Name(s)	Project Number
Luz G. Almanza	**J1201**

Project Title

The Effect of Age on Blood Pressure

Abstract

Objectives/Goals
My objective is to find out the effect of age on blood pressure.

Methods/Materials
Using an automatic blood pressure monitor and cuff (standard and child size), 62 second graders, 62 eighth graders and 62 adults were tested and their blood pressures were recorded.

Results
The second graders had the lowest blood pressure, followed by the eighth graders and the adults had the highest blood pressure. The averages for each group fell within the normal blood pressure range of <120 systolic and <80 diastolic. The difference between age groups was not significant.

Conclusions/Discussion
My hypothesis was supported by the data because age didn't have a significant effect on blood pressure. The results showed a slight increase in blood pressure with age, but not a significant one. All the average blood pressures were within the normal range. This information is useful to people who work in the health care field, because they need to know what a normal blood pressure is for every age.

Summary Statement

My project is about the effect of age on blood pressure.

Help Received

Mr. Arellano at Karl Clemens school let the student test his second graders.

Name(s)

Jessika Baral

Project Number

J1202

Project Title

A Novel Way to Strengthen Eye Muscles and Enhance Peripheral Vision

Abstract

Objectives/Goals

The objective of this experiment is to see if a device and a procedure can be created to strengthen the eye muscles and improve the peripheral vision range of children and others.

Methods/Materials

The materials used in this experiment are foam boards, red LED lights, white LED lights, 22 gauge black wires, 100 ohm resistors, 68 ohm resistors, three microcontrollers, three breadboards, tape, a stopwatch, and a standard vision disk. Few new devices were built. Experiments were conducted by asking the test subjects to follow a set of LED lights with their eyes. These LED lights were programmed using a microcontroller to move in a certain direction and at a certain speed. The LED lights in the devices were laid out in two different configurations: circular and diagonal. An endurance score, the number of cycles the test subject completed before his/her eyes became tired, was recorded. Additionally, a different set of test subjects is being asked to follow a new set of LED lights that will move only in the peripheral vision of the test subjects' eyes. More data is being collected.

Results

Overall, the endurance scores improved by over 100%, from an average of 34.19 to 68.84. The peripheral vision reading ranges of subjects also improved by about 24% for both eyes.

Conclusions/Discussion

The hypothesis of this experiment is supported by the data that has been already collected and analyzed. The eyes of the test subjects became stronger as per improvements in their endurance scores. The test subjects also attained a wider peripheral vision range compared to their peripheral vision before participating in this experiment.

Summary Statement

In this experiment, test subjects effectively exercised their eye muscles to strengthen their eye muscles as well as increase their range of peripheral vision.

Help Received

My school teacher was my mentor.

Name(s)	Project Number
Devon J. Bernsley	**J1203**

Project Title

Why Am Eye So Dizzy? Measuring Nystagmus to Explore Dizziness Reduction Strategies

Abstract

Objectives/Goals
This study examined the effect of sight and head position on a skater's dizziness after a scratch spin. The goal was to determine what strategies people could utilize to lessen dizziness.

Methods/Materials
The skater performed a scratch spin in six different positions: head up eyes open, head up eyes closed, head forward eyes open, head forward eyes closed, head down eyes open, and head down eyes closed. Eyes closed was achieved by blindfolding the skater. After each spin, nystagmus length was measured. Each variation was tested three times.

Results
Head position and sight affected the dizziness of the skater. Eyes open head down was the worst spinning position as it made the skater the most dizzy. Eyes open head forward made the skater slightly less dizzy. Eyes open head up was the best overall position as it caused the least amount of dizziness compared to all of the other variations. Eyes closed head forward was the worst spinning position with eyes closed. Eyes closed head down made the skater slightly less dizzy. Eyes closed head up was the best spinning position of the eyes closed variations as it caused the least amount of dizziness for the skater.

Conclusions/Discussion
My experiment showed that the skater got the least dizzy when she performed the spin with her head up and eyes open. The skater was able to pick a focal point on the ceiling and watch that point while spinning. This is like spotting, which ballet dancers do when they spin. During the other spins with eyes open (head forward and head down) there was no set focal point for the eyes to "spot." As a result, the skater watched the world or her own feet spin, and this made the skater dizzier.
When someone stops spinning, their eyes tell their body that they have stopped spinning, but the fluid in the semicircular canals (within their ear) continues to move and sends a "still spinning" message to the brain. These mixed messages cause the eyes to continue to look for a focal point. This causes nystagmus (involuntary eye jiggles). I measured the length of nystagmus after each spin as a measure of how dizzy the skater was.
This experiment proved that skaters should spot whenever possible. However, if she cannot spot, she will be less dizzy if she keeps her eyes closed, as she will not watch the world or her own feet spin. Then, when she stops spinning, she will not get mixed signals from her eyes and the fluid in her semicircular canals.

Summary Statement
Variations of head position and sight can provide useful techniques for the reduction of dizziness.

Help Received
My mother videotaped the trials.

Name(s)	Project Number
Julia V. Brock	**J1204**

Project Title

How Age Affects Dilation of Pupil in Felis domesticus

Abstract

Objectives/Goals
Objective
The objective is to detect if age can affect how much a cat#s eyes contract when exposed to light.

Methods/Materials
Procedure/Materials
I waited for night to fall, and located all the cats. In the dark, I shined light on the cat#s faces, waited 5 seconds, and shot a photo. I followed through with this on three separate occasions. Then, after the third test, I applied the photos to a graph, and found the area. Some of the materials were the photo sizing and zooming software. The other materials were the camera, USB cord, and an 8 LED flashlight.

Results
Results
Out of the three tests, Oscar, youngest, averaged a 3. Niamo, the second youngest, scored 3.3. Sniff, next-to-oldest, had an average outcome of 11.3. Bootsy, the oldest, got the same.

Conclusions/Discussion
Conclusion
My hypothesis proved correct! The pie charts show Bootsy and Sniff dominating with the hugest slices. Then, the coordinate graph shows an increase of area along with the increase of age.
 This project is important because you might be able to estimate a cat#s age on how its eyes contract. You can also tell if the cat has Feline Leukemia, and needs help, because when the cat has this disease, its eyes secrete assort of mucus that slows down the contraction process and the pupil doesn#t contract as much.

