Name(s)	Project Number
Zachary E. Berger	**J0701**

Project Title

To Music, or Not to Music? An Exploration in Seeing How Music Affects Concentration

Abstract

Objectives/Goals
I've always listened to music when completing schoolwork, so I wanted to know: How does music actually affect my ability to work? This project, 'To Music, or Not To Music' looks at how music with different intensities and music in different genres affects one's ability to perform rote tasks (simple multiplication) and tasks that require a large amount of concentration (memorization of letters).

My hypothesis was that soothing songs would help people perform both rote and concentration oriented tasks more efficiently, and as the songs increase in intensity, peoples ability to perform the given tasks would progressively cripple. I also hypothesized that songs in the classical genre would be easier to work with than songs in the pop/electronic genre, which would be easier to work with than listening to hip hop/rap.

Methods/Materials
METHOD
I had my test subjects help me classify which songs could be deemed intense, or soothing. Then, I had another group of people listen to those songs while performing the given simple multiplication and letters to memorize. I collected that data, and processed it.

MATERIALS
Computer, Libre office spreadsheets, Libre office documents, iMovie, iTunes, Printer, Paper, Paper clips, 9 Pencils, White binder (storage), 15 Classical songs, 15 Pop songs, 15 Hip hop/rap songs, 10 Test subjects for part A
9 Test subjects for part B, Poster board

Results
For memorization tasks, the results did not show a clear pattern of music intensity, across genres, impacting one's ability to memorize more or less. The same was true for rote mathematical tasks.

Conclusions/Discussion
My experimental results neither proved or refuted my hypothesis because my results proved inconclusive. However, anecdotal evidence through interviewing test subjects supported my hypothesis. Consequently, my understanding is that to create conclusive results in my experiment, I would have to add many more songs to my experiment, allow for many more people to do the experiment and control an array of variables I stumbled upon when analyzing my data and speaking to my test subjects.

Summary Statement

This experiment explores the impact of music on concentration and cognition when performing tasks.

Help Received

Name(s)	Project Number
Daniel A. Bernhardt	**J0702**

Project Title

Taste the Rainbow: Do We Need Coloring in Our Soda?

Abstract

Objectives/Goals

The objective of my investigation was to determine if the colors of soda affects the way we perceive its taste. The project I did was a three part test. Those three parts were:

1. If you were blindfolded and you couldn't see the color of soda, what would you taste?

2. If you change the color of soda, does it affect the way you would perceive the taste?

3. If you taste the soda with the manufacturer's colors, is your ability to identify the flavor more accurate?

Methods/Materials

Twelve different sodas were put into three different categories: 1) manufacturer's color sodas, 2) customized color sodas, and 3) sodas to be tasted blindfolded. Test subjects tasted four soda samples which were the manufacturer's colors, followed by four soda samples of customized colors, and responses were recorded. Then, the test subject was put under blindfold and tasted four samples of soda and their responses were recorded. Test subjects were not required to finish each sample. If the test subject's palate was feeling foggy, the test subject could eat a salty pretzel to clear it back up.

Results

The results of the data showed that when the color of the soda was transformed, the subject's ability to accurately identify the flavor of soda plummeted to 25%. When the color of the soda was obscured, the accuracy was much better at 68%. When the color of the soda was that of the manufacturer, the accuracy was best at 82%.

Conclusions/Discussion

The results of data collected through observations confirmed the hypothesis that altering or eliminating the visual perception of the color of soda decreases the test subject's ability to identify the flavor of the soda.

Summary Statement

The project was to determine whether or not visual perception affects taste perception.

Help Received

My mother bought the paper for the display, helped proofread my writing, and helped with some typing.

Name(s)

Madalyn E. Berry

Project Number

J0703

Project Title

At What Grade Level Can Children Differentiate between Candy and Non-Candy Items?

Abstract

Objectives/Goals
The objective of my project was to determine at what grade level can children distinguish between candy and non-candy items.

Methods/Materials
To test my project, I tested 10 girls and 10 boys, in grade levels Preschool through eighth grade (ages 2 - 14). To test my subjects, I glued four candy items and four non-candy items to a piece of poster board. I numbered the items 1 - 8, and asked each test subject if they thought the item is candy or not candy.

Results
I had hypothesized that the preschool aged subjects would have an accuracy rate of 35%. My results exceeded my hypothesis because the preschoolers had a 52% accuracy rate. Another surprising result was that fifth grade did the best with an accuracy rate of 86%. In addition, the item most commonly identified as candy was a Tums.

Conclusions/Discussion
In conclusion, I determined that it is extremely important to keep all medicines and harmful products out of the reach of ALL children because a large majority of my test subjects could not correctly differentiate between what was candy and what was not.

Summary Statement

My project was about determining whether or not children can tell the difference between what is candy and what is not candy.

Help Received

Dad helped me type and make graphs

Name(s)	Project Number
Cailyn G. Bond	**J0704**

Project Title

Would You See It? A Project about Inattentional Blindness

Abstract

Objectives/Goals
The initial goal is to demonstrate the occurrence of Inattentional Blindness. If Inattentional Blindness is demonstrated, then the objective is to determine if Inattentional Blindness occurs less to children than adults.

Methods/Materials
A video was created to try to demonstrate the existence of Inattentional Blindness. In the video, an actor in a dark blue T-shirt asks the viewer to keep track of the cup with the ball under it and begins moving the 3 cups. During the video, the actor's shirt changes from dark blue, to light blue and back to dark blue. A laptop was used to separately show the video to 80 viewers. Forty children and forty adults independently completed a survey after watching the video.

Results
71 (89%) viewers did not notice the shirt color change. Though only 9 (11%) noticed the shirt color change, 45 (56%) correctly identified the cup with the ball under it. These results indicate that though the viewers paid sufficient attention or were focused on the cup and ball challenge, 36 viewers (80%) who correctly identified the cup did not notice the shirt color change. Thus, the results demonstrate the existence of Inattentional Blindness, which happens when our visual system is focused on one thing that allows us to not notice other things in our sight. Because 4 children and 5 adults noticed the shirt color change, or 36 children and 35 adults did not notice the shirt color change, the results indicate that there was not a measurable difference of Inattentional Blindness between children and adults.

Conclusions/Discussion
The video and test results accomplish the initial goal of demonstrating the existence of Inattentional Blindness. However, the data results did not support the hypothesis because children and adults tested similarly. Inattentional Blindness is probably not dependent of being a child or an adult, but influenced by other circumstances and the individual tested

Summary Statement

The project is about whether the existence of Inattentional Blindness could be demonstrated and if so, whether being a child versus an adult influences the occurence of Inattentional Blindness.

Name(s)	Project Number
Nora B. Butler	**J0705**

Project Title

The Art of Seeing Without Eyes

Abstract

Objectives/Goals

The quantitative objective for this project is attempting to determine whether non-blind individuals with no previous training on echolocation can echolocate successfully, and whether age affects the success rate. The qualitative (and main) objective for this project is making the process of echolocation within the human range socially acceptable on a casual, everyday basis.

