CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Isabella Castrodale; Sophia Castrodale

Project Number
J1301

Project Title
Speed Stacking vs. Physical Education

Abstract

Objectives/Goals
Our objective was to find out if Speed Stacking was an effective way to raise a participant's heart rate, as it is now being used in many physical education classes for children.

Methods/Materials
Stop Watch
Speed Stacking Cups

Results
We found, using the Karvonen Formula, that in multiple trials with multiple subjects that the activity of speed stacking did not significantly raise the participant's heart rates, and therefore would be an ineffective component in any physical education program.

Conclusions/Discussion
We concluded that speed stacking should only be considered for use in a P.E. setting, if it's goal was to develop eye-hand coordination, or a a transitional activity between cardio elevating activities such as relays. In a country where childhood obesity is on the rise, it is important that we are utilizing the most effective possible exercise programs for students.

Summary Statement
Our project examines whether or not the speed stacking of cups is an effective way to raise a particpant's heart rate, and thus be a suitable activity for physical education.

Help Received
My mom oversaw our project and gave suggestions regarding scheduling.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Flora G. Chang

Project Number
J1302

Project Title
The Effect of Eye Color on Peripheral Vision

Abstract

Objectives/Goals
The question that my project hoped to answer was if eye color had an effect on peripheral vision. I tested the peripheral vision of people with brown, blue, and green eyes, five times each for each eye, left and right.

Methods/Materials
In order to conduct my experiment, I had to first prepare a peripheral vision protractor to measure the range of peripheral vision each person had. I constructed the protractor by using a thick poster board. The poster board was cut in a semi-circle with a small nose hole. Then, it was marked with lines showing the angles in degrees. Afterwards, a push pin was attached, acting as the focus point. Once the protractor was made, volunteers were experimented on. There were seven volunteers for each eye color, brown, green, and blue. Each volunteer then used the peripheral vision protractor by putting their nose against the nose hole while staring at the focus point. As soon as the volunteers were ready, I slowly moved a blue symbol/marker along the side of the protractor. When the volunteers were able to see the blue marker, they would say 'stop,' and the data would be recorded in the lab book. Each person was tested five times for each eye, left and right.

Results
After obtaining the range of peripheral vision for each person, the averages were then found to determine which eye color had the widest range of peripheral vision. My results were that people with brown eyes had the widest range of peripheral vision. The average for the range of peripheral vision the people with brown eyes had was 14.7 degrees for the left eye and 12.7 degrees for the right eye. (The smaller the number, the wider the range of peripheral vision.) The average for the people with blue eyes was 19.9 degrees for the left eye and 18.6 degrees for the right eye. Lastly, the average for the people with green eyes was 18.6 degrees for the left eye and 17.9 degrees for the right eye. This shows that the people with brown eyes had the widest range of peripheral vision, the people with green eyes was in between, and the people with blue eyes had the narrowest range of peripheral vision.

Conclusions/Discussion
With my results, it was evident that my hypothesis was accurate. People with brown eyes did have the widest range of peripheral vision, people with blue eyes had the narrowest range, and people with green eyes had a range of peripheral vision that was in between the people with brown and blue eyes.

Summary Statement
My project summarizes the effect eye color has on peripheral vision.

Help Received
My father bought the supplies I needed, and the volunteers that were tested on helped me obtain my results.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Jose B. Chayet

Project Number
J1303

Project Title
Dry Eyes and Computers

Abstract

Objectives/Goals
The goal of this project was to investigate if while using the compouter there is a higher incidence of a human having a dry eye.

Methods/Materials
17" MacBook Pro (with hidden video camera)
People Counter
Timer
Shrirmer Test Exam Strips

Results
It turned out that when using the computer the human eye will blink up to 400% less than in a normal enviroment. The lack of blinking will create a lack of moisture in the eye. A lack of moisture in the eye will create a dry eye. The Shrirmer test exam backed up this conclusion by stating that the eye is wih more moiusture when not using the computer than when using the computer.

Conclusions/Discussion
It can be concluded that when using the computer the average human will be blink less and have a higher chance of having a dry eye. There are many pre-cautions to this. Instead of using the computer for an hour non-stop, you should take breaks every thirty minutes and try to blink as much as you can during that break. YOu should also move the monitor to more of an obtuse angle so it is not as hard on your eyes. The most important thing however is to remind yourself to blink while using the computer.

Summary Statement
My project is about trying to see if there is a higher incidence of a dry eye while using the computer

Help Received
Dr. ALex Lichtinger and Dr. Leon helped me in doing the Shrirmer Test Exam becuase I was not able to perform such an exam on subjects.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Jacob S. Deyell

Project Number
J1304

Project Title
Can People Taste the Difference between Fat-Free and Regular Foods?

Abstract

Objectives/Goals
Many people avoid the fat-free variations of their favorite foods, mainly due to their perception of taste differences in fat-free versus regular foods. However, do the foods really taste that different? That is what I chose to investigate. I am interested in discovering if people are able to taste the different between fat-free and regular foods.

Methods/Materials
To determine if individuals could taste the difference between fat-free and regular foods, I gathered fat-free and regular versions of Fig Newtons, cheese, and popcorn; having six separate containers of food. I tested 44 subjects who do not have allergies to the above mentioned foods. The sample was comprised of adults and minors. Each subject received a sample of the fat-free and regular version of each food item. Each subject was then asked to determine which of the food items were fat-free, and which were regular. Results were then tabulated.