Summary Statement

My project is to find out if age affects the way cats' eyes contract when exposed to light. I tested four cats, two old cats, and two young cats. There were two males and two females. I got my results after finding the area of their pupil.

Help Received

My science teacher helped me research my project and my mom helped me with my writing and grammar. I used computer equipment at Anderson Valley Junior/Senior High School. I was under the supervision of Dr. Larry Chaulk, DVM .

Name(s)	Project Number
Matthew J. Choi	**J1205**

Project Title

Impact of Nutrition on Mice

Abstract

Objectives/Goals
   The goal of the project is to understand how different types of food affect mice's weight.
Methods/Materials
   1. Prepare 4 mice cages with toys, shredded paper for bedding and label cage as Control, Vegatable, Junk Food, and Animal Products. 2. Label each mouse
   3. Put each mouse in their cages and never mix them up. The groups should always be separated.
   4. To make sure all the mice stay healthy during the experiment feed all the mice 50% of the doctor recommended daily nutrition requirement. This means at least 2.5 grams of mice feed mix which is made up of dried vegetable, nuts, and seeds sold in pet stores. So feed the mice at 7:00 AM. Since 2.5 grams of feed is needed for each mouse and there are 5 mice in each cage, put a total of 12.5 grams of healthy mice feed mix in each cage. Put the feed in the meal bowl.
   5. Evenings and nights are when mice feeds the most so at 7:00 PM put the following feed in each cage's meal bowl: Control Group: 12.5 grams of doctor recommended mice feed mix (2.5 grams per mouse) For the Veggie, Junk Food, and Animal Product Group we want to put enough food in the cage so that they don't run out. We want to have them eat as much as they want. Put up to 50 grams of the mixture. If the mice do not eat all the food start reducing the amount so that food is not wasted. Veggie Group: Put a mixture of carrots, cucumber, broccoli, califlower, and apple that are cut up. Junk Food Group: Put a mixture of potato chip, cheetos, cakes, cookies and sugar coated cereals. Animal Product Group: Put a mixture of hotdog, spam, butter, and cheese.
   6. Make sure there is enough water in the water bottle everyday.
   7. Weigh them every week by sticking each mouse in a weighing bowl so that they don't run away. Their should be 5 records for 20 mice at the end of the experiment.
   9. Analyze the data and write report.
Results
   Mice on vegetarian pellet diet maintained their weight during the 4 week experiment. Mice on animal products diet gained 18.6% and mice on junk food diet gained 27.5% of their original body weight.
Conclusions/Discussion
   If we assume abnormal weight gain is unhealthy, mice that were fed animal products and junk food became unhealthy. Mice on vegetarian pellet diet maintained their weight and stayed the healthiest. Since mice and humans are genetically similar we may assume that diets of mainly animal products and junk food lead to abnormal weight gain in humans.

Summary Statement

   The goal of the project is to understand how different types of food affect mice's weight and understand how the results can impact humans.

Help Received

   Science teacher Mr. Nelson helped with his advice; Father helped with purchasing supplies and experiment supervision; Sister Claire help with weighting mice; Grandma helped with cleaning and feeding mice

Name(s)	Project Number
Olivia R. Cooper	**J1206**

Project Title

Jump to the Beat: Heart Rate Recovery with Various Post-Exercise Activities

Abstract

Objectives/Goals
The objective of my science fair project, Jump to the Beat, was to discover the fastest way to decrease heart rate after cardio physical activity. I compared sitting, standing, lying down, and walking at an unhurried pace after jumping rope. After researching, I hypothesized that the fastest way to decrease heart rate would be lying down, followed by sitting, then walking, then standing. Based on my research, this would be because of liquid pressure; if the volunteer was lying down, there would be less pressure on the blood, so the heart didn#t have to work as hard, while standing would put more liquid pressure on the blood. Since sitting is in between standing and lying down, I hypothesized it would take more time than lying down and less time than standing. Also, I thought walking would take less time than standing because the muscle movement might help the heart push the blood through the vessels.

Methods/Materials
To test my hypothesis, I recorded data from the volunteer and the environment. Next, I took the Resting Heart Rate (RHR) of the volunteer, and had the volunteer jump rope for 2 minutes. Immediately after jumping, I took the volunteer#s increased heart rate, and had the volunteer either sit, stand, walk, or lie down. While the volunteer was doing the activity, I timed until their heart rate was back down and matched the previous RHR. This time is the Recovery Rate (RR). I repeated the test four times for each volunteer so they had completed each activity after jumping (sit, stand, walk, lie down).

Results
Lying down had the quickest average RR at 1.42 minutes; sitting followed with an average RR of 1.64 minutes; walking came next at 1.94 minutes; standing took the most time and averaged 2.03 minutes. I achieved my objective by discovering the fastest way to decrease heart rate after physical cardio activity: lying down.

Conclusions/Discussion
My results did support my hypothesis. Lying down had the fastest average RR, followed by sitting, then walking, then standing. In the process of my project I learned about heart rate and the relationship with liquid pressure. In a future experiment I would like to see how other variables such as weather conditions, dehydration and regular intensity of physical activity affect the heart rate of my volunteers.

Summary Statement
Your post-exercise activities do affect your rate of return to your resting heart rate.

Help Received
Mother helped me realize the best way to display my data on a graph

Name(s)	Project Number
Jessica Cronin; Alicia Hoxie	**J1207**

Project Title

Exercise in the Equine

Abstract

Objectives/Goals
   The objective of the project, is to determine the pre and post exercise pulse, respiration, total protein, and hematocrit in horses ridden in a 90 minute riding lesson.

Methods/Materials
   Measure resting pulse, and respiration in 5 test horses and 1 control horse. Take pre exercise blood sample from the jugular vein of each horse with vacutainer needle and EDTA tube (Dr. Cronin drew the blood). Exercise horses in lesson. Take post exercise pulse and respiration. Do post exercise blood draw. Using micro-hematocrit tubes, centrifuge, and refractometer. Establish total protein and hematocrit.