Methods/Materials

The experimentation process required a population sample of around forty people (who all consented to be used as participants in this study), organized in one of these three categories: seven to ten years of age, eleven to fifteen years, or sixteen years and older. They were each individually told to stand at arms length from a wall (seven meters in width by three meters in height), blindfolded and in possession of a Petco one and a half inch by one and a half inch dog clicker (for a consistently sharp and defined sound). They were then spun around, stopping each round in one of three locations: right parallel to the wall, facing away from the wall, and left parallel to the wall. In each round, they would click the dog clicker. They would move around in the location, and, based off of the barely distinguishable levels of echoes, determine where the wall was in relation to them. Each test required a nearly silent environment and took about five to ten minutes.

Results

To be considered successful and become a percentage of the outcome, the person would have had to have guessed correctly where the wall was in all the three locations. The subjects in the sixteen years and older category were twenty percent correct. The subjects in the eleven to fifteen years of age category were forty-seven percent correct. The seven to ten years of age category were seventy-five percent correct. One can only guess if this project was successful in elevating awareness and, in the process, helping echolocation among humans more acceptable.

Conclusions/Discussion

The number of younger participants that succeeded in the experiment far outweighed the number of older participants that succeeded. I think that the reason for that proven statistic is the fact that younger humans brains are still developing and open to new, somewhat-unnecessary-to-the-average-person ideas, while older peoples brains have either undergone or are undergoing the pruning process.

Summary Statement

This project is about bringing to light the concept of Human Echolocation (in the hopes of helping to make echolocating socially acceptable), and instructing others on the process, perks, and disadvantages of echolocation for the blind.

Help Received

Name(s)	Project Number
Harrison P. Coorey	**J0706**

Project Title

Are Some Multiplication Facts Harder than Others?

Abstract

Objectives/Goals

An experiment was carried out to determine if some multiplication facts are harder than others. For the purpose of this investigation, time to answer the fact and the accuracy of the answer were used as the indicators of difficulty.

Methods/Materials

A computer program was designed and coded to measure these quantities. The program presented all 100 multiplication facts in the form N x M where N and M ranged from 1 to 10 to a test subject. Facts were given in a random order to avoid bias due to factors such as fatigue at the end of the test. The program recorded the test subject#s time to answer and the accuracy of the answer. Ten subjects ranging in age from 10 to 12 years old were tested. The results were analyzed and graphed to determine the average time to answer each fact and the average accuracy. Averages were also calculated for each of the factors N and M.

Results

The results showed that 6 x 8 is the hardest multiplication fact, and that the 8, 6, 7, and 9 multiplication tables are the hardest, in that order.

Conclusions/Discussion

This was in general agreement with the hypothesis, which predicted that the 6, 7, and 8 multiplication tables would be the most challenging. This information could help educators develop more targeted learning strategies.

Summary Statement

I determined which multiplication facts (1x1 through 10x10) are hardest for 6th grade students by using a custom computer program to measure the speed and accuracy of the responses obtained when each fact was presented.

Help Received

My father helped code the computer program I designed.

Name(s)	Project Number
Sara J. Dajani	**J0707**

Project Title

iPad vs. Text

Abstract

Objectives/Goals
The objective of this science fair project was to determine which method of leaning is best; ipad or regular text. The amount of time to read a lesson and take a test on it was measured as well as the grade obtained on the test for both methods. Results were compared to determine the outcome.

Methods/Materials
12 students age eleven years old who are currently in sixth grade were presented with two English comprehension tests format, an iPad format and a regular printed hard copy text format. Both tests were taken from the sixth grade common core standard English reading comprehension application. The two tests were different but were of the same difficulty level. The students were timed to complete the reading and take the test. The time taken to complete the test and the test scores for each method were compared against each other.

Results
The average time to finish reading and testing for the iPad was 9 minutes and 42 seconds. The average time to finish reading and testing for the regular text was 9 minutes and 2 seconds. This means that regular text reading and testing was at 42 seconds faster than iPad. As for the test scores, the average for the iPad testing was 71.67%, while for regular text it was 85.83%. A difference of 14.16 % in favor of regular text.

Conclusions/Discussion
In conclusion the hypothesis was correct. Even though the difference in time was minute, at just 42 seconds, the difference in test scores between iPad form and regular text form was quite considerable at 14.16% in favor of regular text. Therefore using the regular text is a better method to learn from, and adding the iPad as a learning tool in schools is a decision that needs further studies before implementation, if at all it should be adopted.

Summary Statement
A comparison between iPad learning and regular text learning effectiveness.

Help Received
My teacher helped follow up with my project. My mom helped me with my research. My aunt helped me beautify and arrange my board.

Name(s)	Project Number
Alexis C. Duke	**J0708**

Project Title

Digital Dilemma: An Analysis of Print vs. Digital Text

Abstract

Objectives/Goals
1) To determine the pros and cons of using iPads in the classroom
2) To study the effects on students using iPads: considering behavior, retention, and test scores

Methods/Materials
Preparation
2) Receive assistance in translating the results of a benchmark test to a leveled reading program for at least 30 students each for grades 2, 4, and 6. The benchmark test used in this project was the STAR Reading Test, which yielded a recommended reading level. This specific reading level corresponded with the leveled reading program. The reading program had passages and quizzes pertaining to the passage for all reading levels, so each student had a passage/quiz corresponding to their reading level.
3) After receiving each student's reading level, type up two of each required reading level: one passage for the paper test and one for the iPad test. Print out the required number of each paper-designated passage and upload the designated iPad passages to a cloud database. Also type the corresponding quizzes and print them out separately.
Testing Protocol
Come to a classroom prepared. Go over the following with the students: students should receive their passage, read it once, and raise their hand when finished. When the classroom finished, wait five minutes, the pass out the quizzes.

Results
Behavior:
The students were disinterested when presented with the paper media, but more focused. The students were more open to learning with the iPads, but they were more distracted during the testing.
Test Scores:
2nd Grade: The second graders mostly did poorly on the iPads, with a few outliers. The p-values (probability values) in this category mostly showed statistical significance.
 4th Grade: The fourth graders did slightly better on the paper compared to the iPads. The p-values in this category were somewhat statistically significant. Students began to show early development of preferred reading media.
6th Grade: The results were very mixed and the p-values showed no correlation between test scores and media.

Conclusions/Discussion

Summary Statement

My project compares the overall learning experience attained using iPads in the classroom and compares it to the classical classroom experience using paper.

Help Received

Mother helped type passages.

Name(s)	Project Number
Joy M. Forster	**J0709**

Project Title

Lemonade: The Sweet Solution

Abstract

Objectives/Goals

My project is about which sweetener tastes most like sugar in lemonade. Among the four most popular sweeteners, one must taste closest to the lemonade with sugar.

Methods/Materials

In this experiment, the independent variable are the sweeteners. The dependent variable is the taste. Five pitchers of lemonade were made with one composed of sugar lemonade, and the others with different sweeteners (Equal, Sweet n' Low, Truvia, and Splenda). Samples of all the lemonades were given to twenty volunteers. The results were collected.

Results

The findings of my experiment are that the more closely related people are, the more similar their opinion about taste. Also, people within age groups have similar opinions about taste. These results may have to do with what people are used to drinking.

Conclusions/Discussion

The conclusions of my experiment are that majority of the volunteers favored Equal, where aspartame is the active ingredient. My hypothesis was incorrect; I guessed Splenda would be the most similar to sugar in lemonade. If I do this project again, I might test which sweetener tastes the most like sugar in solids. In the real world, my project can be used to help diabetics and people trying to lose weight. The results of this experiment gives diabetics an idea of which sweetener to use if they want lemonade. People who watch weight have a healthy but tasty alternative.

