prove whether lizards are left or right brained. My goals were to find sufficient data and to learn more about the neurology of lizards.

Methods/Materials
The right hemisphere of the lizard brain is in control of predator monitoring. The left side of the brain is in control of prey monitoring. I tested this by timing how fast both a wild and captive lizard reacted to each. I also tested whether they reacted to predator or prey first when side by side. I did this by getting a cardboard box and making a wall through a quarter of the box so that there are two rooms. The room on the right consisted of the predator which were two fake but realistic tarantulas and a fake lizard. The room on the left consisted of the prey which were five crickets. I used a stopwatch to time their reactions to predator and prey. I also placed the predators in each lizards habitat and observed their reaction.

Results
Based on my testing, I found that lizards are in fact right brained. This is because of the speed of their reactions to predators and their actions towards an attack. These results are only based on the wild lizard because they are the original lizards and have much more experience than captive lizards. i only included captive lizards so that people could understand my project more. The wild lizard would try to hide in the leaves of its habitat and would try to blend in with its substrate. although, I found it odd that it reacted to prey first when the prey was side by side with a predator. I found this very odd.

Conclusions/Discussion
To conclude, lizards are right brained because of the timing of their reactions towards predators and the effort that they would take to be safe from a predator. My hypothesis was that lizards were in fact right brained. I believed this because of the large chance of being eaten rather than starving to death.

Summary Statement
My project is about how lizards are left or right brained.

Help Received
Mother helped by materials; Father helped with the creation of the board.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Cameron M. Rossi

Project Number
J2298

Project Title
Crickets: A Sense for Scents. Exploring Natural Insect Repellants

Abstract

Objectives/Goals
My project was to determine which scents crickets like the least. By understanding how crickets sense and react to scents we can protect gardens and crops in a safe and natural way by using scents as repellants. My hypothesis is they will dislike the peppermint, lemon, pine-sol, and musk because they are strong and/or unnatural scents that can be dangerous. Crickets will like vanilla and cinnamon which are food sources.

Methods/Materials
Crickets were tested 12 at a time for 5 minutes in a in a clear plastic container (14x21x6) during three different trials to measure distance in cm from each scent which was recorded every one minute. The control group was crickets were observed with no scent present on a cotton ball that was placed in the center. The variables were the six different scents added to cotton balls that were measured separately. The scents used were vanilla extract, peppermint extract, lemon juice, pine-sol cleaner, musk cologne, and cinnamon oil. Vanilla and cinnamon scent were chosen because they are natural food scents. Musk cologne, lemon juice, peppermint, and pine-sol cleaner were chosen because they are very strong and unnatural scents.

Results
The crickets disliked the peppermint, lemon, and cinnamon and kept the furthest distance on average compared to the control group and the other scents. They liked vanilla the most and averaged the closest distance overall when comparing to the control group and the other scents. They also liked the pine-sol and musk and averaged a closer distance than the control group, peppermint, lemon, and cinnamon.

Conclusions/Discussion
My hypothesis is partially correct because they did not like peppermint and lemon which research supports is used in insect repellant but they did like vanilla. My hypothesis is partially incorrect since they did not like cinnamon which is used in insect repellant. They did like pine-sol and musk. Pine-sol contains natural pine oil which comes from trees that crickets inhabit. Musk contains pheromones and crickets use scents for mating. In conclusion, crickets chose to stay away from harmful scents using their sense of smell. This supports using organic scents as natural insect repellants that are also environmentally safe.

Summary Statement
My project is to find out what scents crickets like the least to determine if scents can be used as natural insect repellants.

Help Received
Mother helped set up the graphs; Father helped put mesh screen on the plastic container.

CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
Kathryn S. Watts

Project Number
J2299

Project Title
Do Brine Shrimp Need Sunglasses to Hatch?

Abstract

Objectives/Goals
This experiment intended to see how exposure to the different types of radiation (microwave, UV light, and light bulb radiation) would affect the number of brine shrimp eggs that hatch. The hypothesis in this experiment was that the light bulb radiation is less intense and would allow more eggs hatch than the microwave and UV light radiations. A creature would be more likely to survive if exposed to a less intense light wave.

Methods/Materials
Materials:
The materials that were used in my experiment were brine shrimp eggs, a microwave, UV light, lamp, clear containers/cups, tap water, sea salt, a measuring cup, a Popsicle sick, a scale, paper towels, and a timer.

Method:
A set of cups, each containing 50 brine shrimp eggs, were individually exposed to radiation. A salt solution was added to each cup after exposure and allowed sit undisturbed for 48 hours. After 48 hours, the number of hatched brine shrimp eggs were counted and recorded.

A percentage and average of hatched brine shrimp eggs was calculated for each type of radiation.

Results
The data collected for the hatched brine shrimp eggs was:
Microwave Radiation had an average of 11.4% hatch.
UV Radiation had an average of 10.6% hatch.
Light Bulb Radiation had an average of 0.2% hatch.

Conclusions/Discussion
The data from my experiment rejects my hypothesis since I believed the light bulb radiation would have more eggs hatch but it ended up having the least number of eggs hatch. This radiation turned out to be the one that would not have many eggs hatch after exposure.

This experiment connects to the real world by showing that exposure to various every day, natural radiation can be safe for organisms so they can live safe and healthy lives.

Summary Statement
How does different types of radiation affect the development of an organism

Help Received
Mom read and helped edit my research report, Ms. Christina Fisher provided the lab space for me to do my experiment, Dad help me with the display board and research