Results
   All horses in pre and post respiratory rates were within normal limits, as were pre and post heart rates. Pre and post total protein and hematocrit measurements fluctuated but all remained within normal limits. Our control horse had an unusually high "pre" total protein.

Conclusions/Discussion
   As expected the horses heart and respiritory rate went up with exercise to varying degrees. Hematocrit and total protein varied but stayed in normal limits. We think the variations may have somthing to do with breed,temperament and age.

Summary Statement
   We monitered pulse, respirartion, total protein, and hematocrit, in 5 horses before and after moderate exercise.

Help Received
   Dr. Cronin drew blood and we used her lab to do blood work. Horse owners allowed horses to be in experiment. Instructor allowed experiment to take place.

Name(s)	Project Number
Marco E. de Cardenas	**J1208**

Project Title

Is a Dog's Mouth Cleaner than a Human's?

Abstract

Objectives/Goals
My objective was to learn if a dog's mouth has more bacteria than a human's. My hypothesis was that a dog's mouth would be cleaner because I had heard that a dog's saliva can heal wounds faster and thought this might apply to my experiment.

Methods/Materials
The materials I used were agar plates, cotton swabs, a kindle for note taking, and a camera. I took five dogs and five humans. I swabbed each tongue and gum-line from 6:30-7:00pm. After every time I swabbed their mouth, I then swabbed it onto an agar plate. I let each group sit for five days before counting the bacterial colonies.

Results
The results of my experiment showed that in each round, a dog's mouth had a higher sum of bacterial colonies. These followed my goals and objectives as planned with few problems.

Conclusions/Discussion
The project results proved my hypothesis false. This expanded my knowledge about a dog's mouth and a human's mouth. I learned many different types of bacteria. These results can also help people know to better take care of their teeth after I told them that they need to take better care of their or their pet's mouths.

Summary Statement

The purpose of this experiment was to see if a dog's mouth has more bacteria than a human's.

Help Received

My father drove me to subject's houses. My father payed for all of the needed supplies.

Name(s)	Project Number
Irena L. DeZazzo	**J1209**

Project Title

Can Canines Recognize Muffled Spoken Commands?

Abstract

Objectives/Goals
I came across a recent article that said a chimpanzee was able to comprehend muffled speech. I researched and found out about a parrot that was also able to identify muffled words. I wondered if other animals, such as dogs, were capable of such word recognition. In my project I hoped to discover whether or not dogs might be able to identify muffled commands. I believed that most of the dogs would not respond well to muffled commands. However, I also believed that the response would greatly depend upon the dog. A dog must have sharp hearing and a good attention span in order to take the time to identify a muffled command and respond appropriately.

Methods/Materials
I tested sixteen dogs using three different commands, each repeated one to five times (three to fifteen tests per dog). The commands I used were "sit," "stay," and "come." I visited the home of each test dog, and had their owner give the verbal commands to their dog normally, and then give the commands to their dog muffled. To muffle speech, each owner placed a folded washcloth (four layers thick), and four layers of tissue (a two-ply tissue folded in half), over his or her mouth. I filmed the owner giving the commands to their dog/s, and later reviewed the footage and recorded the results on my computer.

Results
I performed a total of approximately 160 tests and found that 94% of the dogs responded appropriately to the muffled command "sit,", 87% responded appropriately to the muffled command "stay," and 81% responded appropriately to the muffled command "come."

Conclusions/Discussion
The results were surprising to me. The dogs I tested comprehended the commands much better overall than what I had expected. My findings showed that many dogs were capable of recognizing muffled commands. The easiest command for the dogs to comprehend was "sit." The "stay" command was also well understood. The most difficult command for the dogs to identify was "come." The majority of dogs did not respond to the muffled command "come" immediately, but did respond after the command had been repeated three to five times. I believe that "come" was the hardest command to obey because it does not have a hard syllable in it, as do "siT" and "sTay," and therefore may be harder to hear and understand when muffled. The information I learned may be useful in teaching dogs how to recognize muffled commands and respond appropriately.

Summary Statement

I tested canines to see whether they were able to comprehend muffled spoken commands.

Help Received

My mother drove me to the dog testing sites, my father helped with graphs, and my science teacher gave support.

Name(s)	Project Number
Carly R. Dion	**J1210**

Project Title

CSI: Carly's Science Investigation. Fingerprint Patterns in Siblings

Abstract

Objectives/Goals
The question I posed is will fingerprint patterns show similarity between siblings? After working with fingerprints for several weeks, when creating a title, a crime scene quickly came to mind. I was reminded of the popular television show CSI, but cleverly changed the acronym to Carly's Science Investigation. The purpose of my science project was to investigate similarities and differences in fingerprint patterns and therefore magnify my interest in genetics.

Methods/Materials
In this investigation, 10-15 pairs of sibling fingerprints are taken and 10-15 pairs of non-related fingerprints are taken. The right index finger is used for the best analysis and effect. The fingerprints are then analyzed and categorized by the patterns they form -- either loops, whorls, or arches. The data is then entered into a chart and/or graph to help compare and visualize where the similarities lie. The materials used are: an ink pad (black works the best), white paper, paper towel, moist towelettes for cleaning hands, a magnifying glass, and consent forms.

Results
I analyzed fingerprints of 13 pairs of siblings and 13 pairs of non-related people and discovered something very fascinating. Nine out of the 13 pairs of siblings had the same fingerprint category on their right index finger. Three of those were arches; three were loops; and three were whorls, proving that it was no coincidence. Interestingly enough, four out of the 13 fingerprints of those who were unrelated had matching fingerprint patterns, but they all happened to fall under the loop category, which is the most common pattern.

Conclusions/Discussion
My hypothesis was correct. Fingerprint patterns do show similarity between siblings. Fingerprints may be unique, but fingerprint patterns will often lie within the same category as a sibling. Because fingerprints are used in the criminal investigation field, this information could be helpful to all the federal and local agencies that investigate and solve crimes. Any information obtained about fingerprints would also be helpful in the recovery of missing persons. In the future, this information could be useful to trace and track ancestors. Therefore, the fields of criminal justice and genealogy can be enhanced from this information.