Results
The results of this experiment were tabulated in percentage form. For those individuals under the age of 18, 23% were able to correctly distinguish between the cheeses. Forty-five percent were able to correctly distinguish between the Fig Newtons. Sixty-eight percent were able to correctly distinguish between the popcorn.

The results of this experiment for those individuals over the age of 18 are as follows. Forty-one percent of the subjects were able to correctly distinguish between the cheeses. Thirty-two percent were able to correctly distinguish between the Fig Newtons. Seventy-seven percent were able to correctly distinguish between the popcorn.

Conclusions/Discussion
The results determined that overall people are not able to taste the difference between fat-free and regular foods. However, I was also able to conclude that those over 18 years of age had a greater ability to distinguish between the fat-free and regular versions of the foods. Therefore, the efforts that the food manufacturers are putting forth to make their fat-free foods as good as the regular foods, seems to be working.

Summary Statement
My project tests if individuals are able to taste the difference between fat-free and regular foods.

Help Received
None

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
David M. Elizondo

Project Number
J1305

Project Title
One or Two (Eyes): Which Is Best for You?

Abstract

Objectives/Goals
My project was an attempt to determine whether one eye or two are more accurate when aiming a paintball gun. My hypothesis was that one eye would be more accurate than two, because people tend to reflexively close one eye when aiming at a target.

Methods/Materials
Informed consent was obtained from 4 participants, selected by age, gender and paintball experience. Each subject was instructed to fire 25 shots at a standard target 30 feet away, first with one eye open and then with two eyes open. All controlled variables were monitored and kept the same.

Results
One eye was consistently more accurate than two eyes, and there was an overall increase in accuracy of 11%.

Conclusions/Discussion
My conclusion is that vision and perception play an important role in aiming accuracy. One eye was clearly more accurate than two.

Summary Statement
My experiment is about the human eye and visual perception in aiming at a target.

Help Received
Mother provided transportation and monitored the experiment's safety protocol.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

Benjamin T. Ellerbrock

Project Number

J1306

Project Title

Fingerprints: Barcodes of Life

Abstract

Objectives/Goals

An individual's fingerprints are unique thus giving all humans an identification barcode. Fingerprint patterns, however, are limited to eight different types. This study examined fingerprint patterns of thirteen families to determine if those patterns are similar and therefore might have a genetic link. One set each of identical triplets and twins were included in the study.

Methods/Materials

Fingerprints from both thumbs and both index fingers were collected using standard fingerprinting techniques. All fingerprints were examined under light magnification and placed into either one of eight categories of classic fingerprint pattern types or into a category of unreadable.

Materials used included fingerprint ink, ink roller, fingerprint cards, card holder and lighted magnifying glass.

Results

All eight fingerprint patterns were seen. Ulnar loops were the most common pattern (39%). Family pattern similarities were seen in 11/13 families. Identical twins had similar thumb patterns but different index finger patterns. Similar patterns were seen in 2 of 3 identical triplets; the 3rd triplet displayed patterns different from his brothers.

Conclusions/Discussion

Fingerprint pattern similarities were seen in 85% of the families suggesting there may be a genetic link to these patterns. Of special interest is the case of the triplets. The two with similar patterns are both right handed; the one with different patterns is left handed. This makes me wonder if there might be a connection between the pattern difference and the handedness difference.

Summary Statement

My project examines family member fingerprint patterns to see if similarities might suggest a genetic link to fingerprint pattern type.

Help Received

My Mom and Dad helped type the report; my Dad read the report and offered suggestions for editing it.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Sara T.S. Frank

Project Number
J1307

Project Title
Do You See What I See?

Abstract

Objectives/Goals
Does everyone see colors the same? Do either gender or age affect color perception? My hypothesis is that people see colors differently, especially as they age.

Methods/Materials
Materials:
1.An LED light box, which I will construct
2.DMM to measure voltage
Procedure:
1. Construct an LED light box, consisting of two different colored lights, red and green, each separately controlled.
2. Set the red LED light to a constant color, as measured by the DMM.
3. Subjects will be asked to adjust the green LED in such a way as to produce a third color.
4. Measure the voltage of the green LED with a DMM in order to determine an individual subject's color perception.
5. Graph the DMM reading of each subject and plot by age and gender.
6. Test the hypothesis based on the data.

Results
In these results, it was shown that in both genders, as a person ages, the DMM measurement gets higher, which means that they see colors as duller (requiring higher voltage to compensate and make the colors brighter). In particular, the color perception of men decreases significantly past the age of 45. For women, color perception also changes as they age, but not as significantly as men. Results also show that male and female color perceptions differ from each other, slightly when younger, and more significantly when older, with men having poorer color perception than women.

Conclusions/Discussion
My hypothesis that people see colors differently, especially as they age, was correct. It was surprising to me how much men#s color perception degrades, especially beginning in middle age. My research also shows that males and females do see colors differently, with men having less distinct color perception than women, especially in the older age groups.
I believe this information could have practical applications. For example, knowing that older people see color less brightly could affect the way color is used in clothing, paint, store displays, and even pills (which are often differentiated by color) that are aimed at this age segment. Also, since men seem to see

Summary Statement
Both gender and age determine your color perception

Help Received
Grandfather taught how electricity works and how to build a LED light box

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Taylor C. Hemphill

Project Number
J1308

Project Title
The Buzz Around Town

Abstract

Objectives/Goals
My project was to determine at what frequency range people lose their ability to hear high frequency sounds.