Summary Statement

My project is a sensory taste test involving artificial sweeteners compared to sugar in lemonade.

Help Received

Neighbor provided lemons and friends become taste panels.

Name(s)	Project Number
Miles A. Gaitan	**J0710**

Project Title

The Effect of Physical and Mental Exercise on Memory

Abstract

Objectives/Goals

I have always had a memory problem. During a conversation I am not always able to remember certain words. So I began to wonder, what can I do to help me remember theses words? Additionally, my grandparents are losing their memory with age, so I wanted to help them improve their memory as well. My project is the effect of physical and mental exercise on memory.

Methods/Materials

I tested 39 boys and girls, aged 11-13 years old. The groups included a control group, a group that exercised their brain and a group exercising their body. All groups took the first memory test. One group completed a crossword puzzle, another group jumped rope and a third group sat quietly for three minute period. Then they all took the second memory test. I tallied results from the three groups two memory tests by subtracting the number correct on the first test from the number correct on the second test. Then I determined which group had the highest increase in correct responses

Results

I observed that of the participants that exercised their brain, only one participant, 8%, remembered more during test two. I observed that of the participants that exercised their body, six contestants, 43%, remembered more during test two. I observed that of the participants in the control group who rested between tests, seven participants, 54%, remembered more during test two.

Conclusions/Discussion

My results show memory is improved by resting. On average, working out the mind increased memory 8% of the time. When working out the body increased memory 43%. Resting increased a surprisingly 54% of the time. Doing nothing increased the most on average.

Exercising the mind and body are still great things to do. However, my research shows that resting the brain as in getting a good night sleep might be the best for memory.

Summary Statement

My project is the effect of physical and mental exercise on memory and whether either of these exercises can improve memory.

Help Received

My mother helped edit and format my report and helped with the display board layout. Ms. Hill, my science teacher, helped edit my project and assisted with graphing data. Mrs. Pasternak, my 6th grade teacher, allowed me to use her students as my participants.

Name(s)	Project Number
Sydney S. Gamble	**J0711**

Project Title

The Truth about Higher-Order Learning vs. Rote Methods

Abstract

Objectives/Goals
The objective of this experiment was to determine if students retained and recalled more information if they were taught with Higher-Order (Critical Thinking) versus Rote Memorization methods.

Methods/Materials
Informed consent was obtained from 80 students (40 fourth graders and 40 fifth graders). The scientist separated 40 fourth grade students into two groups of 20 students. The 40 fifth grade students were separated into two groups of 20 students. The scientist taught A Groups using Higher-Order (Critical Thinking) methods and B Groups using Rote Memorization. The groups were taught separately for 40 minutes each, according to a curriculum formulated after conducting research on both methodologies. One day after each teaching session, the same test was given to all students to evaluate short term memory retention. Two weeks later, a second test was given, this time to evaluate long term learning retention and recollection.

Results
Results for the first test (conducted one day later) showed Group A student population taught with Critical Thinking methodologies overall scored 8.5% better than Group B student population taught with Rote Memorization. On the second test (conducted two weeks later), Rote Memorization fourth grade students scored 4% below their first test scores and the fifth grade students scored a significant 18.9% below their first test scores. Conversely, the Critical Thinking fourth grade students scored a notable 12% higher on their second test, while the fifth grade students dropped a mere 1% lower on their second test.

Conclusions/Discussion
Students taught using Rote Memorization scored lower than Critical Thinking students on a test given one day after the teaching session. When the students were required to recall information two weeks after the teaching session, Rote Memorization test results were significantly lower. Students taught using Critical Thinking achieved both immediate recall of information similar or better than rote students and could also recall, analyze and apply the concepts taught after a full two week duration had passed. The scientist also attributes these findings to the physiology of the human brain, where the process of consolidation on the cognitive level is far more likely to occur effectively when the brain is actively participating in the learning (Critical Thinking) versus passively absorbing information (Rote Memorization).

Summary Statement

The focus of this project was to determine which teaching methodology, Higher-Order (Critical Thinking) or Rote Memorization is most effective, notably relative to brain memory consolidation so as to benefit our education system and society

Help Received

Fourth and fifth grade teachers assisted in scheduling the teaching and testing sessions.

Name(s)	Project Number
Maya C. Gonzales	**J0712**

Project Title

A Shot at Success: Does Exercise before Learning Improve Comprehension and Memory?

Abstract

Objectives/Goals
A leading problem in our society is the lack of physical activity in the lives of busy teenagers. Many students need motivation to escape from the pile of homework on their desks to do something active. After reading an article describing a study done at M.I.T. on how exercise improves learning ability, I was motivated to do my own study on whether or not exercise affects learning comprehension and memory in adolescents. The purpose of my study is centered around finding benefits to physical activity beyond staying fit, as well as to examine if the physical activity adolescents typically participate in, specifically team sports, have a positive impact on learning. It is my hope that the set of data I have unlocked in my project will prove to America that exercise is crucial for the body and the mind.

Methods/Materials
The way in which I tested my hypothesis was by teaching ten 8th grade test subjects 5 Japanese words after they had moderate exercise for 1 hour. These subjects had no prior knowledge of the Japanese language. I then tested them 24 hours later on the same words in a matching quiz. The following week, as a control, I taught the same test subjects five new Japanese words at the same difficulty level without prior exercise, and tested them 24 hours later.

Results
The results of my study support my purpose. My hypothesis was that if adolescents exercise before learning and then take a test, they will preform better on the test compared with adolescents who do not exercise before learning. After conducting my experiment, I found that my data highly supports my hypothesis. The average test scores of test number 1 (Exercise-Learn-Test) was 92%, in contrast to the average test scores of Test number 2 which was 56%.

Conclusions/Discussion
I have concluded that my experiment is one that has the potential to alter the way in which people view exercise and its benefits. The data in this project is very relevant to teenagers, and I am confident that this is a new way of thinking about exercise that will lead to further, more advanced studies that people will truly appreciate.

Summary Statement
The purpose of my project is to discover benefits to exercise in teenagers beyond physical health.

Help Received
My father helped motivate the purpose, and my basketball team helped by participating in the experiment as the test subjects.

Name(s)	Project Number
Bailey J. Henderson	**J0713**

Project Title
Zooming through Fluency

Abstract

Objectives/Goals
The objective of this experiment is to measure which out of three fluency improvement methods works the best or shows more improvement in children's words per minute in fluency and determine what method affects a child#s fluency more dramatically. My experimental problem is #What is the increase in reading fluency words per minute with different methods (control-no practice, Repeated Reading, Wide Reading, and Neurological Impress) when reading a fairly easy passage?#

Methods/Materials
In this experiment I use two timing devices, 33 2nd graders, fluency pieces, and 1 classroom. Within the experiment I used three methods--the ones listed in the problem--as my three independent variable.Three kids a day were chosen and used to read the fluency and I would record the results.

Results
In the end of the experiment the method Neurological Impress got the most improvement. Repeated Reading (the method I hypothesized to get most improvement) got second and Wide Reading got last with bad improvement. The reason why my results contrasted with my objective was because Neurological Impress gave the reader more of an example on how to read the fluency well.

Conclusions/Discussion
The experiment is scientifically important because if a teacher uses the better method than children will receive better fluency, get a better education, succeed in school, and be prepared for life. It also offers a start for more experiments like this one which will decipher how to get a great education.