Summary Statement

Although every fingerprint is unique, genetics does play a role, as similarities do exist in the fingerprint patterns of siblings.

Help Received

Mrs. Ligeti helped formalize my ideas and taught me how to conduct a science investigation; parents drove me to get fingerprint samples from neighbors and friends; my mom made several trips to get supplies for my board.

Name(s)	Project Number
Lekha R. Duvvoori	**J1211**

Project Title

I See What Eye See: Measuring Low Light Color Vision, Assessing Its Impact on Web Design and in Daily Life

Abstract

Objectives/Goals
To investigate differences in low light color vision between genders and ages, so that if older adults have trouble seeing color in low light, we can help people be aware of this.

Methods/Materials
A low light apparatus was created by covering a lamp and creating a card slide with pin point openings beneath. Consented subjects were placed in a dark room, and very low light gradually increased until they were able to see numbers on Ishihara Color Plates which have color dots. The process was replicated over 4 plates. The number of pinpoints of light intensity was calibrated against a photographer's light meter.

Results
As hypothesized, the ability to see color is affected by the amount of light, and people are able to distinguish objects before their colors. The results from over 50 subjects between 6 and 75 years, supported my hypothesis that older adults have more difficulty with low light color vision. Over 30 years, there is an increased difference between subjects in their ability to see color in low light. Gender difference was not significant.

Conclusions/Discussion
In my research, I did not find much written on low light color vision. Color is constantly used in daily life without considering low light effects. My findings suggest that we should be careful in choosing colors as many people, especially the elderly, have difficulty distinguishing colors in low light. When designing web pages, apps or even traffic signs, lighting and color choices matter. When testing for safety among pilots, truckers and others, we need to also test for low light color vision and not just color blindness. Optometrists and doctors could use simple tests for low light vision.

Summary Statement

I developed an apparatus to measure color vision in very low light and observed that as people age, they need brighter light to distinguish colors, requiring changes in how we use color in technology and daily life.

Help Received

Name(s)	Project Number
Daniela H. Gottesman	**J1212**

Project Title

Exploring the Relationship among Fingerprints and Toeprints

Abstract

Objectives/Goals
The objective of this research was exploring the correlation among toeprints and fingerprints. The first aspect was to explore the relationship between pairs of corresponding left and right fingerprints, as well as pairs of corresponding toeprints. The second aspect focused on exploring the correlation between the set of corresponding fingerprints and toeprints of the same side. One goal of this work is to develop methods and tools for predicting one sides' fingerprints and toeprints from the corresponding fingerprints and toeprints of the other side. Another goal of this work is to develop methods and tools for correlating the right sides' fingerprint pattern to the corresponding right toeprint pattern, and similarly for the left side.

Methods/Materials
Ink pads
Table to keep track of the prints of the specific finger and toe
61 individuals
Each individual's hands and feet were rolled on the ink-pad so that their entire finger from the last knuckle to the fingernail was evenly covered with ink. After the latter was completed, the chosen finger or toe was guided to the correct area in the grid. The prints were manually inspected classified into 10 categories of finger/toeprint patterns, according to the Henry Classification System, including Ulnar Loop, Radial Loop, Whorl, Tented Arch, Central Pocket Loop etc., and were organized in a table for analysis.

Results
The data show that the most dominant fingerprint and toeprint pattern on the left side of the body is the Ulnar Loop, and the most frequent fingerprint and toeprint pattern on the right side of the body is the Radial Loop. Interestingly, these two prints are "mirrors" of each other.

Conclusions/Discussion
This research revealed that, the most dominant fingerprints (and toeprints) on the left side are "mirrors" of those on the right side. This research also rejected my initial hypothesis that if the fingerprints of a group of individuals are similar, then there must be a similarity between their toeprints. Rather, the data displayed no strong correlation between an individual's fingerprints and toeprints. This research proves that one cannot predict a fingerprint from a toeprint. On the other hand, detectives can conclude that a discovered Ulnar Loop has a high probability of coming from an individual's left side finger or toe. Likewise, if detectives discover a Radial Loop, then it is likely to be from an individual's right side finger or toe.

Summary Statement

This project is about exploring the correlation among fingerprints and toeprints.

Help Received

Ms. Miller reviewed my abstract.

Name(s)	Project Number
Connor J. Hartigan	**J1213**

Project Title

Oo, Oo, Oo, I Wanna Be Like You

Abstract

Objectives/Goals
My objective was to determine whether or not monkeys have a hand preference. I predicted that the primates in this experiment will use one particular hand more naturally than the other. Since humans and monkeys are both closely related in terms of dexterity, visual appearance and intelligence, I believe that the monkey results will be similar to that of humans. Since 85% of all humans demonstrate a right handed preference, I predict that the monkeys will also be right handed. My goal is observe 12 monkeys and tally which hand they use to perform various skills.

Methods/Materials
Materials needed include - annual pass to the zoo, digital and video camera, computer, notebook, pen, 12 monkeys (4 Capuchin, 2 Gibbon, 2 Colobus and 4 Spider), natural zoo habitat (including ropes, branches, shelves to sit on, trees, cage bars), variety of enrichment supplies (such as phone books, PVC tubes, hanging toys, paper tubes)and treats (raw vegetables, branches of leaves, shelled peanuts, monkey chow). Methods included - select species of monkey to study, observe/video each cage for 15 minutes, at the same time over 4 days, record observations, review video and tally hand preference for each skill for each monkey.

Results
According to my experiment, the primates used their right hand MORE than half of the time, over 4 observation periods. The trend was for all monkey groups to prefer their right hand 55-65% of the time.

Conclusions/Discussion
My experiment measured the number of times a non-human primate, a monkey, used its right hand compared to its left hand. I predicted that monkeys used their right hand more than their left. Specifically, I looked at which hand they used first because that was their preferred hand. The data I obtained did support my hypothesis. My research showed me that chimpanzees were 96-98% identical to humans, so I expected the monkeys and humans to be very similar. In fact, monkey DNA is more similar to human DNA than a rat is to a mouse. I discovered that 85% of the people on earth are right handed so I expected monkeys to be right handed. The data showed that monkeys prefer to use their right hand more than their left. In my study, monkeys used their right hand 55% of the time. Mathematically, this proves that my hypothesis was correct because the monkeys preferred their right hand the most.