Methods/Materials
An IPod Touch was downloaded with the 'Dog Whistle Application'. Over 100 subjects ranging in age from 8 to 30+ years were asked to turn so their back was facing tester and indicate by raised hand when they could hear the beeping noise of the Dog Whistle Application. The testing pitch range began at 8,000 kHz and continued upwards in increments of 2,000 kHz as long as the subject indicated they could hear the beeping noise. Once 14,000 kHz was reached the pitch was increased in increments of 1,000 kHz until subject could no longer acknowledge sound. Once the pitch was not acknowledged the pitch was decreased by 1,000 kHz until subject could once again acknowledge sound. At that point the high frequency pitch was again increased until subject again indicated no sound. The high frequency pitch was moved in between the last 2 numbers until subject once again acknowledged pitch. The high frequency pitch range was then recorded.

Results
On average, a decrease in the ability to hear high frequency pitches began at 14,000 kHz for ages 8-30 and 8,000 kHz for ages 30+. On average a decrease in the ability to hear high frequency pitches began at 8,000 for BOTH genders.

Conclusions/Discussion
The following conclusions can be drawn from this experiment: The decrease in high frequency range diminishes significantly with age. On average a decrease in the ability to hear high frequency pitches began at 14,000 kHz for ages 8-30 and 8,000 kHz for ages 30+. There was no significant difference in high frequency range digression between either gender. Several things to keep in mind from this experiment are; even though MOST average age 30+ year olds cannot hear the high frequency ranges that some teenagers and young adults can, there are some exceptions...and one may just be the teacher in your class. That should be kept in mind should you choose to test this application in class when texting or phone conversations are not allowed. Some young children may not be able to communicate the pain that may accompany continued high frequency pitches-be aware! Last, but not least, next time you decide to loiter outside a store area, you may just be chased away, not by a policeman, but by the BUZZ AROUND TOWN.

Summary Statement
Finding out at what frequency range most people lose their ability to hear high frequency sounds.

Help Received
Mother for helping me purchase supplies, type and arrange board. Brother for helping me with graphs and charts.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Cole W. Henriksen

Project Number
J1309

Project Title
Stressed Out?

Abstract

Objectives/Goals
I predict that heart rate (HR) and systolic blood pressure (BP) will show a greater increase while diastolic blood pressure (BP) and oxygen saturation level (O2sat.) will show a greater decrease while playing the Mature (M) rated video game versus the Teen (T) rated video game.

Methods/Materials
1. Record physiological measurements for pre-game teen "T" rated video game.
2. Have subject play teen rated game for five minutes.
3. Record physiological changes for teen "T" rated video games.
4. Have Subject rest for 15 minutes.
5. Record physiological measurements for pre-game mature "M" rate video game.
6. Have subject play mature "M" rated video game for five minutes.
7. Record physiological changes for mature rated video game.

Results
Playing Mature "M" rated video games produced a higher heart rate and blood pressure response than when playing the Teen "T" rated video games, while there was no significant difference in oxygen saturation level between the Teen rated video games and the Mature rated video games (both showed a moderate decrease in oxygen saturation level, normalizing after 5 minutes of rest).

Conclusions/Discussion
My results showed that there is a significant difference between playing a Mature "M" rated video game opposed to playing a Teen "T" rated video game. The Mature rated video game produced more stress in the test subjects measured by blood pressure and heart rate response.

Summary Statement
My project studied the physiological effects of playing Mature rate video games versus Teen rated video games.

Help Received
My Mother helped me by taking my subject's blood pressure while I monitored their heart rate and oxygen saturation levels.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Eileen Y. Hsu

Project Number
J1310

Project Title
Now You See It, Now You Don't: How Eye Color Affects Peripheral Vision

Abstract

Objectives/Goals
The purpose of my project was to test how eye color affects peripheral vision. Through research on peripheral vision prior to experimentation, I learned that the pupils of brown eyes are substantially larger than the pupils of blue eyes. Because the range of peripheral vision relies on the amount of light the pupil can take in, I decided to test if eye color affects peripheral vision and formed a hypothesis: If the eye color is darker, then it will have a wider range of peripheral vision.

I hope that further studies of my experiment may help optometrists create eyeware and treatments for people of different eye colors.

Methods/Materials
Materials: For experimetation, I used 1 arc perimeter, 1 target, test subjects, a windowless room with a constant light source.

Procedures: First, gather all materials. Have the first test subject place their chin on the right side of the chin rest. Tell him/her to cover his/her right eye, and to stare directly at the white focus point. Slowly move the target around the outside of the left half of the arc perimeter until the subect can see it. Record the angle. Next, with the same eye, slowly move the target around the outsidce of the right half of the arc perimeter until the subect can see it, and record the angle. Repeat this process with as many test subjects necessary.

Results
After completing experimentation, I learned that dark colored eyes do indeed have a wider range of peripheral vision than light colored eyes. The results showed a substantial difference between the average angle at which a dark eyed person could see the target and the average angle at which a light eyed person could see it. The difference was almost 10 degrees, comparable to the neglicable results received when testing peripheral vision between the genders.

Conclusions/Discussion
Though having proved my hypothesis correct, I still had a few issues with experimentation. For example, at one point during testing, the light source fell. Another limitation I encountered: I had originally planned to test as many classes as I could, but after having tested only two, I realized that both consisted of predominantly dark eyed people. Because of this, I had to hand pick light eyed test sujects in order to even out the ratio of light eyed test subjects to dark eyed test subjects.

Summary Statement
My project shows my results of how eye color affects peripheral vision, divided up into lighter eye colors and darker eye colors.