Summary Statement
Which fluency practice method has the most improvement in 2nd graders

Help Received
Teacher offered guidance, and second grade teachers offered student subjects

Name(s) **Maddie E. Hutson**	Project Number **J0714**

Project Title
Now You See It, Now You Don't

Abstract

Objectives/Goals
The objective of this experiment is to determine if the perception of objects in our peripheral vision is influenced by the object's color. I believe that people will be able to see the red-colored object best in their peripheral vision.

Methods/Materials
I built a vision protractor using a foam board, a pushpin, and a cup. I also cut out blue, red, green, and yellow circles of the same size and glued them to a Popsicle stick. I asked each test subject to stare at the pushpin that was centered on the vision protractor, then moved the stick with the yellow circle on it along the edge of the protractor, first to the left and then to the right until the test subject could not see it anymore. I recorded the angle at which the object disappeared from the subject's vision for each side. I repeated this with the blue, green, and red circles and recorded all the results in degrees.

Results
According to my experiment, 87% of the test subjects were able to see red in their peripheral vision best. Blue was the second easiest to see, followed by green and yellow.

Conclusions/Discussion
Red was the easiest to see in the test subjects' peripheral vision. This could be because red is the color of blood and our mind automatically associates blood with danger - and danger captures our attention. It could also be due to the fact that humans see the most red wavelengths out of any color.
Yellow was the hardest to perceive in their peripheral vision because it was the lightest color and therefore seemed to fade into the background. Studies also show yellow is the most irritating color to the eye.

Summary Statement

My project was to determine if perception of objects in our peripheral vision is influenced by the object's color.

Help Received

Mother helped purchase the materials, took photographs, and acted as the qualified supervisor.

Name(s)	Project Number
Carolyne J. Ikeda	**J0715**

Project Title

The Great Reading Mystery: Was It the Book or Was It the Tablet?

Abstract

Objectives/Goals
The purpose of the experiment was to determine if there was a difference in reading comprehension from a book to a tablet. I hypothesized that the subjects would have better reading comprehension after reading from a book.

Methods/Materials
Informed Consent forms where collected from 17 subjects. Each read a reading selection from a book and from a Kindle. A multiple choice test for each selection was given. After the experiment, subjects were asked for their device preference; book or Kindle. The materials include; The Giver, Lois Lowery, multiple choice tests on Chapter 1 and 6 with 4 questions each, a Kindle Paperwhite, Bic Round Stic blue and red pens, an Apple Desktop Computer, a HP Photosmart 7525 Printer, Xerox Premium Purpose Paper, a Tanita Yellow Timer, a Daiso Japan D-97 notebook, and 17 subjects.

Results
The average test scores from the book were 1.67% higher than the test scores from the tablet. The majority of the subjects (71%) preferred to read from a book.

Conclusions/Discussion
The conclusion supports the hypothesis; subjects have better reading comprehension after reading from books. Although the difference between the two test scores was small the subjects scored on average higher after reading from a book.

Summary Statement

The experiment was designed to determine if comprehension is different if a subject reads from a book or a tablet.

Help Received

Mother helped type report; Father gave advice; english teacher helped edit; under supervision of science teacher; little sister helped organize subjects

Name(s)	Project Number
Diya Jain	**J0716**

Project Title

Does Color Affect Learning and Memory?

Abstract

Objectives/Goals

The purpose of this project is to find out if color does affect learning and memory. It is important because it can change the way we learn. Based on my research, my hypothesis is that color does affect learning and memory.

Methods/Materials

I created three presentations to show to the participants, one for each school level(elementary, middle, high). Each presentation consisted of six words that were in different colors: red, orange, yellow, green, blue, and black. The background color was white. Then I had to gather the participants. I got 30 students in total; 5 kids of each gender from elementary school, middle school, and high school. Next I showed them the presentation. Each word was shown for 30 seconds. After a five minute break, I asked each participant if they could remember the definition and try to use it in a sentence. The responses were timed. I then found the averages of the times and compared it against the control which was the black word.

Results

For high school, the words in black color had the fastest time with an average of 3.17 sec for memory retention and 4.9sec for creating sentences with learnt words. I think that word in black color was proven to be better because high school students are used to seeing/reading words in black color for a longer period of time and have become used to it.

For middle school, word in red color had the fastest time with an average of 3.61 seconds for memory retention compared to the average black time which was 4.78sec. For learning, black had the best time with an average of 3.9 seconds.

For elementary school, word in red color had the best time with an average of 1.53 seconds for memory retention and 3.92 seconds for learning. Overall, words in red color also had the fastest time with an average of 3.10 seconds for memory retention and an average of 5.09 seconds for learning.

Conclusions/Discussion

In conclusion, color did affect learning and memory. My hypothesis was supported by the data that I gathered. The students responded quickest for the words in red, hence showing that it was the most efficient for the brain in learning and understanding.

There were many factors that could have changed the results like the background that the interview was done in, the knowledge of the participants, and the complexity of the words.

Summary Statement

In my my project, I tried to find out if color does affect learning and memory, and based on my data it shows that color did affect learning and memory and the students responded the quickest to word in #red# color.

Help Received

Project Guidance was provided by a science teacher in my middle school, Mrs. Popescu. My brother helped me coordinating students in high school for interviews and elementary students. My dad helped me with printing & helping with buying items needed for the presentation board.

Name(s)	Project Number
Vatsal Jain; Vivek Patel	**J0717**

Project Title

Can You Hear Music without Music? Dwell into the World of Auditory Pareidolia

Abstract

Objectives/Goals
This experiment is aimed at discovering, #Does our expectation affect our hearing perception?# We also want to find out if children#s hearing perception is sharper and more accurate than adults?

Methods/Materials
In this project, we will determine how long the volunteers perceive music in the absence of it. In this experiment we will be using a DJ software so we can fade a song into static. Once the song was completely stopped and there was only static we started a stopwatch. We stopped the stopwatch when our test subject indicated they could not #hear# the music anymore. For this experiment we need a computer with a headphone jack, headphones, demo version of Traktor Pro 2, white noise sound file, stopwatch, MP3 file of a song, and 10 or more volunteers.

Results
Our result proves that young children had a faster response time to indicate the actual music has been stopped than adults and teenagers. The experiment also proved our hypotheses wrong, children#s hearing perception is sharper and more accurate compare to adult and teenagers#.

Conclusions/Discussion
The results showed that children had sharper hearing and if they listened to the music for thirty seconds they had a faster reaction time. Adults are more exposed and developed to more variety of ideas so they assume and expect more in their heads compared to children. Children have more relaxed, less pre-assumption so their state of mind is much clearer. Music is a good way to relieve your stress because it helps calm down your mind, muscles, and dilute your tense thoughts and natural fear to unknown. Music may one day be used to achieve effects on relieving patient anxiety during surgery. Pareidolia could be used in neurosurgery and curing bodily diseases like cancer and diabetes.

Summary Statement
We tested how long people can perceive music in the absence of it.

Help Received
Mom helped printing my reports and setting up my board.

Name(s)	Project Number
Georgia G. Johnsen	**J0718**

Project Title

Fatal Distraction

Abstract

Objectives/Goals
My objective was to determine which was more distracting to drivers, talking on a cell phone held to one's ear, or talking on a hands-free cell phone device. My goal was to determine which was more distracting by creating an experiment utilizing a sorting exercise.