Summary Statement
My project is about non-human primate hand preference.

Help Received
Mrs. Oggiano taught me how to conduct a science fair project, My mom drove me to the zoo, proofed my report, loaned me her scrapbooking supplies and helped me assemble the board. The zookeepers provided enrichment supplies.

Name(s)

Kendall A. Kissel

Project Number

J1214

Project Title

Running Away from Asthma: Does Running Improve Lung Capcity in Asthmatics?

Abstract

Objectives/Goals
The purpose of this experiment was to see whether or not both vital capacity and tidal capacity improve by running in asthmatics. The hypothesis suggested both vital capacity and tidal capacity increase with running.

Methods/Materials
In this experiment, the subjects ran five, ten, and fifteen minute lengths. This experiment studied seven subjects including five asthmatics and two non-asthmatics. Lung capacity was measured with two devices: a peak flow meter which was used to measure lung capacity immediately after the run and a homemade spirometer which measured lung capacity three minutes after the run.

Results
The baseline measurement averaged to be 280 ml. After a five minute run, vital capacity improved to 304 ml on average. After a ten minute run, vital capacity improved from the original lung capacity to 340 ml on average. After a fifteen minute run, the vital capacity increased dramatically to 510 ml. The longer the asthmatic subjects ran, the higher their vital capacity was.
 These results may have occurred because of the #breaking point.# A #breaking point# is when asthmatics# lungs open up to be more like a normal lung.

Conclusions/Discussion
The hypothesis proved correct. Not only did the asthmatics# lung capacity improve, but the non-asthmatics (control group) lung capacity also improved.This experiment is important because it could lead to a cure for asthma. It also opens up so many more questions such as whether or not other exercise such as soccer, basketball, and swimming could improve asthma.

Summary Statement

This project tested to see whether or not running improves lung capacity in asthmatics.

Help Received

Fellow students were test subjects

Name(s)	Project Number
Noah J. LaBella	**J1215**

Project Title

Identifying Family through Fingerprints

Abstract

Objectives/Goals
I will attempt to show that fingerprint patterns show similarities in family members.

Methods/Materials
The materials I used in my scientific experiment are fourteen human subjects, an official forensics police kit and a fingerprint classification chart. My experiment procedures were to fingerprint each subject, analyze and compare the fingerprints, document findings, then draw conclusions. Each subject was compared first to the control subject who is not blood related to any other subject and then to all blood related subjects.

Results
There are no similarities in fingerprint patterns among blood related subjects any more so than in non-blood related subjects. Identical twins' fingerprints have more similarities than two random people's fingerprints but their fingerprints are not identical.

Conclusions/Discussion
Under close examination, there is conclusive evidence that all fingerprints are unique to each individual. Therefore, fingerprints are the most reliable identification available for human beings and there is no evidence to suggest that identifying family through fingerprint patterns is possible.

Summary Statement

My project compares the fingerprints of family members to see if they have general familial similarities.

Help Received

Was instructed in the use of fingerprint comparison equipment by Officer John Abel and Deputy Chief John Toomey of the Utica Police Department; Mother took photographs and helped cut out charts for display

Name(s)

Robyn G. Lee

Project Number

J1216

Project Title

Which Middle School Sport Burns the Most Calories?

Abstract

Objectives/Goals

The CDC estimates that childhood obesity has more than tripled in the last 30 years. Children who are obese are more likely to be obese as adults and suffer resulting health consequences such as diabetes, heart disease, stroke and certain types of cancer. To help fight childhood obesity, my study measured which sports or activities of middle school children burn the most calories and compared them to a typical Middle School P.E. class. My goal was to objectively measure which sports or activities should be emphasized for Middle School children.

Methods/Materials

Typical Middle School sports and activities included 1-mile run, full basketball game, full soccer game, full volleyball game, 50-min P.E. class, 9-holes golf round and 1-set singles tennis match. My control activity was quiet reading for 1 hour. Total movement and acceleration for each sport or activity were measured using the built-in 3-axis accelerometer in the iPhone 4 or Palm Pre apps recorded and stored the accelerometer data (g/hr) for the duration of each sport or activity and downloaded. I measured the total movement during the different activities (which varied from 11-90 min) and also normalized them to 1 hour. Heart rate was also measured using a finger-tip Pulse Oximeter to get the average heart rate for each sport or activity. Heart rates were converted to calories burned using the #Cals Burned# iPhone App, which used #Metabolic Equivalent of Task# database.

Results

The total movement (in g/hr) for a soccer game was 6375.5 (highest), followed by 9-holes of golf (3,932.9), 1-set of tennis (2,076.8), basketball game (1923.3), 1-mile run (1838.1), volley game (1673.5) and P.E. class (1624.9). My control activity, reading, was 140.3. When normalized to 1 hr, running was the highest but my P.E. class still had the lowest level of movement. Total calories burned showed a very strong correlation with the amount of movement ($r=0.98$).

Conclusions/Discussion

This study shows that a sport with the longest duration have most movement like golf. But when normalized to one hour, the more strenuous sports are much higher # running and soccer. My P.E. class was shown to have the least amount of activity. In calories, (total activity time) soccer was shown to burn the most calories and a basketball game the least. For calories burned per hour, a mile run burns the most and golf burns the least amount of calories.

Summary Statement

My study measured which Middle School sport or activities was best at fighting childhood obesity by using a Smartphone accelerometer.

Help Received

My dad helped me with heart rate measurement and statistics.

Name(s)	Project Number
Natasha M. Lethaby	**J1217**

Project Title

The Suffocating Snorkel

Abstract

Objectives/Goals

The objective of my project was to determine how a snorkeler#s depth affected their inspiratory reserve volume.

Methods/Materials

I used my extended snorkel and homemade spirometer to measure my test subject#s inspiratory reserve volume at different depths. Once the participant got to the required depth they would inhale as much as possible through the snorkel and do a normal expiration through a tube connected to the spirometer. While they exhaled I would watch the spirometer and record the reading I got from it.

Results

Overall there was an 80.5% decrease when I compared the averaged inspiratory reserve volumes at the surface to those at five feet underwater.