Help Received
Recieved equiptment (arc perimeter) from Dr. Randal Yumori, friends helped record results, support of my parents.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Grace Khanlian

Project Number
J1311

Project Title
Effects Of Music on Human Blood Pressure and Heart Rate

Abstract

Objectives/Goals
I want to see which type of song will effect a person's blood pressure and heart rate. I have four different song genres testing on various people; Classical, Jazz, Hip Hop, and Techno. Each is about 4 minutes long.

Methods/Materials
1) 50 Volunteered Subjects (various age groups)
2) Blood pressure machine (sphygmomanometer)
3) Four types of songs (Classical, Jazz, Hip Hop, and Techno) on I pod
4) Stopwatch

Results
In this study; difference in mean,median and majority of population (25-75 percentile) between baseline and different genres of music (classical and Jazz music) showed no significant change. However, in Rap and Techno music population mean,median and majority range all trended higher by 5-10% from the baseline.

Conclusions/Discussion
My hypothesis turned out to be wrong for both predictions. I had predicted that Rap/Hip Hop would show the greatest increase in heart rate and blood pressure and that Jazz would show the greatest decrease for these same two physiological measurements. My results showed Techno music as having the greatest increase on heart rate and blood pressure while classical music reduced heart rate and blood pressure the most.

Summary Statement
Measuring Blood Pressure and Heart rate for subjects listening to different music genres.

Help Received
My dad provided the statistical software (engine room by excel microsoft) to plot the graphs

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Cole C. Kurth

Project Number
J1312

Project Title
Don't Drink and Sing

Abstract

Objectives/Goals
The objective of my project was to discover the effect of various liquids on the subjects' vocal ranges. I hypothesised that the drinks milk, iced water, root beer and coffee would have a negative effect on the range, while water, orange juice, and herbal tea would have a positive effect.

Methods/Materials
I tested the project by having the subjects drink one of the selected drinks, wait one minute for the drink to take effect, and then recording the subject's range from their lowest note to their highest note. I then compared the affected range to the subject's original vocal range. The subject was then given 24 hours to recover for the next test. Materials that were used for the project include 8 singers of constant age and vocal training, 8 ounces of 7 different drinks, a piano, a recording device, media to store the data, and cups.

Results
The results showed that the average unaffected range of the subjects was approximately 35.75 notes. Water increased the average range by 3.25 notes, Throat Coat Tea by 2.95 notes, Root Beer by 1.39 notes, and Orange Juice by 1.13 notes. Cold water decreased the average range by 1.11 notes, Coffee by 0.12 notes and Milk by 4.75 notes. My results show that drinks do have both a positive and negative effect on the vocal range.

Conclusions/Discussion
Water and Orange Juice increased the average vocal range because these drinks washed away phlegm in the throat that had previously prevented the vibrations of the vocal cords from escaping. Milk decreased the subjects' range because it created more phlegm which blocked the vocal vibrations. Tea and Root beer had a positive effect because these drinks relaxed the vocal cords, allowing for a wider range of vibrations to be made. Coffee had a negative effect on the vocal range because the stimulant, caffine, tightened up the vocal cords creating a smaller range of vibrations. The results show that water, juice, root beer and tea increase the average singers' vocal range while coffee, milk, and iced water decrease it. My results, with the exception of root beer, support my hypothesis.

Summary Statement
The project is about the effect of various drinks on the average vocal range.

Help Received
Dad helped prepared graphs, Expert provided information.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Anvesh R. Macherla

Project Number
J1313

Project Title
What Did You Say? iPods Cause Hearing Loss! A Study to Find if iPods Cause Hearing Loss

Abstract

Objectives/Goals
To find out how much damage iPods can cause if listened frequently with a high volume.

Methods/Materials
To conduct this experiment an iPod, headphones, and 50 8th graders, 50 high school students, and 50 adults were used. The variables are those who listen to their iPods with >60% volume or >10 hours weekly and for >1 year. The controls are those who did not qualify for being variables. Each frequency was played and recorded if it was heard.

Results
It was observed that all the variables from 8th grade, high school, and adult groups could hear fewer tones than their control group. The range of hearing for any variable compared to its control had major differences. The 8th grade control vs. variable difference was 27%. The high school difference was 30% and the adult difference was 28%.

Conclusions/Discussion
The experimental results suggest that there is a remarkable difference in the hearing ability between variable and control groups. The hearing variation is very significant, especially in high frequencies. Throughout all the frequencies and age groups, there is a 28% hearing deficiency in the variable groups which proves that iPods can cause hearing loss if listened frequently.

Summary Statement
A study to find if iPods cause hearing loss.

Help Received
Parents driving me and professionals guiding me.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Neena Mohan

Project Number
J1314

Project Title
Aahhh! I Put My Cells Through That?!?

Abstract

Objectives/Goals
Based on the theories of osmosis and diffusion, my project is about testing which drink will dehydrate human cells the most: Coffee, Soda, or an Energy Drink. I believe that Pepsi (the soda) will go into a deeper state of hypertonicity and dehydrate the cells more. This is because it contains less water than black coffee and Monster Energy (the energy drink). Also, since Pepsi is more chemically manipulated and engineered, its particle size is bigger and probably won't be able to pass through the selective semi-permeable membrane of a cell and reach its balanced isotonic state.

Methods/Materials
I used dialysis tubing to represent a human cell because it acts like a cell membrane and liquids are able to pass through it as well. I took four equal pieces of dialysis tubing which I cut with scissors, and filled with equal amounts of water. I then took dental floss and medical clamps and tied the ends of the tubing tightly so that none of the water would leak out. Next, I put one piece of tubing each into bowls containing black coffee, Pepsi, Monster Energy, and water (my control). After regular intervals, I used a nylon measuring tape to measure the circumference of each cell and recorded my data. How much the cells shrink will determine how dehydrated they are. I also took notice of the color difference inside and outside of the cell.