Methods/Materials
My experiment included three steps.
Step 1. Subjects were asked to sort 200 colored candies without any distractions.
Step 2. Subjects holding a cell phone to their ear, while asked to sort 200 colored candies as they answered mental math questions.
Step 3. Subjects using the speaker phone feature on a cell phone (hands-free), while being asked to sort 200 colored candies as they answered a different set of mental math questions.

During all three stages, or steps, I timed the participants, recorded how many questions they answered, and took note of their level of frustration as well as their strategies employed to deal with their frustration.

Results
The results showed that although participant's times decreased slightly with each task, their ability to answer questions dropped significantly when they used a hands-free device (average: 9 questions) compared to using a cell phone held to one's ear (average: 12 questions). Interestingly, the level of frustration for participants increased significantly when using a hands-free device, and the subjects used a greater number of strategies to try and slow the questioner down, in order to allow the subjects to hear and focus on the questions being asked.

Conclusions/Discussion
My hypothesis was correct, it is more distracting to talk on a hands-free cell phone than it is to talk while holding a cell phone to one's ear. Therefore, it would be more distracting to drivers to drive a vehicle utilizing hands-free devices rather than holding a cell phone traditionally.

This experiment opens an interesting dialog because California has created law that drivers must be hands-free, and federal law requires all new cars and trucks to come equipped with hands-free device support. If it is more distracting to drive hands-free than not, these laws should be rethought. I am concerned about this particular subject because both my brother and sister drive, and in a few years I will be driving too. I would like us all to be as safe as possible.

Summary Statement

My project determined that using a hands-free cell phone device was more distracting while driving when compared to holding a cell phone to one's ear.

Help Received

Both my mom and dad helped me with this project by asking math problems to my subjects. They were in another room on a phone asking the questions while I observed the subjects as they sorted the colored candies.

Name(s)	Project Number
Cameron C. Jones	**J0719**

Project Title

Is It Warm in Here or Is It Just Me? Regulating Thermal Comfort with Personal Peltier Modules

Abstract

Objectives/Goals
Enormous amounts of energy are being used every day to heat buildings, vehicles, and other places that human beings occupy. Taking advantage of how humans perceive warmth, it may be possible to develop a personal thermal regulation device that can deliver the same comfort level with less wasted energy. My Peltier device delivers timed pulses of heat to the wrist or arm of a user. The sensation of the heat pulses changes the perceived thermal comfort level of the subject when exposed to temperatures. My hypothesis is that it is possible to regulate a person#s perception of ambient temperature and thermal comfort using a wearable computer controlled device based on the Peltier effect.

Methods/Materials
Attach 4 temperature sensors to the Arduino. Then take the first three sensors and tape them to the subject#s chest, back, and arm. Position the fourth sensor away from the subject to detect ambient air temperature. Select desired power level, pulse width values, and delays for Peltier module using the control program. Attach the Peltier surface to desired location on body. Place the test subject in cool environmental conditions. (14C - 19C). Start the Arduino serial monitor to begin data logging of the temperature sensors. Monitor test subject comfort level (on a -5 to 5 scale) and record internal temperature at 2 minute intervals for 15 minutes total. Repeat the steps above changing the pulse width, delay, test subject, and/or environment.

Results
After performing experiments in different environments using different parameters for the pulse width and delay time, I showed measurable improvements in perceived thermal comfort for two different test subjects exposed to environments ranging from 14C to 19C for 15 minutes at a time. I evaluated tests where the Peltier surface was applied to the inner arm near the elbow. I found the effect was more pronounced when it was used on the inner arm near the elbow.

Conclusions/Discussion
Subjects reported improvements in thermal comfort of one to two levels based on a ten point scale. My device was able to demonstrate this effect using an average power of approximately 4 watts. This project demonstrates that it is possible to influence thermal comfort by low power manipulation of skin temperature in small areas of the body. This could allow the design of clothing with integrated Peltier modules that would help preserve thermal comfort in cool conditions.

Summary Statement
Regulating thermal comfort with computer controlled personal Peltier modules.

Help Received
My father helped purchase the parts and assisted in debugging the control program.

Name(s)	Project Number
Sawyer A. Kelly	**J0720**

Project Title

Musically Minded

Abstract

Objectives/Goals
What genre of music, if any, increases efficiency while doing schoolwork?
I tested this because when I was listening to music while working. While researching, I discovered that when we listen to music, a chemical called dopamine is released into our brains. This makes us energized and happy, therefore, music may help our efficiency.

Methods/Materials
I tested 6 people to see if listening to a certain type of music made them work more quickly while doing schoolwork. They were each given a test with math, vocab matching, and a word search on it and then I timed them while they listened to a certain type of genre.

Results
My testing revealed that listening to hip-hop music allowed my participants to finish their tests fastest with an average time of 2:08, this beat the runner-up (classical) by a lot. Taking the tests without music being played had the 3rd fastest time and the Choice section of music had the slowest time.

Conclusions/Discussion
Though my hypothesis was correct; I still think this subject could be delved deeper into. Humans are so diverse, it's impossible to get a completely accurate result. If I redid this experiment, I would want to test different age groups and include more music genres. I also want to put in some harder problems that require critical thinking/reading comprehension.
I found it interesting that choice had the slowest time, I believe this happened because since this song was my participants' choice, they got distracted by the music because they enjoyed the song. One final note: Had I included harder problems, I believe classical would have been the best, as that affects your ability to comprehend things better and also assists your ability to think critically.

Summary Statement
My project is testing to see what genre of music, if any improves speed while doing schoolwork.

Help Received
Tested human subjects

Name(s)	Project Number
Alex A. Kurlan	**J0721**

Project Title

Retention and Ratings of Black/White vs. Color Video Presentations

Abstract

Objectives/Goals

I have always wondered whether people learn and perceive information differently in color versus black/white. The purpose of this study was to determine if there was a difference. I hypothesized that the color presentation would be rated better and would deliver better factual recollection because color draws more attention and stirs interest.

Methods/Materials

I created educational presentations about two different organisms. One was an animal and the other was a tree. Each of the presentations were produced in both color and black/white videos using the same audio narrative. A survey of fourteen questions was created with the first 10 specifically on the topic itself and the last four on how well the information was delivered. After creating these four presentations I surveyed the students on their factual recollection and also their subjective impression of the presenter and the presentation. 102 students were tested (204 surveys).

Results

The recall test scores for the color animal video were 27% higher than the black/white video retention scores. For the tree video, the retention differences between the black/white and color video were not significant (6%). For the animal video, the color version rated a 21% higher quality score than the black/white version. The scores of the color tree presentation rated at 4% higher quality than the black/white version.

Conclusions/Discussion

This study supported my hypothesis that color presentations lead to a better overall impression of the presenter and the presentation. This implies that a more attractive presentation, even though providing the same information, confers a positive bias towards the presenter and the presentation and is more highly regarded by the audience. Color may also enhance factual recollection compared to black/white presentations. The results of this project ought to be taken into consideration for advertising and education. Future studies could assess whether age or gender impact the results.

Summary Statement

My experiment studied the impact of color on recall and comprehension of educational material.

Help Received

Name(s)	Project Number
Kylynn M. Leffingwell	**J0722**

Project Title

What Level of Visual Distortion Weakens the Stroop Effect?

Abstract

Objectives/Goals
To determine when the brain stops confusing the character(words) with the color.