Conclusions/Discussion

According to my tests there#s an obvious difference on your inspiratory reserve volume if you try and snorkel deeper than about two foot. My tests justify the need for pressurized air during snuba and scuba and also gives you the maximum, practical length of a snorkel.

Summary Statement

Basically I'm testing the effect of water pressure on a snorkeler's inspiratory reserve volume.

Help Received

My dad assisted in the actual experiment, he helped me measure peoples inspiratory reserve volume.

Name(s)	Project Number
Sean P.B. McGovern	**J1218**

Project Title

Do You Get a Buzz Out of Exercise? The Effect of Physical Activity and Exercise on Hand Steadiness

Abstract

Objectives/Goals
The specific aim of this project was to evaluate hand-grip strength (HGS) and hand steadiness (HS)after exercise as markers of physical activity.

Methods/Materials
After providing consent, healthy 18 to 65 year olds were eligible to help with the project. MET (Metabolic Equivalent Task) minutes were calculated using the validated International Physical Activity Questionnaire (IPAQ). The MET score accounts for both time and intensity of exercise. Age, gender, handedness and body mass index (BMI) were recorded. Dominant hand HGS was measured using a handheld hand-grip dynamometer. HS in the dominant hand was measured using a homemade #buzz-wire# modified by replacing the single wire by 2 pieces of wire connected by a metal ring. HS was measured by holding a metal wand (3 mm diameter) within the ring (6 mm diameter) and counting the total number of hits in 30 seconds. A hit was recorded when the wand touched the side of the ring causing the buzz-wire to buzz. HGS and HS in the dominant hand were immediately re-measured in the same way after exercising the dominant hand by squeezing a hand-exerciser 75 times.

Results
40 subjects (40% male; aged 23-58 years; BMI range 18.0-32.3; HGS range 24.6-64.8 kg) completed the study. Total weekly MET minutes ranged from 249 to 5148 minutes. There were more men in the low physical activity group. In all subjects, HGS and HS decreased after exercise (mean pre-exercise HGS-39.2 kg, and post-exercise-31.8 kg; mean pre-exercise #hits#-4.4, and post-exercise #hits'-9.2). The % HGS decrease after exercise was similar between the most physically active (17.0%) and the least active (18.4%) groups. The relative increase in #hits# after exercise was highest in the least physically active (4.4 times) and lowest in the most active (1.6) groups. There was no association between change in HS and age, gender, BMI and, importantly, HGS.

Conclusions/Discussion
These data suggest that: HS and HGS decrease after hand exercise; HGS and change in HGS are not good measures of physical activity; and the change in HS after hand exercise is a reliable and easy way to measure physical activity. There was no association between HGS decrease and HS suggesting that the decrease in HS may be a systemic and not local effect explaining its association with physical activity. These findings may be important where hand-steadiness is needed after exercise such as in the police, armed forces, and athletics.

Summary Statement

Hand steadiness after exercise is a good, cheap and convenient measure of physical activity.

Help Received

My Father helped make graphs from the Excel Spreadsheets

Name(s)	Project Number
Matthew T. Piegza	**J1219**

Project Title

The Hearing Abilities of Men and Women Ages 15-52

Abstract

Objectives/Goals
My objective was to see if hearing declines as people age (are there ringtones children can hear that parents cannot hear) and if there was any correlation between ear infections as a child or listening to music through earbuds/headphones or attending loud music concerts and the hearing abilities of men and women.

Methods/Materials
The materials I used include: an I-pad; Nixon headphones; mosquito sounds (ranging from 8Khz-21.4Khz); paper; pen; notebook; graphs; internet connection (www.freemosquitoringtones.org). I asked 40 subjects(males and females between the age range of 15-52yrs.)to participate in my study. I recorded their age and gender and asked them to put on the earphones and adjust them for comfort and fit. I prepared them for the first sound and asked them to respond with yes/no. I repeated the 13 sounds and recorded their responses. Once testing was finished, I asked them the three questions and recorded their answers.

Results
I found that while hearing declines over age, there were differences between the hearing abilities of men versus women. Male hearing is better at its peak, but has a steeper decline than female hearing which had a more gradual decline with age. My data showed that at age twenty-nine the male hearing abilities started to decline. According to my data, hearing ability is best in mid-to late teens and after age forty there was a large drop in hearing abilities. I also found that the most damaging factor to hearing loss is not listening to loud music with headphones/earphones (my hypothesis), but was going to four or more loud music concerts as reported by my subjects.

Conclusions/Discussion
Based on my data, I found there are differences between hearing abilities of men and women as they age. I also found that people who had protected their hearing ability (by not attending loud music concerts or listening to music through headphones/earphones), had better hearing ability than their counterparts. As for discussion of the topic: I believe hearing ability is an important topic that is often overlooked as people age. It is a common practice for people to get reading glasses as they age, but it is less common/accepted that people may need hearing aids or assistance. My data suggests that men and women need to protect their hearing and continue to monitor their hearing ability.

Summary Statement

The differences between the hearing abilities of men and women as they age and possible factors that contribute to hearing loss..

Help Received

My Mom helped me with graphs. My Teacher provided overall supervision. My test subjects agreed to participate.

Name(s)	Project Number
Aisha Raheem	**J1220**

Project Title

Go with the Flow!

Abstract

Objectives/Goals

I live on a busy intersection, Brookhurst and Hazard, in Garden Grove, California. There is a lot of traffic passing by all the time. I did an experiment for my school science fair, and noticed that my brother had lower expiratory volume than the other boys of his age who live in the suburbs. That got me thinking about the people who live and work on my street. Are we all being affected by the traffic that is always going back and forth? So I decided to take the things that I learned from my earlier project, and apply it to learning about how people are being impacted by the toxic pollution from the traffic. Expiratory volume is a good way to measure a person's lung capacity. Usually, a lower expiratory volume means that a person's lung capacity has been reduced for some reason. Toxins from smoking or pollution on the air from traffic could cause a lower expiratory volume.

Methods/Materials

I tested the people who live and work in Brookhurst.I measured their expiratory volume in milliliters using a spirometer. I invented disposable mouthpieces and had the people inhale for a couple of seconds. I also had them fill out a form asking them questions (gender,age,height,etc).