Results
The results of my project were this: The Coffee shrunk a total difference of 8 millimeters, the Soda shrunk 10 millimeters, the Energy drink 5 millimeters, and the water stayed the same. This shows that the "cell" with Pepsi outside of it shrank the most. Also, the color of the cell placed in the soda did not change like the the cells placed in coffee and the energy drink. This proves that soda dehydrates human cells more.

Conclusions/Discussion
My hypothesis was correct; the Pepsi did cause the circumference of the cell to shrink the most. The soda didn't pass through the dialysis tubing as much as the coffee and the energy drink did. This happened because the molecules in the soda could not pass through the semi-permeable membrane of the dialysis tubing and couldn't balance out and reach equilibrium. If I were to do this project again, I would test a different liquid like a stronger energy booster drink. I would also weigh the "cells", to get a more accurate measurement and try to find a way to determine specifically which cells are being dehydrated by these drinks.

Summary Statement
My project, "Aahhhh!! I Put My Cells Through That?!?", is about testing which of these drinks will dehydrate human cells the most: Coffee, Soda, or an Energy Drink?

Help Received

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Nolan A. Palmer

Project Number
J1315

Project Title
Respiratory Physiology: Does Elevation Affect Vital Capacity?

Abstract

Objectives/Goals
My objective was to determine whether the lung capacity of middle school students who live continuously at high elevation differed from that of the same aged students who live continuously at sea level.

Methods/Materials
Approximately 130 student volunteers between the ages of 12 and 14 consented to participate in this study. Fifty percent live in San Diego, at sea level and fifty percent live at elevations above 9,000 feet in Colorado. The protocol consisted of students completing a questionnaire regarding their activity level and length of time living at this elevation, as well as the length of time their parents and grandparents have lived at this elevation. They then began the experiment by filling their lungs as fully as possible and exhaling forcefully and completely into a balloon. The diameter of the balloon was then measured (in cm). Three attempts per person were made and averaged, with the average being plotted on a graph to achieve a conversion to volume and determine the actual lung capacity. Height and weight were used to calculate body surface area to determine an estimated vital capacity for each person. Actual capacity was then divided by estimated vital capacity and recorded as a percentage for each participant, and as a gender group by location. These averages were compared in order to draw a conclusion.

Results
Subjects at the highest elevation used the greatest percentage of vital capacity (82%), while those at the lowest elevation used 10% less vital capacity (72%). This was consistent between the gender groups. 64% of students at the highest elevation had lived their entire lives at that elevation and 24% of these were the third generation to have lived their entire lives at that elevation. Likewise, 64% of those at sea level have lived their entire lives at that elevation, though only 11% of them were the third generation to do so.

Conclusions/Discussion
My findings proved that those who live continuously at high elevations have a greater lung capacity than those who live at sea level.

I would like to do further investigation to see whether subjects living at an intermediate elevation have vital capacities that fall correspondingly between the two groups that I studied.

Summary Statement
My project studies whether living continuously at high elevation increases one#s vital lung capacity.

Help Received
Mr. Degen and Ms. Slifka,, science teachers in Colorado, helped their students participate in research and sent me the results Mrs Deppe, science teacher in Apple Valley, helped me figure out how to compare estimated and actual vital capacities. . My mother helped record measurements, typed report and helped

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Braden D. Rollins

Project Number
J1316

Project Title
Who Looks More Like Their Fathers? Sons or Daughters?

Abstract

Objectives/Goals
My objective was to determine whether females look more like their fathers than males do. My hypothesis is that the females offspring will be more like the male parent. I came to this hypothesis because many people have told me this is something they have observed and I also have observed this as well.

Methods/Materials
During the experiment, I wrote a questionnaire with questions about the physical characteristics of the offspring of a living male father which include: Do you have detached earlobes? Do you have a hitchikers thumb? Can your roll your tongue? Do you have dimples? Are you right handed? Do you have freckles? Do you have a widows peak? Do you have allergies? Do you have naturally curly hair? Do you have a cleft chin? Do you naturally see the colors red and green? Do you have hair on your fingers (Mid Digital Hair)? Is your second toe longer than your big toe? Do you have a dark complexion? Do you have long toes? And do you have a uni-brow? I either handed this to, emailed it to, or orally communicated this questionnaire to the fathers of families and requested him to give it to a daughter and son of his, as well as, himself, see what the results were and communicate those results back to me. I also walked around town and observed more families using sight to see which of the children looked more like their father, asking of course, first, if the adult male was their real father.

Results
I came to the conclusion from my original testing that forty-five out of fifty female offspring in the families tested looked like their fathers genetically more than the male offspring. This is statistically 90%. With these results, I must come to the conclusion that I , in fact, proved my hypothesis absolutely correct; and therefore, the female offspring is more like the male parent than the male offspring.

Conclusions/Discussion
My conclusion is that I, in fact, did prove my hypothesis absolutely correct and I know this because 90% of the results said that females were more like their fathers than the males were. This means if you are a male and you look like your dad, just wait until your baby sister comes around.

Summary Statement
Female offspring share more phenotypes with their father than male offspring.

Help Received
Mother helped with supplies; Mrs. Vellas helped to refine my project; Mrs. McCandless for helping me to interpret the data.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Hannah E. Sallee

Project Number
J1317

Project Title
Now You See It! Does Eye Color Affect Peripheral Vision?

Abstract

Objectives/Goals
The objective of this project was to determine if eye color affects peripheral vision.