Methods/Materials
I took the original stroop effect and began to distort the words into varying degrees.
Level 1 was the control. No distortion at all.
Level 2 the words were slightly distorted
level 3 the words were more distorted
level 4 the words were barely recognizable

I showed the four levels to second, fourth, and sixth graders. I timed how long it took to complete each level.
I tested 75 children all together (25 in each grade)

Results
Each level became easier to complete as the testing went along.
It appeared as though level 3 is when the brain started to just see color rather than the words.

Grade levels -
6th grade was the fastest in completing the testing
4th was in the middle
2nd was the slowest (as was expected)

Boys and girls - boys had faster times than girls

Conclusions/Discussion
All of my hypotheses were correct

Using this test can help scientist determine how the brain works.
Could this test be more useful in testing children with visual problems?
This might be helpful in determining how to help these children.

Summary Statement

Determining when the brain will recognize color rather than words when using the stroop effect.

Help Received

teacher helped with scientific process, parents helped put board together

Name(s)	Project Number
Joseph D. Lou	**J0723**

Project Title

How Costly Is Multitasking? A Computer-Assisted Quantitative Study of Age and Gender Differences in Switching Costs

Abstract

Objectives/Goals
It#s a widely accepted notion that multitasking has negative impacts on productivity. However, there was no complete quantitative study on age and gender differences in the multitasking costs. The objective of my project was to answer the above question by testing a large sample size of diverse participants.

Methods/Materials
I first created a web-based Multitasking Test (MTT) program using JavaScript, a computer programming language. I then wrote a Python program to analyze the collected data. My MTT program allows subjects to conduct 6 playing card pattern matching tasks including 3 simple and 3 complex tasks. Each task contained 20 trials for each subject in order to get more accurate results. The switching costs (SC) in time and accuracy were then measured and analyzed. I had three IVs: (a) age group, (b) gender, and (c) the complex level of the task (simple or complex).

Results
My MTT program attracted hundreds of participants from 24 states in the US, and even 24 participants from overseas. A total of 607 subjects have completed 3,642 tasks successfully for data analyses. Among all age groups, the 22-25 year old group had the lowest SC in both the simple tasks (428 ms and 0.28 errors) and complex tasks (1,319 ms and 0.76 errors). As for gender differences, males showed more SC (15% increase in time and 6.6% increase in errors) than females when doing the complex tasks. Overall, the complex tasks did increase the SC significantly (175% increase in time and 112% increase in errors) when compared with the simple tasks.

Conclusions/Discussion
My project has two important discoveries. First, multitasking has switching costs across all ages and genders, which is consistent with the Cognitive Load Theory. The more complex the tasks are, the more the SC are increased. Second, people are not certainly the best at multitasking just because they multitask the most. Even though high schoolers (14-17) are reported to multitask the most, they do not appear to be very good at it. This is because the human brain is not matured until the person is 24 years old, based on neuroscience findings. My results strongly suggest that people, especially teenagers, should stop multitasking and focus more during homework or work to increase their productivity in speed and accuracy. The more complex the tasks are, the more focus is required to do the tasks quickly and correctly.

Summary Statement

I created a web-based program, performed a quantitative study (N=607) of age and gender differences in switching costs during multitasking and found interesting facts that contribute to cognitive studies.

Help Received

Name(s)	Project Number
Madeleine H. McLeod	**J0724**

Project Title

What's Your Style? Could Font Styles Make a Difference in Your Reading Speed?

Abstract

Objectives/Goals
Fonts are described in terms of their aesthetic qualities such as face style, size, and color. The objective of this investigation is to evaluate the relationship between font style and reading speed. With over 200,000 different styles available, students are exposed to a wide variety in texts and are expected to fluently read diverse fonts. Understanding the influence of font style on reading performance can provide young people with successful reading experiences that lead to good reading habits for life.

Methods/Materials
Numerous middle school students were given a passage to read multiple times, each in a different 12-point font style (Cambria - control, Chewy, Permanent Marker, Homemade Apple, Covered by Your Grace). Test subjects were timed while reading the 250 word fictional passage. Reading speed was calculated for each font style using the average reading times measured. To account for the effect of familiarity with each repeated reading, a separate "correction" passage was included as part of the testing. The final reading speed results were calculated by combining the correction passage offset with the original test passage results.

Results
The results of the data collected and analyzed showed that the control font, Cambria, which was the most common and standard of all the fonts, was the style that students read the fastest at 173 words per minute. On the other hand, the style that read the slowest was "Homemade Apple", an exaggerated cursive font, which students read at approximately 110 words per minute. All of the other font styles that were tested had reading rates in-between these high and low data points.

Conclusions/Discussion
It was evident that the simplest fonts read more easily and quickly. More complicated fonts were slowest to read. Several possible explanations support this conclusion. First, the students were more familiar with standard, simple fonts. So, students were able to read these styles faster. Another factor that appears to influence the testing results was the letter formations and spacing. Fonts with close letter and word spacing, and traditional letter formation, produced the fastest reading rates. Those with less distinct letters and greater variation in size, form and spacing, took longer to read. Ultimately, as particular font styles produce greater reading performance and success, students desire to read more and build strong lifelong reading habits.

Summary Statement

The objective of my experiment was to measure the time it took for middle school students to read a passage in different fonts and determine if font style has a significant effect on reading speed.

Help Received

I received assistance from my science teacher and parents, who helped me define the testing process and gave feedback on the written report.

Name(s)	**Project Number**
Emily T. Mirbod	**J0725**

Project Title

ASL Retention Among Non-Deaf Subjects

Abstract

Objectives/Goals
Ten male subjects and ten female subjects were both shown ten signs by the tester with a brief description of each. After fifteen minutes subjects were tested to see how many signs they remembered out of the ten shown.

Methods/Materials
The project was to determine the retention between different genders using American Sign Language. My hypothesis was that women would remember more signs than men out of the ten signs shown.

Results
Women remembered more signs than men. The average for women was 8.25 and the average for men was 6.35.

Conclusions/Discussion
The hypothesis was proven correct, women remembered more of the ten given signs than men. Women would likely have more success with sign language classes and programs.

Summary Statement

Testing memory among genders using American Sign Language.

Help Received

Mother helped with board and the Mentor helped with research

Name(s) Mussa Mohamed	Project Number **J0726**

Project Title

Influence of Environmental Light on Reaction Time

Abstract

Objectives/Goals
Daytime driving is generally safer than driving at night due to an abundance of light. The purpose of this project is to test if there is a relationship between the intensity of light and the reaction time of drivers.

Methods/Materials
1. 1 meter stick
2. Lux meter
3. Night light
4. Volunteers
5. Notebook
6. Computer
7. Pencil

Results
Based on the graph, fifty-five percent had faster reaction time in sunlight and thirty-five percent had faster reaction time in dim light. Meanwhile, the intensity of light did not affect the reaction time for ten percent of the subjects.

Conclusions/Discussion
My hypothesis was correct. I was not surprised that fifty-five percent of my test subjects had faster reaction time in sunlight. Due to the lack of visibility, the test subjects had a slower reaction in dim light then sunlight. Based on the results, it would be advisable for car manufacturers to consider the findings of this project to modify existing headlights.

Summary Statement

The purpose of this project is to test if there is a relationship between the intensity of light and the reaction time of drivers.