Results

My results showed that there is a definite difference in the groups that I tested. The people of work on Brookhurst seem to have less expiratory volume than those of us who live there.

Conclusions/Discussion

In conclusion, I was very interested to learn that the people who work on this street have lower lung capacities than those of us who live here. I think this is because workers have doors and windows that face Brookhurst. Their doors could stay open a lot because of customers going in and out. People who live on the street can protect themselves from the traffic emissions by closing their windows, and maybe running their air conditioning.

Summary Statement

Comparing Expiratory volume of people who live and who work on Brookhurst Street, between Hazard and Westminster in Garden Grove, California.

Help Received

Sr. Maryam Abbasi guided me through out the project. My mother helped me make the mouth pieces and helped me paste the board.

Name(s)	Project Number
Martha I. Rangel	**J1221**

Project Title

Band vs. Guitar

Abstract

Objectives/Goals
My objective was to determine who has a better lung capacity before and after running band students or guitar students.

Methods/Materials
the material i used were: a hot plate to warm the water, an air flow meter which was used to check the students lung capacity, latex gloves to protect the the mouthpiece from getting germs.

Results
my results stated that the band students had an average lung capacity than the guitar students. the guitar students were three times increasing and decreasing their lung capacity. the band students were increasing their lung capacity by the third time they inhaled. the guitar students were increasing their lung capacity by the fourth times the students inhaled.

Conclusions/Discussion
thee band students had the right amount needed to have an average lung capacity. the guitar students were either too low or too high. some students were trying too much, but on the other side some students didn't even try enough where they gave me accurate numbers.

Summary Statement
What is the right amount of lung capacity needed to have an average good lung capacity.

Help Received
father helped glue, teacher surpervised, mother cut papers

Name(s)	Project Number
Elizabeth Redko	**J1222**

Project Title

Thunderous Clock

Abstract

Objectives/Goals

This project asked, #Does grooming a horse after a 40-minute workout, lower the horse#s heart rate?#

Methods/Materials

Procedure: The experiment#s methodology involved three horses which heart rates were measured at resting prostitution using a stethoscope; secondly, they were taken to the arena and exercised for 40-mitutes. The exercises involved walking, trotting, and cantering. Then they have been groomed with grooming supplies, after the horses# heart rates were taken again.

Experimental Design: Organization of this experiment was primary goal:

Constants: Throughout the whole experiment the author will be testing horses that are all about the same size and the horses heart rates were measured in the same arena, in the same temperature, same time of day, and in the same barn. The horses were also ridden in the same arena, same time of day, same weather.

Controlled Variable: The author measured horses# heart rates that were not groomed.

Manipulated Variable: The manipulated variable in this experiment is testing the difference between heart rates of horses that were groomed and that were not groomed after a 40-minute workout.

Responding Variable: During this experiment the author measured heart rates of four horses that have been worked for 40-minutes and groomed after the workout, also the author measured the heart rates of horses that were worked for 40-minutes but not groomed.

Trials: Throughout the experiment the author tested four horses twenty times each. The testing is still in process and each horse is going to be tested twenty-three times in total.

Sample Size: Four horses participated in this experiment.

Results

Results showed that all of the horses# heart rates dropped about 35 percent. The lowest heart rate after grooming was 47 beats per minute.

Conclusions/Discussion

The author concluded that grooming does affect the horse#s heart rate after a 40-minute workout. Because it relaxes the horse and it settles the rhythmic flow of the heart rate.

Future studies are in process and will involve more horses for testing and more trials. This project/ experiment is still in progress.

Summary Statement

This project tested the impact of grooming on the equine restoration and heart rate of horses.

Help Received

Ojai Valley School Provided the use of horses.

Name(s)

Therese A. Santiago

Project Number

J1223

Project Title

Harder to Breathe

Abstract

Objectives/Goals

The objective of this project is to see if there is a difference in peak flow between Filipino children and adolescents and the Caucasian standard reference chart.

Methods/Materials

Methods:
1.Healthy Filipino children(both Filipino parents) between 8-18 years old living in Fresno were recruited. 2.Parent consent for their child's enrollment in the study was obtained. 3.Health questionnaire was filled out by the parents.Children with known asthma, cough, cold, chest pain and shortness of breath were excluded from the study. 4.The height was obtained using a Stanley(tm) metal tape measure. 5.The Peak Flow was obtained using Philips Respironics Personal Best Peak Flow Meter(tm). 6.Each participant was asked to do the following: A.Stand up straight, B.Move the marker on the peak flow meter to zero, C.Take a deep breath and make sure your lungs are filled to the maximum, D.Place the device into your mouth with a good seal, E.Blow into the device as hard and as fast as possible, F.The first attempt of the participant is to orient on the peak flow meter use and will not be recorded, G.Once participant is oriented, the second attempt is done, H.Write down the number that the marker has hit, I.Repeat this process a total of three times, J.Record the values of the last 3 attempts numbers, K.The highest value will be compared to the predicted peak flow.

Materials: About 30 Philips Respironics Personal Best Peak Flow Meters(tm), Stanley(tm) Metal Tape Measure, Paper, Pen, Camera, Consent Form, Health Questionnaire.

Results

25 out of the 29 participants had a peak flow number lower than the Caucasian standard reference chart. Only 4 of the participants had a peak flow higher than the predicted values. The average peak flow values on the 29 Filipino participants was 84% which is 16% lower than the predicted values.

Conclusions/Discussion

The results of this test have shown that there was a difference in peak flow between the predicted Caucasian standard values and the Filipino children and adolescents. The peak flow numbers of the Filipino children and adolescents were lower than the Caucasian standard reference chart. So, my hypothesis was supported. Based on this study, there may be a need for adjustments on Filipino children and adolescents normal peak flow values. If I can get enough data in the future, I could help make a reference chart for Filipino children and adolescents.

Summary Statement

This project compares the peak flow values of Filipino children and adolescents to the Caucasian predicted values.

Help Received

Parents helped fix science fair board; Parents contacted Filipino subjects' parents about the the experiment.