Methods/Materials
I built a one foot radius protractor out of foam board. I cut out different colored shapes and glued them to wooden sticks. I had each subject hold the protractor up to their face and I tested a different shape and color for each eye by slowly moving the wooden sticks along the protractor. I recorded when each subject first detected motion, color, and shape. I tested five subjects with brown eyes, five with green eyes, and five with blue eyes. Subjects were of varying ages.

Results
For the left eye, green eyes had the best average for detecting motion and color. Brown eyes had the best average for detecting shape. For the right eye, green eyes had the best average for detecting motion, color, and shape.

Conclusions/Discussion
Even though my results show that people with green eyes have the best averages for peripheral vision, I think that age and how well one's normal vision is affects peripheral vision.

Summary Statement
This project was to determine if eye color affects peripherall vision.

Help Received
Father helped with graphs and proofreading report.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Brian R. Scott

Project Number
J1318

Project Title
Step It Up: Can Pulse Oximetry During Breath Holding Predict One's Level of Physical Fitness?

Abstract

Objectives/Goals
I wanted to see if there is a correlation between decline in oxygen saturation during breath holding as measured by pulse oximetry, and an individual's level of physical fitness as estimated by 48 hour pedometer readings. I predicted that the subjects with the least amount of daily activity would have the most rapid drop in oxygen saturation.

Methods/Materials
I obtained informed consent from 15 subjects, 9 males and 6 females, ranging in age from 10 to 71. I asked them about their exercise habits. The subjects used pedometers to record the amount of steps taken over 48 hours. Their baseline oxygen saturation was measured by a finger pulse oximeter. They then took a normal breath, held it for 30 seconds, exhaled, and immediately repeated that for a total of 4 times (2 minutes). The oxygen saturation was recorded every 30 seconds for a duration of 2 minutes and 30 seconds. The time at which the oxygen saturation dropped by 2 percent was noted.

Results
The average steps taken over the 48 hour period were 13,678. The average time to a 2% oxygen saturation drop was 57.1 seconds. Subjects who did ordinary activity had a 2% oxygen saturation drop at 34.5 seconds, those who did moderate activity dropped at 41.4 seconds, and those who did aerobic (long distance) training dropped at 90 seconds. Analysis of steps taken and oxygen saturation decline over 2 minutes showed that those who took the most steps had the slowest decline in oxygen saturation.

Conclusions/Discussion
My results showed that using a pulse oximeter to measure decline of oxygen saturation during breath holding does correlate with activity levels as measured by a pedometer. This novel, simple, and inexpensive test could help measure one's level of physical fitness, and may be useful in settings such as schools, the military, and doctors' offices.

Summary Statement
The rate of decline in oxygen saturation during breath holding can predict one's level of physical fitness.

Help Received
Father loaned me a pulse oximeter and supervised; mother bought the pedometers; 15 subjects volunteered their time.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Shelby N. Smith

Project Number
J1319

Project Title
What Is the Effect Food Has on Vocal Range?

Abstract

Objectives/Goals
My experiment is the effect food has on vocal range.

Methods/Materials
I tested this with peanut butter, soda, and chocolate. I measured a person's voice by using the piano and then gave them one of the foods and measured it again and then repeated for each food.

Results
The results I got did not match my hypothesis. Chocolate had the least amount of effect on the vocal range. Next was peanut butter and the last one was soda.

Conclusions/Discussion
If this experiment were to be retried I would suggest more subjects.

Summary Statement
My project is about the effect food has on vocal range.

Help Received
My science teacher allowed class time for my experiment. My music teacher lent me a key board for the experiment.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Nisha Srinivasa; Kathleen Sullivan

Project Number
J1320

Project Title
Swimming Sensation

Abstract

Objectives/Goals
Our science fair experiment is about swimming. We chose to do a project on how, and if a swimmer's arm span affects their speed in the pool, since we are both swimmers and it is an area of interest for the both of us. We tested the hypothesis: If a swimmer has longer arms, he/she will complete a length in less time than a similarly trained swimmer.

Methods/Materials
Materials
Tape measure
Stopwatch
Paper
Pencil
Competitive swimmers
We conducted our experiments on 19 Masters Swimmers, ranging from ages 23-64 years old.We measured their body to arm span ratio and recorded it on a piece of paper. We then had them swim a 25 yard length in the pool and we recorded their times

Results
According to our data, we found that only the swimmers with exact body to arm span ratio of 1:1 that swam proved our hypothesis correct.

Conclusions/Discussion
Based on our results, we cannot conclude that our data proves our hypothesis. This does, however, lead us to believe that further testing with more control factors could result in a relationship between the arm span and speed of the swimmers.

Summary Statement
Our project is about if a swimmer's body to arm span ratio affects their speed in the pool

Help Received
used 19 masters swimmers training under coach Doug Green

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Tia A. Tang

Project Number
J1321

Project Title
The Effectiveness of Brewer's Yeast as a Mosquito Repellent

Abstract

Objectives/Goals
Can Brewer's Yeast be an effective mosquito repellent? The objective is to determine if the consumption of Brewer's Yeast for five days will reduce the number of mosquito landings in human subjects.

Methods/Materials
Materials: seventy five male and female mosquitoes, a mosquito cage, eleven human participants, fifty five (486 mg) Brewer's Yeast tablets, and a stopwatch. The disease-free mosquitoes (laboratory maintained) were put into a caged container. Participants were asked to put their hand in the cage for one minute and shook off mosquitoes that landed on their hand to avoid getting bit. The number of mosquito landings was counted, and each participant did three trials. Starting the next day, the eleven participants took one Brewer's Yeast pill a day for five days. The procedure was repeated, and a comparison of the number of landings prior to and after consuming Brewer's Yeast was made.