Help Received

School allowed me to use their equipment and field

Name(s)	Project Number
Mary C. Monaghan	**J0727**

Project Title

Children's Drawings: A Study to Create an Illusion of Space Using Depth Cues

Abstract

Objectives/Goals

This project's purpose was to determine if the exposure of visual depth cues can improve or have an impact on children's drawings.

Methods/Materials

One-hundred sixteen students ages six to thirteen years were tested. Students were asked to draw six drawings that exhibit an illusion of space (Trial #1). Then students were shown various types of depth cues seen in the real world. Students were then asked to draw the same six drawings again (Trial #2), remembering what was learned from the exposure of visual depth cues. The students were given no directions on how to draw. Each of the 1,392 drawings were scored using a created grading criteria. Totals were recorded for drawings in each trial.

Results

Results show that 89 students (77%) showed improvement in one or more of their drawings from the exposure of depth cues. In contrast, 27 of the 116 students tested (23%) did not show any improvement. Drawings were typical for their developmental stages. The specific drawing that showed the most improvement was shading squares from dark to light adding up to 48 students (41%) with this improvement. The second most common improvement was the placement and/or size of flowers to show depth adding up to 38 students (33%) with this improvement. Results show that as age progresses, the quality of drawings increases as well.

Conclusions/Discussion

Learning by observation and hands on experiences can help with teaching about our world. After students were exposed to depth cues, many experienced an "Ah Ha!" moment or understood that there are many ways to represent an illusion of space. If students were given more time to explore a larger variety of visual depth cues more improvement would be shown. Hands on experiences are important in schools to help students understand how to accomplish tasks. In conclusion, if children explore more with creating an illusion of space, their two-dimensional drawings will begin to show depth.

Summary Statement

My project is about depth cues and their influences to create an illusion of space in children#s drawings.

Help Received

Mother supervised classes that were tested and helped with display board layout.

Name(s)	Project Number
Ujjaini Mukhopadhyay	**J0728**

Project Title

Note Taking: Necessary or Nuisance?

Abstract

Objectives/Goals

The ability to take good notes is crucial for learning and succeeding in school. Based on research, if the number of skills to understand passages is increased, then the comprehension and retention of the passage improves leading to higher test scores.

The objective of my project is to investigate if note-taking actually helps with comprehension, retention, and test-taking at the middle school level and whether the test scores improved with the increase in number of skills used to comprehend the information.

Methods/Materials

Ten test subjects were selected from my eight-grade science class. Nine passages with the short quiz containing 7 to 8 questions were selected for the experiment. The experiment was designed in three parts. Each part consisted of three tests and each part used an increasing number skills. Each test was conducted such that the test environment was the same. In the first part, students were asked to read a passage. After 25 minutes, they were given the short quiz associated with the passage. The entire process was repeated two more times with different passages. In the second part, the same procedure was repeated with three different passages but the test subjects were asked to follow along with the passages read to them. It was again repeated two more times. The last part of my procedure involved students following along and taking notes as the passage was read to them. This was repeated two more times with different passages. The students answered the same number of questions for each part.

Results

After each of the tests were scored, the average percentage of correct answers for the first, second, and third set was computed. The data was also analyzed by using the box-and-whiskers plot. The average percent of correct answers and the range of scores were plotted against the number of skills used. The scores improved remarkably from 22% where students read the passage only to 64% where they took notes along with reading and listening. The median score of the class also improved significantly.

Conclusions/Discussion

The data that was collected and the results of this experiment demonstrated a gradual improvement in the test scores as more and more skills were used. The significant improvement from 22% to 64% supported my hypothesis that taking notes in class reinforces understanding and helps recalling information when required.

Summary Statement

The project is about investigating whether the process of taking notes in class helps middle school students improve their comprehension and retention of information.

Help Received

Mrs. Sarkar helped guide the project. Parents helped with the display board. Mr. Berwald helped conduct the experiment with his students.

Name(s)	Project Number
Keegan Noronha	**J0729**

Project Title

In the Mood: Music Tonality and Its Effect on Happiness

Abstract

Objectives/Goals
The objective is to study the effect of musical tonality on the mood of the listener. My hypothesis is that if a tune is in a minor key, then it is perceived as sadder than if it were in a major key.

Methods/Materials
Two tunes, one major and one minor, were converted into the opposite tonality by changing a few notes. Using "Finale" music scripting software, digital (mp3) files were generated for the original and converted tunes, keeping tempo, rhythm, instruments and other variables constant. A web form was set up, with media objects to allow respondents to hear each tune online and indicate a happiness score on a scale of 1 to 7. Responses were invited by e-mail, and respondents were requested to circulate the URL by e-mail and Twitter.

Results
The major tunes scored much higher on the scale of happiness than the minor tunes. The converted tunes generated stronger feelings than the originals, i.e. the major tune converted to minor was sadder than the minor tune. The 85 invitations I sent out brought in more than 125 responses.

Conclusions/Discussion
Some music experts insist that minor keys on their own do not make music sad, and that many other factors such as tempo and rhythm work together: e.g. Middle Eastern and Gypsy dances are in minor keys. This study shows that tonality on its own does affect the mood of music, at least for the audience I reached. Tonality is used in advertising, e.g. in political advertising, to portray candidates as happy, and their opponents as dismal. It is important to understand how it works.

Summary Statement

This project uses a web survey to test the hypothesis that a tune in a major key sounds happier than a tune in a minor key.

Help Received

Advisor helped with ideas, showed me how to convert major to minor, and helped to set up web response system.

Name(s)	Project Number
Audrey A. Portela	**J0730**

Project Title

The Effects of Distraction on Child Memorization

Abstract

Objectives/Goals
To determine how different forms of distraction effect Child memorization
I will be using music and cartoons as a distraction

Methods/Materials
1. Show child a computer file with a set of 15 random pictures. Give them 30 seconds to memorize as many as they can.
2. Repeat with a new file and new pictures. This time there is a video set to the side (no volume) The video is playing a Scooby-Doo cartoon
3. Repeat with a new file and new pictures. This time they put on earphones and listen to music. The music s Strawberry Fields by the Beatles.

Compare results
I tested 40 kids all together 10 kids from K-3rd grade

Results
The music was the most distracting. The Music was in the middle. The kids did the best with the control. (no distractions)

Music was the most distracting for each grade level.

Conclusions/Discussion
According to my results, music was more distracting than the cartoon.

This shows that kids will have a harder time learning, or memorizing while listening to music.
Should you listen to music while doing homework?

Summary Statement
Determining how distractions effect the way children memorize.

Help Received
teacher - scientific process parents - materials and help put board together

Name(s)	Project Number
Sebastian L. Roeder-Hensley	**J0731**

Project Title

Quick or Slow? Testing Human Reaction Times to Sight and Sound

Abstract

Objectives/Goals
To figure out if people react faster to sight or sound.

Methods/Materials
Materials: 1) Computer program written by Sebastian Roeder-Hensley, testing reaction times to sight and sound; 2) Computer with Mouse; 3) Headphones; 4) Quiet room; 5) Chair; 6) Table; 7) 7 Human test subjects
Methods: 1) Have the test subject do the following:
a) Sit down in quiet room with computer open to Scratch computer program
b) Put on the headphones
c) Click the start button on the computer screen
d) Click the mouse as soon as a red square appears on the screen or a beeping noise is heard
2) Record each reaction time that the computer program automatically displays (in thousandths of a second) after the mouse is clicked.
3) Repeat the testing process 5 times with 7 subjects.