Name(s)

Megan L. Wagoner

Project Number

J1224

Project Title

Hay! Pick Me

Abstract

Objectives/Goals
My project is about finding what hay horses prefer. I believe that if I put a horse in an arena for five minutes and watch him eat three different hays, oat hay, grass hay, and alfalfa, then I believe the horse will prefer alfalfa.

Methods/Materials
To test my objective, I got five horses, and one at a time I put them in an arena for five minutes using a timer. I evenly spaced three types of hay; oat hay, grass hay, and alfalfa in a small arena. I let the horse graze and with a stopwatch I recorded how long he ate each hay. I repeated this with each horse ten times.

Results
My hypothesis was proven correct. The five horses ate alfalfa 70%-94% of the time. They ate grass hay for 2%-18% of the time, and oat hay for 0%-0.3% of the time. For 3.7%-12% of the time they did other things in the arena, like roll and walk around.

Conclusions/Discussion
I expected that the horses would want to eat the grass hay since their ancestors roamed the prairies, but after researching the subject and completing my project, it was proven that horses prefer what they are fed on a daily basis. This project could help horse owners decide what hay is best for their horses, and find the most cost-efficient way to meet their needs. This is especially important in these times of economic struggle. This project also helps owners know what hay their horses like so that their horses will eat the hay and not pick up destructive habits that would make owners pay even more for repairs.

Summary Statement

My project is about finding what hay horses prefer of the three hays; oat, grass, and alfalfa.

Help Received

Mother helped with cost of hays and with the timer and cousin helped with decorating the board.

Name(s)	Project Number
Steven S. Higginbotham	**J1298**

Project Title

Carrying Capacity of the East Fork Winter Range

Abstract

Objectives/Goals
I began my project by selecting twenty-six areas to collect vegetation samples. In each of these areas I measured a square yard and cut the grass (elk are grazers and eat grass) within the square. I recorded details related to the area where these stratified random samples were taken. I let each sample cutting dry for two weeks then accuratley weighed them to determine their dry weight. By studying and calculating my data, I discovered how many elk the East Fork Winter Range can sustain at a healthy condition. Through my research I discovered more about the diversity of the range and understand the carrying capacity based on vegetation amounts and the species of wildlife that rely on the vegetation on the East Fork Winter Range.

Methods/Materials
MATERIALS
Orange Tape, Stakes, Hammer, Measuring Tape, Clippers, Ziploc/Paper Bags, Field Notebook, Camera, Maps, Binoculars, Pocket Knife, Pack, Markers.

PROCEDURES
1. Select a study area. 2. Mark off a square yard. 3. Clip grass in the square and place in a Ziploc bag. 4. Place cutting into brown paper lunch bag (label) and let dry for a two week period. 5. After two weeks weigh dried grass and record dry weight. 6. Photograph study area and sample areas. 7. Locate and mark clipped area on the topographical map. 8. Repeat steps one through seven at twenty-six different locations on the winter range. 9. Select areas and conduct the Vegetation Step Test at twenty-five different locations. 10.Locate and mark Vegetation Test areas on the topographical map. 11.Calculate the carrying capacity formula (see Carrying Capacity Formula page in Data.) 12.Meet with and/or contact resource persons.

Results
My data resulted in finding the average amount of vegetation at 1,210 pounds per acre and demonstarted that the range can sustain a larger herd.

Conclusions/Discussion
Through my studies, I discovered that the East Fork Winter Range can sustain a healthy elk herd of approximately 15,840. My hypothesis was partially correct. Currently 7,200 elk inhabit the range, with the capability of sustaining a larger herd. I collected data from grass cuttings in different areas of the range so my cuttings would be widespread and results accurate. My studies are very important to the balance of the

Summary Statement
I the studied maximun amount of elk that the East Fork Winter Range can sustain in a healthy habitat.

Help Received
Father helped type and tape materials on the board.

Name(s)	Project Number
Courtney J. McCullough	**J1299**

Project Title

The Effect of Breeding during Moon Phases on Rabbit Litter Gender

Abstract

Objectives/Goals
The objective was to learn if the sex of rabbit kits would be affected by breeding during the full moon or new moon phase rather than random dates between the moon phases. My hypothesis was that more does(females) would be born if bred during the full moon and more bucks(males) would be born from a litter bred during the new moon. Some believe that breeding is related to the lunar cycle and this theory will be tested.

Methods/Materials
Materials needed: 12 or more does, 4 bucks, 6 nest boxes, moon phase calendar for 2011 and 2012, wood shavings, and extra cages for raising the litters. 18 litters of rabbits were bred on various dates which coincided with the moon phases starting in September through January of 2012. A minimum of 6 litters were bred during each phase, new moon, full moon, and somewhere in between the two. Extra breeding was also done to take into account the possible non pregnant does and loss of litters from natural causes. 28 days after breeding, nest boxes were placed in the cages. Litters were recorded when born. After 4 weeks of age, each litter was sexed and recorded by gender. At the end of the final litter, all data was tallied and placed into graphs for comparison.

Results
The results of the data showed a distinct trend toward a correct hypothesis. The total number of kits born was 108, with 57 bucks and 51 does born, a typical percentage one might expect; however, during the full moon, there were 7 bucks and 25 does born, and during the new moon, 29 bucks and 9 does were born. When breeding in the middle of the moon phases, there were 21 bucks and 17 does.

Conclusions/Discussion
During the new moon, 22% of the babies were bucks and 78% were does, while 76% bucks were born during the full moon breedings with only 24% does. When breeding during any other time, the buck percentage was 55% and 45% does. This shows that my hypothesis proved to be correct. If these results can be reproduced, the possibility of controlling the gender in a positive way could allow farmers and breeders to save time and money by not having to cull unwanted animals. In the field of show rabbit, males can be shown much longer. When producing food, maximum number of does will produce more meat. The benefit of this investigation is important to anyone needing a particular gender of rabbit. This experiment was successful as completed and I feel it also has the potential for further investigation.

Summary Statement

This project tests whether breeding during a new moon increases the number of bucks in a litter and breeding by a full moon increases the number of bucks in a litter.

Help Received

My teacher gave me some suggestions about improving my board.