Results
Seven out of eleven subjects, or 64%, had a decreased number of mosquito landings after taking Brewer#s Yeast. The average subject had 2.1 landings per person before consuming Brewer#s Yeast. After ingesting Brewer's Yeast for five days, participants had a much lower average of 0.7. The overall trend showed that there was a significant decrease in mosquito landings after taking the Brewer#s Yeast.

Conclusions/Discussion
There appears to be a decrease in mosquito attraction to humans after taking Brewer#s Yeast. My hypothesis was supported because the majority of the subjects had less mosquito landings after taking Brewer#s Yeast. The proposed reason for this effectiveness is that consuming Brewer#s Yeast alters a person#s scent into something that is repulsive to mosquitoes. Brewer#s Yeast could potentially be an inexpensive and healthy way to help protect people all over the world. Millions of people could be protected from the West Nile virus, malaria, and locally, valley fever. In our search for #green# technologies, Brewer#s Yeast is a natural way to prevent mosquito bites. DEET, an active chemical ingredient in many repellents, has been found to cause skin cancer, brain cell death, and behavioral changes. Brewer#s Yeast is much more cost-efficient than DEET. By changing from using a potent chemical to a natural substance, we could really help our planet.

Summary Statement
This project determines whether Brewer's Yeast, a natural product, can be an effective mosquito repellent after being consumed by humans.

Help Received
Charles Smith, an entomologist, provided me with the mosquitoes and the mosquito cage. My mother drove and picked them up.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
William J. Theaker

Project Number
J1322

Project Title
Can Finger Length Predict Running Speed?

Abstract

Objectives/Goals
In my experiment I compared the digit ratios of San Carlos School male students (ages 12-13 years old) to their times in a 90 yard dash. I wanted to see if there was a relationship between the digit ratios and their running speeds.

Methods/Materials
Informed consent was obtained from 12-20 volunteer runners, boys ages 12-13 years old. Xeroxed subjects right and left hands. (If hands and lines on them were not clearly visible, I xeroxed them again at a different brightness.) I measured both hands from where the hand connects to the finger, to the tip of the finger, for both the ring and index fingers. I used the 2D:4D ratio and made a chart with the finger length data. For the race I split the runners into two groups for more accurate timing. I wrote down the times of the runners and repeat the process with the second group. I wrote down the data and compared the speed chart with the finger length ratio chart. Materials: pen, pencil, xerox machine, 12-20 male running subjects ages 12-13 yrs. old, a field, tape measure, clip board, timer, notebook, and ruler.

Results
From my data I saw that the second digit to forth digit ratio (2D:4D) measurements did a fairly good job at predicting the runners finishing order. From the data table which predicted the finishing order, at least 5 of the runners finished in the exact predicted order, which means that the 2D:4D ratio correctly predicted one third of all the runners placements. The rest of the runners were only 1-3 spots away from their predicted slots, except for two outliers (one of which having a medical condition.)

Conclusions/Discussion
The results of my experiment mostly agreed with my hypothesis: that finger length may predict running speed. The 2D:4D ratio predicted the outcome of the race in most cases, supporting the claim that there is a relationship between digit ratio and athletic ability (in this case-running a 90 yard dash). The reasoning behind this assumption is the fact that increased testosterone in utero causes growth of the ring finger compared to the index finger, and the resulting 2D:4D digit ratio can be used to predict lots of health and behavioral traits later in life. If I could change this project I would use more people to get a more accurate outcome. I would also recommend to measure the fingers normally without Xeroxing and to use calipers for easier, more accurate measuring.

Summary Statement
My project is how the 2D:4D finger length ratio can predict the outcome of a 90 yard running race.

Help Received
Mother helped time subjects and helped mount my project on the board.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Valerie Trejo

Project Number
J1323

Project Title
Athletes vs. Musicians

Abstract

Objectives/Goals
My main goal was to discover who has a better lung capacity athletes or musicians.

Methods/Materials
My materials were a air flow meter, fifteen musicians between the ages of 11-12 years, fifteen athletes also in the ages of 11-12, and non athletes and non musicians in the same age group as the athletes and musicians. I will first have the student sit in perfect posture have them inhale deeply on to the air flow meter then I will continue this process for all my trials.

Results
My average for athletes was 1301 milliters the average for musicians was about 1333.33. The greatest average for the athletes was 2250 ml the least was 250 ml.
The greatest average was 2000 ml the least was 250 ml. From my results I saw that musicians had the greatest average out of all of my trials.

Conclusions/Discussion
My conclusion was that the musicians have a stronger lung capacity then the athletes.

Summary Statement
My project is to see who has a better lung capacity athletes or musicians.

Help Received
My science teacher helped me with my testing by providing me her class room.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Alexa J. Wheelan

Project Number
J1324

Project Title
Off Balance

Abstract

Objectives/Goals
To evaluate how various sounds, i.e. music, affect a human's resistance to becoming dizzy when spun around, and what sounds result in the quickest and longest recoveries from dizziness.

Methods/Materials
Subjects will spin around for 30 seconds with no sound. I will check and record the duration of the nystagmus (the horizontal twitching of the eye caused by becoming dizzy). When they recover subjects will repeat this process for each sound.

Materials:
A stop watch, human test subjects, and a fully charged Ipod that has a variety of different sounds.

Results
The genre "Synth." caused the nystagmus to linger for the longest period of time. The Humpback Whale calls and no sounds at all caused the nystagmus to linger for the shortest amount of time.