Results
The time averages were always faster for visual reactions. This disproved my hypothesis that people would react faster to sound. Each test subject clicked the computer mouse faster after seeing a red square appear, compared to hearing a beeping noise; this consistency proved that the results were not random, or based on the person taking the test. While some people were slower overall than others, the slower they were with visual reactions, the slower they were with sound reactions. Also, the visual reaction time of 0.276 showed up once with test subject 2, three times with test subject 3, two times with test subject 4, once with test subject 6, and once with test subject 7; no other specific time appeared this much.

Conclusions/Discussion
My original hypothesis was that people would react faster to sound because the noise would startle them more. Based upon my results, the overall sound reaction time average for all test subjects was 0.43, and the overall sight average was 0.33. I now know that people react faster to sight than sound. Based on my averages for each person, I know that I can trust my results because no test subject#s reaction time for visual was greater than his or her reaction time for sound. If I were to dig deeper into this subject, I would investigate whether or not people who cannot hear have a faster visual reaction time than people who can hear, and whether people who cannot see have a faster hearing reaction time than people who can see.

Summary Statement
Do people react faster to seeing an object appear visually or to hearing a noise?

Help Received
Dad helped fix one bug in Scratch computer program after it was created.

Name(s)	Project Number
Zara A. Shariff	**J0732**

Project Title

How the Eye Views and Reads Words

Abstract

Objectives/Goals
The purpose of my project is to determine how the eye reads words. Does the eye read a full word or does it read individual letters? I hypothesized that the brain concentrated on the letters and read words based on memory.

Methods/Materials
I first asked ten human subjects (five boys and five girls) to read two written passages, each passage being 150 words. The first passage had correctly spelled words and the second passage consisted of words of that were transpositioned (the middle letters of the word are jumbled, but the first and last letters remained in the same place). I recorded the amount of time it took the subjects to read each passage and made an average of that to identify the time for the actual experiment. For the actual experiment, I asked 20 subjects (ten girls and ten boys) to read the same two passages. I recorded the following elements: the time it took the subjects to read each passage, the number of errors, the words that were misread and their parts of speech.

Results
After collecting all the data, I calculated the averages of the time, the number of errors, and the specific type of words. The average time (seconds) it took the girls to read the read the first passage was 46, and boys took an average of 47.8 to read the first passage. The total average time for the first passage was 46.9. For the second passage, the girls took an average of 56.3, while the boys average was 57.8. The total average for the second passage was 57.05. The number of errors for both genders was 5.2 words. The average number of errors for the first passage was 0.75, and 1.65 for the second passage.

Conclusions/Discussion
By finishing the experiment, I was able to find out if the eye reads full words or individual letters. I knew that if the eye read individual letters, the subjects would have taken a longer time to read the second passage and they would have got many more words wrong. Another important reason why I concluded that the eye reads the full word is because many people had gotten the word raced and locked wrong in the transpositioned passage. This must mean that those two transpositioned words can create more than one word, such as cared (for raced) and clocked (for locked).

Summary Statement
Does the eye read the full word or does it read individual letters?

Help Received
Sister helped proofread, Family friend helped proofread.

Name(s)

Sarah M. Shine

Project Number

J0733

Project Title

Anything Boys Can Do Girls Can Do Better! The Effect of Gender on Optical Illusion Perception

Abstract

Objectives/Goals
The objective of this experiment was to measure the effect of gender on optical illusion perception. The hypothesis was that if the subject's gender was female, she would be more adept at recognizing the optical illusions than a male subject.

Methods/Materials
Materials: stopwatch (cell phone), blue masking tape, pencil, ten fifth-grade boys, ten fifth-grade girls, ten optical illusions, blank sheet of paper, shadow box, clipboard, data sheet, measuring tape, assistant
Methods: Ten optical illusions (black-and-white) were placed in a shadow box. Twenty fifth-graders were tested over a span of two days. Ten of these subjects were male and ten were female. One at a time, the subjects looked at the illusions for ten seconds each. After each illusion, the subject answered a question about what they had just seen. The answers were then recorded on a data sheet.
Experimental Design: Over the course of two days, twenty subjects were tested. Of those twenty, ten were female and ten were male. The researcher tested each subject and recorded his or her answers as correct, half-correct, or wrong. The data were then added up and used to make conclusions. In order to control all variables excluding gender, all subjects were the same age, looked at the illusions for the same amount of time, were the same distance from the illusion, and had their faces level with the box.

Results
The results of the data collected show that female subjects had a total of 44.5 correct answers and that male subjects had a total of 43.5 correct answers each. However, the results varied on the different illusions. On some the boys had a higher score, on some the scores were the same, but on most, the girls were more accurate.

Conclusions/Discussion
The results support the hypothesis that female subjects would have a more acute perception of optical illusions than male subjects. The two genders had an overall difference of one point however, so the results were inconclusive. This project is meant to help adolescents and their teachers by learning more about the human brain and the differences between genders.

Summary Statement

This project was done to identify some of the differences between genders, specifically pertaining to optical illusions.

Help Received

Mother helped put together board, Sister helped with data sheet, Used 5th grade test subjects from Union Hill School

CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)	Project Number
Samantha Smith; Julia Vasquez	**J0734**

Project Title

What Do You See?

Abstract

Objectives/Goals

The purpose of our experiment is to see whether the eye color affects a persons ability to see different colors through dark light. We believe a darker eye color will see better in the dark because they have more rod cells.

Methods/Materials

Materials List:red, orange, yellow, green, blue, and purple construction paper, 10 (5 female 5 male) people per eye color, a room equivalent to 4ft by 5ft, Light meter-lux measurement tool by Vlad Polyanskiy app, measuring tape, science fair notebooks, colorblind test, timer, ipod or iphone, tape. Method:Before we actually started testing, we had to check and see whether our subjects are colorblind or not. We did this by using one color blind test. If they got it wrong, we were not able to use them in our experiment. Next, we organized the people we were going to use by categorizing them into 3 groups, brown, blue and hazel eyed. There was ten people in each group, five were female and the other five male. After, we were finally able to start the actual testing by taping the 6 construction papers to the wall and marking a line for the people to stand on, 3.5 feet away from the wall. Then we asked them to bow down their heads as one of us escorted them to the line. While inside the closet, one of us asked them to tell us what color they saw. Another person was outside the closet timing them for a total of 30 seconds and would knock on the door when their time was up. This person would also record the data given from the team memeber inside the closet.

Results

Our test results showed that the people with brown eyes did the best at identifying the six different colors, especially the color blue since 90% of the 10 people identified it. At identifying the other colors they scored no lower than a 60%. Blue eyes were able to recognize most of the colors but was short 40% for purple, causing the average to be a little lower than the brown eyed people. All the other colors they recognized well. hazel didn't do nearly as well, but got the best percentage for the color purple, 80%, and unfortunately failed at figuring out most of the other colors.

Conclusions/Discussion

Results showed that brown eyes did the best because they had more rod cells than blue and hazel eyes do.The brown eyed people's average was about 70% which was the highest percentage out of the other eye colors. Our hypothesis was correct because we thought that brown eyes would see the colors the best in the dark.

Summary Statement

My partner and I were testing which eye color could see different colors in the dark the best.

Help Received

Our science teacher corrected and revised our work that went our report and on our board.