Conclusions/Discussion
My hypothesis that "Synth." would cause the nystagmus to linger the longest was proven correct. I believe that this was caused by the constantly changing beats, tones, and rhythms that are in "Synth.". It may be hard for your brain to track these sounds while also tracking your movements.

Summary Statement
To evaluate if and how various sounds affect a human's resistance to becoming dizzy.

Help Received
My dad helped me put songs on my Ipod.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Sean Won

Project Number
J1325

Project Title
An Ideal Penmanship

Abstract

Objectives/Goals
Does the style of grasping a pencil affect the quality of the penmanship?
Hypothes:Peoples penmanship depends on the way of grasp

Methods/Materials
Materials
15 Pencils, # 15 Paper on which testers will write the sentence, "I can't drink chocolate milk because I am full.", # 5 testers who grasp pencil in the Right ways, # 5 testers who grasp pencil with Tripod grasp., # 5 testers who grasp pencil with Quadropod grasp., # 10 evaluators who rate testers for best penmanship, # 10 rating forms, # 2 Erasers, # 1 Camera to take photographs of each tester, # 1 Calculator
Procedure
1.Type and print 15 pieces of following sentence: "I can't drink chocolate milk because I am full.", 2.Finding five testers who use the Tripod grasp, another five testers who grasp pencil with the Quadropod grasp, and five people who grasp pencil with the Right way., 3.Individually give each tester a pencil and a sentence sheet., 4.Let the tester to print the sentence., 5.Give him one minute to copy sentence., 6.Repeat steps four to five for another fourteen time.,7.Take three pictures while they repeat steps.,8.Line up all fifteen sentences.,9.Show the writing samples to the Evaluators and pass out voting paper.,10.Have each evaluator to judge neatness by putting names in order from one being best to fifteen being worst.,11.Collect the Evaluating Papers,12.Average each score by adding all the scores they got from each evaluator and divide it by fifteen.,13.Graph the data.

Results
The way of grasping the pencil which leads to the best penmanship was the tripod grasp. The Tripod grasp got first place, the Quadropod grasp got the second place, and the right way to grasp a pencil got the last place.

Conclusions/Discussion
My Hypothesis was proven, way of grasping pencil affects on peoples penmanship. However my prediction was wrong. Rightway was not best way to grasp a pencil.

Summary Statement
It is about way of grasping pencil affects on the penmanship.

Help Received
Mother helped designing board.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

Philip C. Wright

Project Number

J1326

Project Title

Flip Turn vs. Open Turn: Win or Lose at the Wall in Competitive Swimming

Abstract

Objectives/Goals

My goal was to find out if a flip turn is truly faster than an open turn in competitive freestyle races and whether the extra breath you get in an open turn makes a difference for the race.

Methods/Materials

My sister and I were the test subjects. The location for the tests was our association swimming pool.
In the different sets, we swam either two or four laps freestyle with flip turns or open turns at the opposite wall. There were ten trials per set for each type of turn, alternating between the two types of turns. Each race started in the water on one wall with a given start signal and finished on the same wall. The time for each race was taken with a stop watch. Rest time was 2 minutes between races. The pool is 12 yards long, so in these experiments a freestyle race is either 24 yards or 48 yards long.

Results

My results show that on average the flip turn is faster than the open turn. When I swam the 24 yard freestyle races my flip turn races were an average of 0.4 seconds faster than the open turn races. When my sister did the same races her flip turns made her an average of 0.9 seconds faster.
In the 48 yard races with three turns the flip turn races were on average 1.4 seconds faster than the open turn races.

Conclusions/Discussion

Based on my data the time advantage of a flip turn versus an open turn is different for different people and varies with the experience a swimmer has with each type of turn.
The data also shows that the time advantage of a flip turn appears to add up in a longer race and that the additional oxygen you get in an open turn does not make up for the advantage of performing flip turns. This, however, could be different in very long races with many turns or in swimmers that are not well trained to hold their breath and budget their oxygen.

Summary Statement

This project is about the comparison of two different types of turns commonly seen in competitive swimming.

Help Received

Guidance from my Science teacher Mrs. Martin. Helpful discussions with my swim coach Rod Hansen. My Mom helped as the stop watch timer.

CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Liam L. Young

Project Number
J1327

Project Title
The Human Eye: Adaptation to Darkness

Abstract

Objectives/Goals
To determine if age affects the human eyes ability to adapt to darkness

Methods/Materials
The test subjects will stand 6.1 meters (20 ft.) from a covered eye chart in a well lit room. Lights will then be turned off, and the eye chart will be uncovered. Subjects will confirm when they can read the letter on the chart. The time between when the lights were turned off and when they confirmed the letter will be recorded. This experiment will be repeated three times per test subject. The same test will be conducted on all subjects.

Results
Age does affect the eyes ability to adapt to darkness. Younger people have the fastest and most similar rod response time, whereas middle age people have longer and more varied times. The oldest people have the slowest times.

Conclusions/Discussion
The older one gets, the longer it takes for their eyes to adapt to darkness. This is what was predicted based upon research regarding rod response time. Younger people have the shortest times because their eyes have not changed yet. Middle age people have longer and more varied times than the younger people because their eyes are changing and change happens at different rates. The elderly have the longest times due to pupil size reduction which becomes noticeable after middle age.

Summary Statement
To determine if the eyes ability to adapt to darkness is age dependant.

Help Received
Dr. Ninh Tran, M.D. who helped fine-tuned my expermental design. My brother served as my lab assistant and controlled the light switch.